



STUDY ON THE ACCULTURATION IN TRADITIONAL VERNACULAR
HOUSES BETWEEN VIETNAMESE AND THE CHAMS IN THE MIDDLE
REGION OF VIETNAM (16TH- 18TH CENTURIES)



A Thesis Submitted in Partial Fulfillment of the Requirements
for Doctor of Philosophy HISTORY OF ARCHITECTURE
Department of Architecture and Related Arts

Silpakorn University
Academic Year 2025

Copyright of Silpakorn University



วิทยานิพนธ์นี้เป็นส่วนหนึ่งของการศึกษาตามหลักสูตรปรัชญาดุษฎีบัณฑิต

สาขาวิชาประวัติศาสตร์สถาปัตยกรรม แบบ 1.1

ภาควิชาศิลปสถาปัตยกรรม

มหาวิทยาลัยศิลปากร

ปีการศึกษา 2568

ลิขสิทธิ์ของมหาวิทยาลัยศิลปากร

STUDY ON THE ACCULTURATION IN TRADITIONAL
VERNACULAR HOUSES BETWEEN VIETNAMESE AND THE
CHAMS IN THE MIDDLE REGION OF VIETNAM (16TH- 18TH
CENTURIES)

By
Mr. Son Dinh CAO



A Thesis Submitted in Partial Fulfillment of the Requirements
for Doctor of Philosophy HISTORY OF ARCHITECTURE
Department of Architecture and Related Arts
Academic Year 2025
Copyright of Silpakorn University

Title Study on the Acculturation in Traditional Vernacular Houses
between Vietnamese and the Chams in the Middle Region of
Vietnam (16th- 18th Centuries)
By Mr. Son Dinh CAO
Field of Study HISTORY OF ARCHITECTURE
Advisor Assistant Professor Pratima Nimsamer, Ph.D.
Co advisor Le Vinh An, Ph.D.

Faculty of Architecture, Silpakorn University in Partial Fulfillment of the
Requirements for the Doctor of Philosophy

..... Dean of Faculty of
(Associate Professor Apiradee Kasemsook, Ph.D.) Architecture

Approved by

..... Chair person
(Associate Professor Chotima Chaturawong, Ph.D.)

..... Advisor
(Assistant Professor Pratima Nimsamer, Ph.D.)

..... Co advisor
(Le Vinh An, Ph.D.)

..... Committee
(Associate Professor Nuanlak Watsantachad, Ph.D.)

..... External Examiner
(Professor Warunee Wang, Ph.D.)

620230021 : Major HISTORY OF ARCHITECTURE

Keyword : Acculturation, Vernacular House, Middle Region, Champa, Vietnamese

Mr. Son Dinh CAO : Study on the Acculturation in Traditional Vernacular Houses between Vietnamese and the Chams in the Middle Region of Vietnam (16th-18th Centuries) Thesis advisor : Assistant Professor Pratima Nimsamer, Ph.D.

This thesis examines the vernacular houses of Vietnam's Middle Region—specifically Types B, C, and D—as enduring outcomes of sustained intercultural encounters between Vietnamese settlers and the indigenous Cham communities from the sixteenth to eighteenth centuries. These houses are interpreted not merely as architectural forms, but as cultural artifacts that embody negotiation, adaptation, and continuity across centuries of shared habitation.

The research reconstructs a tripartite process of acculturation. First, during the stage of Exchange and Symbiosis, early coexistence facilitated the selective incorporation of Cham construction techniques into Vietnamese frameworks, enabling both groups to respond to common environmental challenges. Second, the Early hybrid stage generated transitional types such as Type D and early Type C houses, which combined Vietnamese floor plans with Cham-inspired truss systems and double-roofing methods. Finally, in the Later mature stage, late Type C houses consolidated a distinctly Vietnamese identity while strategically retaining Cham-derived elements that enhanced structural performance and climatic adaptability. This developmental sequence underscores how architectural innovation emerged through cultural dialogue rather than unilateral assimilation, balancing symbolic expression with technical resilience and environmental responsiveness.

The thesis further documents endangered indigenous knowledge systems, including traditional clay roofing methods, the use of *Keo* diagonal beams, and specialized carpentry tools, situating them within broader processes of technical adaptation. Artisan guilds are shown to have functioned as crucial mediators in standardizing and transmitting hybrid forms, extending their influence beyond domestic spaces into civic and ceremonial architecture, such as *dinh* halls and selected imperial structures. By tracing these networks, the research highlights how vernacular practices informed state-level architectural expression, linking local building traditions with imperial aspirations.

Methodologically, the thesis integrates typological classification, spatial and structural analysis, and contextual interpretation, thereby generating a framework that connects empirical documentation with theoretical reflection. Placing the Vietnamese–Cham exchange within the wider Southeast Asian patterns of cultural interaction, migration, and innovation, the research contributes to comparative scholarship on hybridity, identity formation, and

resilience in vernacular traditions.

Beyond its historical insights, the thesis bears contemporary relevance. Its findings provide evidence-based strategies for conservation, restoration, and adaptive reuse, offering ways to reconcile cultural preservation with sustainability imperatives in the face of climate change and modernization pressures. Academically, the study enriches architectural and heritage curricula, supports professional training programs, and empowers community-based initiatives. More broadly, it advances a transferable methodological model for analyzing climate-responsive, culturally embedded architectures across regions, positioning Vietnam's Middle Region as a valuable case study in the global discourse on architectural hybridity and heritage conservation./.



ACKNOWLEDGEMENTS

First and foremost, I would like to express my deepest gratitude to the Almighty for the strength and perseverance granted throughout this challenging, yet profoundly rewarding, journey.

My sincere appreciation is extended to my advisor, Assistant Professor Pratima Nimsamer, PhD, and my co-advisor, An Vinh LE, PhD, for their insightful feedback, expert guidance, and continuous motivation. Their academic rigor and dedication have been instrumental in shaping my research and bringing this dissertation to fruition.

I am profoundly grateful to the Faculty of Architecture, Silpakorn University, the PhD program professors, and the administrative staff for providing a world-class academic environment, excellent facilities, and the necessary resources that facilitated this extensive research project.

I also wish to extend my sincere thanks to the Faculty of Architecture at Van Lang University—my home institution—for their unwavering support, understanding, and encouragement during my research leave and the final stages of my Ph.D. journey.

Lastly, I wish to extend my deepest appreciation to my beloved family and relatives. To my parents, for their unconditional love, sacrifices, and unwavering belief in my potential; their support has been the foundation of my life and achievements. To my wonderful wife and my dear children, for their endless patience, understanding, and boundless love.

Finally, I would like to thank all friends, colleagues, and everyone who has offered their support and kindness along the way.

Son Dinh CAO

TABLE OF CONTENTS

	Page
ABSTRACT	D
ACKNOWLEDGEMENTS	F
TABLE OF CONTENTS.....	G
LIST OF TABLES	L
LIST OF FIGURES	M
Chapter One Introduction.....	1
1.1 Study background.....	1
1.2 A brief history, geography, and culture of the Middle Regions of Vietnam	8
1.2.1 The establishment of the kingdom of Cochin-China (16th – 18th).....	8
1.2.2 Geographical features of the Regions.....	14
1.2.3 The main Residents of the Regions and their Cultural characteristics	18
1.3 Previous studies	23
1.4 Gaps in Research and Significance of Research.....	24
1.5 Area of study	27
1.6 Research Aims and Objectives.....	33
1.7 Structure of the Thesis	35
1.8 Chapter conclusion 1	42
Chapter Two The State of Knowledge on Vernacular Houses in Vietnam and Concepts of Acculturation	44
2.1 Indigenous people and their traditional housing in Vietnam	44
2.1.1 Vietnamese culture and their traditional housing	44
2.1.2 Chams culture and their traditional housing	54
2.2 Studies of vernacular houses in the Middle Region of Vietnam.....	59
2.2.1 Domestic studies.....	59
2.2.2 Foreign studies.....	64
2.3 Theory and Concepts of Acculturation.....	71

2.3.1 Acculturation theory in the Global context.....	71
2.3.2. Acculturation in Architecture and Heritage studies.....	73
2.3.3 Acculturation phenomenon between Vietnamese and the Chams.....	74
2.3.4 Acculturation in the field of Socio-culture of Vietnamese and the Chams	80
2.3.5 Acculturation in Vernacular Architecture of Vietnamese and the Chams	82
2.4 Necessary of the study topic.....	85
2.5 Chapter conclusion 2	86
Chapter Three Research Methodology	90
3.1 Research approach and scope of the site investigation.....	90
3.2 Research methods	95
3.2.1 Literature reviews.....	95
3.2.2 Data collection.....	96
3.2.3 Data analysis.....	101
3.3 Chapter conclusion 3	103
Chapter Four Characteristics of the Vernacular Houses in the Middle Region.....	106
4.1 An introduction to the Vernacular houses.....	106
4.2 The Nha Ke-Bay (Type A).....	107
4.2.1 Architectural concept.....	107
4.2.2 Site plan, layout of the house and orientation	111
4.2.3 Floor plan, spatial arrangement and entrance.....	113
4.2.4 Building structure and feature of the truss	115
4.2.5 Roofing technique and materials	118
4.2.6 An architectural form and façade composition	119
4.3 The Nha Roi (Type B)	120
4.3.1 Architectural concept.....	120
4.3.2 Site plan, layout of the house and orientation	121
4.3.3 Floor plan, spatial arrangement, and entrance.....	122
4.3.4 Building structure and feature of the Truss.....	129

4.3.5 Roofing technique and materials	130
4.3.6 An architectural form and façade composition	133
4.4 The Nha Ruong (Type C).....	135
4.4.1 Architectural concept.....	135
4.4.2 Site plan, layout of the house and orientation	138
4.4.3 Floor plan, spatial arrangement and entrance.....	139
4.4.4 Building structure and feature of the Truss.....	145
4.4.5 Roofing technique and materials	147
4.4.6 An architectural form and façade composition	149
4.5 The Nha La Mai (Type D)	151
4.5.1 Architectural concept.....	151
4.5.2 Site plan, layout of the house and orientation	152
4.5.3 Floor plan, spatial arrangement and entrance.....	153
4.5.4 Building structure and feature of the Truss.....	156
4.5.5 Roofing technique and material.....	157
4.5.6 An architectural form and façade composition	159
4.6 Comparative analysis of Vernacular houses	160
4.6.1 Entrance orientation and spatial symbolism.....	161
4.6.2 Number of compartments and spatial organization	161
4.6.3 Column arrangement per Truss	161
4.6.4 Truss typology and structural expression.....	162
4.6.5 Roofing techniques and climatic adaptation	162
4.7 Chapter conclusion 4	164
Chapter Five Tradition in the Construction of Vernacular Houses	166
5.1 Migration, cultural exchange, and craft tradition	166
5.2 Traditional ceremonies in Construction works of the Regions	167
5.2.1 “Le Phat Moc”: Wood-cutting ceremony (Vietnamese).....	167
5.2.2 “Le Dong Tho”: Foundation ceremony (Vietnamese and Chams).....	169

5.2.3 “Le Dat Da Tang”:	Basement stone placement ceremony (Vietnamese and Chams)	170
5.2.4 The “Le Thuong Tru”:	Wooden frame erection ceremony (Vietnamese and Chams).....	171
5.2.5 The “Le Thuong Luong”:	The Main ridge beam raising ceremony (Vietnamese and Chams)	172
5.2.6 The “Le Gai Noc”:	Roofing commencement ceremony (Vietnamese and Chams)	174
5.5.2	The technical origins of the design methods.....	175
5.2.7 The “Le Nhap Trach”:	Housewarming ceremony (Vietnamese)	177
5.2.8 The “Le An Vi”:	Ancestor welcoming ceremony (Vietnamese).....	179
5.2.9 The “Le Tong Moc”:	Ceremony of expelling evil spirits (Vietnamese)	180
5.2.10 The “Le Tan Gia”:	New house completion celebration (Vietnamese and Chams)	181
5.3	Used materials and roofing techniques	182
5.3.1	Used material evolution	182
5.3.2	Comparative roofing techniques.....	188
5.4	The ways of traditional Carpenters in design.....	193
5.4.1	Design method of the Vietnamese carpenter in the northern region	193
5.4.2	Design method of the Vietnamese carpenter in the middle region.....	200
5.4.3	Design method of the Cham’s carpenter in the south-middle region	205
5.5	Comparison and discussion of their technical origins	210
5.5.1	Regarding carpentry designing tools	210
5.6	Chapter conclusion 5	213
Chapter Six	Aspects of Acculturation in the Vernacular Houses	219
6.1	Geographical, cultural, and social aspects	219
6.2	The used-spatial habitation.....	221
6.3	Carpenter’s tools and Design method.....	224
6.4	Constructional technique.....	226
6.5	Architectural scale and aesthetic	227
6.6	Chronology.....	229

6.7 Chapter conclusion 6	230
Chapter Seven Discussion on the Acculturation in the Vernacular Houses	233
7.1 The Stage of Exchange and Symbiosis.....	233
7.2 The Early hybrid stage of acculturation.....	235
7.3 The Later mature stage of acculturation	236
7.4 Regarding the physical changes of the vernacular house since then to now ..	238
7.5 Chapter conclusion 7	239
Chapter Eight Conclusion and Future Directions.....	244
8.1 Study results	244
8.2 Contribution of the study	246
8.3 Academic significance of the study.....	247
8.4 Applicability of the study.....	249
REFERENCES.....	251
Appendices.....	258
Appendix AI: The inventories of the vernacular house in the study area	258
Appendix AII:The documents of the vernacular house in Northern of Vietnam..	320
Appendix AIII: the images about survey the vernacular house and Cham culture in the middle region of Vietnam	324
Appendix AIV: Table of Key Terminologies	339
VITA.....	345

LIST OF TABLES

	Page
Table 1: List of the investigated Vernacular houses in the Middle regions.....	93
Table 2: List of the interviewed Traditional Master Carpenters in the regions.	100
Table 3 Comparative observation among the vernacular houses	161
Table 4: Synthesize information about the similarities and differences among the Type A, Type B, Type C, and Type D.....	163



LIST OF FIGURES

	Page
Figure 1: The Map of Vietnam nowadays (excluding the archipelagos and offshore islands).....	3
Figure 2: The Northern (Bac Ky = Tonkin), Central (Trung Ky = Annam), and Southern regions (Nam Ky = Cochin-china) of Vietnam during the French conquest (1884-1945) under the Nguyen Dynasty	4
Figure 3: Early 14th century (A part was cut to Dai Viet).....	11
Figure 4: 16th – 18 th centuries (Kingdom of Cochin-China).....	11
Figure 5: 19 th – 20 th centuries (Kingdom of Vietnam)	11
Figure 6 :Frontier map of Cham-Pa kingdom during the periods.....	13
Figure 7 : Geographical features of the Middle regions.....	15
Figure 8 Map of the Middle Region of Vietnam.....	29
Figure 9: Study areas in the North-Middle Region of Vietnam.....	30
Figure 10: Study areas in the South-Middle Region of Vietnam.....	30
Figure 11: Floor plan of the “Nha Roi” and the “Nha Ruong”.....	49
Figure 12: Structure of the “Nha Roi” and the “Nha Ruong”.....	49
Figure 13: Structure of “Nha Roi” (Type B).....	49
Figure 14: Structure of “Nha Ruong” (Type C).....	49
Figure 15: Structure of “Nha La Mai” (Type D).....	50
Figure 16: Feature of “Vi “Keo”” trusses of the “Nha Roi” (B), “Nha Ruong” (C) and their variation types (B’ and C’)	50
Figure 17: Site Plan of Vietnamese residence in the Middle Region of Vietnam	52
Figure 18: The Green-tree-fence, Gateway and the Main house.	53
Figure 19: Front screen and Water tank.....	53
Figure 20: Site Plan of the Chams residence in Ninh Thuan Province.	57
Figure 21: The residence bounded by the Dry-tree-fence.	57
Figure 22: Main gateway of the Chams housing.....	58

Figure 23: The Van Mieu Temple worship for Confucius (Hue City, Thua Thien Hue Province).....	75
Figure 24: The Thien Mu Pagoda (Pagoda of the Celestial Lady) worship for Buddhist in Hue City, Thua Thien Hue Province	75
Figure 25: The Po Klong Galai Cham’s Tower in Phan Rang City, Ninh Thuan Province.	76
Figure 26: The interior of Po Klong Galai Cham’s Tower.....	76
Figure 27: The Cham’s stone reliefs at the Chien Dan Tower in Quang Nam Province.	77
Figure 28: Linga Shiva stone sculpture at the Chien Dan Tower.	77
Figure 29: Location of the Vernacular houses in the Middle Region (namely Type B is Nha Roi, Type C is Nha Ruong, and Type D is Nha La Mai).....	95
Figure 30: Floor plan of the “Nha Ke-Bay” (Type A).....	109
Figure 31: Across section of the “Nha Ke-Bay” (Type A).....	109
Figure 32: Elevation of the “Nha Ke-Bay” (Type A), case of Mr. Le Duy Bao’s house, Kim Son village, Hoang Tien commune, Hoang Hoa district, Thanh Hoa province, constructed 1742.	110
Figure 33: Feature of a truss of the “Nha Ke-Bay” (Type A).....	110
Figure 34: Features of the “Ke-Bay” curve-shaped-diagonal beam and its relationship with the roof slope.....	117
Figure 35: Floor plan of the “Nha Roi” (Later Type B), case of the house of Mr. Nai Nha, Phuoc Huu village, Phuoc Hau commune, Ninh Phuoc district, Ninh Thuan province (see Table 1, no. 59).....	124
Figure 36: Across section of the “Nha Roi” (Later Type B) with the main column placed at the central of the truss.	124
Figure 37: Front view of the “Nha Roi” (Early Type B), entrance in the direction of gable, house of Mr. Nai Nha, Phuoc Huu village, Phuoc Hau commune, Ninh Phuoc district, Ninh Thuan province (see Table 1, no. 59).....	125
Figure 38: The truss of the “Nha Roi” (Early Type B).....	125
Figure 39: The reused-wooden frame of the “Nha Roi” (Early Type B) in Vietnamese’s house	126
Figure 40: Another simple truss of the “Nha Roi” (Early Type B) in Cham’s house	126

Figure 41: Primary technique using bamboo and tree branch in the “Nha Roi” (Early Type B)	127
Figure 42: Front view of the “Nha Roi” (Later Type B), house of Mr. Quang Dai Hoang, Phuoc Dong 1 village, Phuoc Hau commune, Ninh Phuoc district, Ninh Thuan province (see Table 1, no. 62).....	127
Figure 43:: The truss of the “Nha Roi” (Later Type B), entrance in the direction across the top-ridge beam, house of Mr. Quang Dai Hoang.....	128
Figure 44:: The double roofed layers of the later Type B, above mentioned house of Mr. Quang Dai Hoang’s family.....	131
Figure 45: The space-gap between the double roofed-layers of the later Type B (above mentioned house of Mr. Quang Dai Hoang’s family).....	132
Figure 46:The original decorative motifs on the main doors of the Cham’s house (above mentioned house of Mr. Nai Nha’s family).....	134
Figure 47: The original decorative motifs on the windows of the Cham’s house (house of Mr. Nai Nha’s family)	134
Figure 48:: The Vietnamized decorative motifs on the main doors of the Cham’s house (case of the house of Mrs. Luu Thi Trang’s family, see Table 1, no. 60)	135
Figure 49: Vietnamized decorative motifs on the windows of the Cham’s house (case of the house of Mrs. Luu Thi Trang’s family, see Table 1, no. 60)	135
Figure 50:Location of the “Ram Thuong” upper floor	136
Figure 51: Floor plan of “Nha Ruong” (Later Type C), case of Mr. Le Hoi’s house, Kim Long village, Hue City, Thua Thien Hue province (see Table 1, no. 17).....	140
Figure 52:Cross section of “Nha Ruong” (Later Type C), case of Mr. Le Hoi’s house, Kim Long village, Hue City, Thua Thien Hue province (see Table 1, no. 17). (Source: An Khang company).....	141
Figure 53: Front view of “Nha Ruong” (Later Type C), case of Mr. Le Hoi’s house, Kim Long village, Hue City, Thua Thien Hue province (see Table 1, no. 17).....	141
Figure 54: Wooden structure of the “Nha Ruong” (Later Type C), case of Mr. Le Hoi’s house, Hue City, Thua Thien Hue province (see Table 1, no. 17).	142
Figure 55: Cross section of the “Nha Ruong” (Early Type C), case of the “An Hien” Garden House, 58 Nguyen Phuc Nguyen Street, Huong Long Ward, Hue City (2014)	142

Figure 56: Front façade of the “Nha Ruong” (Early Type C), case of the “An Hien” Garden House, 58 Nguyen Phuc Nguyen Street, Huong Long Ward, Hue City (2014)	143
Figure 57: Wooden structure of the “Nha Ruong” (Early Type C), case of the “An Hien” Garden House, 58 Nguyen Phuc Nguyen Street, Huong Long Ward, Hue City (2014).....	143
Figure 58: Feature of the “Keo” straight-shaped-diagonal beam and its relation to the roof slope (Early Type C)	147
Figure 59: Using bamboo as a roof-structure for thatched roofing (Early Type C)..	148
Figure 60: Using wood as a roof-structure for tiled roofing (Later Type C).....	148
Figure 61:: Floor plan of the “Nha La Mai” (Type D), case of Mrs. Le Thi Tam house, Dong Xuan district, Phu Yen province (see Table 1, no. 58).	154
Figure 62: Cross section of the “Nha La Mai” (Type D), case of Mrs. Le Thi Tam house, Dong Xuan district, Phu Yen province (see Table 1, no. 58).	154
Figure 63:Double roofed layers of the “Nha La Mai” (Type D), case of the House collected from Ninh Phuoc district, Ninh Thuan province, displaying at the Ethnology Museum of Vietnam.	155
Figure 64: Fundamental-based roof layer of the “Nha La Mai” (Type D) made of bamboo mixed clay, collected house from Ninh Phuoc district, Ninh Thuan province, displaying at the Ethnology Museum of Vietnam.....	155
Figure 65: “Le Thuong Luong” main ridge-beam raising ceremony of the Chieu Kinh Dien Temple (Thai Mieu area - Hue Imperial City), 2013.....	173
Figure 66: Bamboo-wooden house (Stage 2), case of Mrs. Hoang Thi Loan’s house in Hoang Tru Village, Nam Dan District, Nghe An Province	184
Figure 67:Truss of Bamboo-wooden (Stage 2).....	185
Figure 68: Interior of Wooden house 01 (Stage 3), case of Mr. Nguyen Sinh Sac’s house in Kim Lien Village, Nam Dan District, Nghe An Province	185
Figure 69: Interior of Wooden house 02 (Stage 2 & 3), case of Mr. Nguyen Sinh Sac’s house in Kim Lien Village, Nam Dan District, Nghe An Province.....	186
Figure 70:Wooden house and brick walls (Stage 5), case of Mrs. Nguyen Thi Tuy’s house, Phu Mong Village, Kim Long Ward, Hue City, Thua Thien Hue Province..	186
Figure 71: Truss of Wooden house (Stage 5), case of Mrs. Nguyen Thi Tuy’s house, Phu Mong Village, Kim Long Ward, Hue City, Thua Thien Hue Province.....	187

Figure 72:Interior of Wooden house (Stage 5), case of Mrs. Ngo Thi Chau’s house in Thuy Phu Commune, Huong Thuy District, Thua Thien Hue Province (2014) (Source: An Khang company).....	187
Figure 73: Ancestor Altar of the Wooden house (Stage 5), case of Mrs. Ngo Thi Chau’s house in Thuy Phu Commune, Huong Thuy District, Thua Thien Hue Province (2014).	188
Figure 74: Technique of single-roofed layers of Nha Ke-Bay (Type A)	189
Figure 75: The tiles putted direct on the rafters of Nha Ke-Bay (Type A).....	189
Figure 76:Technique of double-roofed layers of Nha La Mai (Type D).	190
Figure 77: Distance between the Two-roof layers of Nha La Mai (Type D)	190
Figure 78: An unusal single-roofed layers of vernacular house in the Middle Regions (Case of the town house in Hoi An ancient city, Quang Nam Province, Vietnam)..	192
Figure 79: Technique of multi-roofed layers of Nha Ruong (Type C).	192
Figure 80: Consolidated layer of clay for multi-roofed layers of Nha Ruong (Type C). (Source: Author).....	193
Figure 81: Feature of the “Thuoc Sam” (Ruler A).....	194
Figure 82:The use of Ruler A.....	195
Figure 83: Relevant tools used for design.....	195
Figure 84: Design method of northern region’s vernacular architecture (according to the carpenters in the northern region).....	198
Figure 85: Analysis of the cross-section of the typical northern region’s vernacular architecture (Ly Nhan District, Ha Nam Province).....	198
Figure 86: Feature of the “Thuoc Nach” (Ruler B).....	201
Figure 87: The remaining Ruler B of the carpenter	201
Figure 88:The use of Ruler B with Plumblin e	201
Figure 89: The use of Ruler B to fix the roof slope.....	201
Figure 90: Design method of the middle region’s vernacular architecture (according to the carpenters in middle region).....	203
Figure 91: Analysis of the cross-section of the typical middle region’s vernacular architecture (Phu Vang District, Thua Thien Hue Province).....	203
Figure 92: Feature of “Thuoc Nac” (Ruler C)	206
Figure 93: Carpenter Nai Nha	207

Figure 94: Carpenter Dang Ngoc	207
Figure 95: Design method of the Cham’s vernacular house in Ninh Thuan Province (Source: An, L.V. & Son, D. C., (2023), p.24)	209
Figure 96: “Lu Ban Xich” Rule.....	211
Figure 97: “Khuc Xich” Ruler	211
Figure 98: “Truc Xich” Ruler	211
Figure 99: “Thuy Binh” Tool.....	211
Figure 100: Poklong Garai Tower (13 th century) in Phan Rang City, Ninh Thuan Province, Vietnam.....	213
Figure 101: Geometrical analysis of the East elevation of the Tower (13 th century).....	213
Figure 102: The “Kumano Hongu Taisha” Shrine, Wakayama prefecture, Japan (1889).....	222
Figure 103: The “Osu Kannon” pagoda, Nagoya City, Aichi prefecture, Japan (re- located 1612).....	222
Figure 104: The “Giac Luong” pagoda, Thua Thien Hue province, Vietnam (1533s)	223
Figure 105: The Shine of Duong No Dinh communal hall, Thua Thien Hue province, Vietnam (1471)	223
Figure 106: The “Xieng Thong” pagoda, Luang Prabang, Laos (constructed 1560.)	223
Figure 107: The “Wat Phatum Wanaram” pagoda of the Grand Palace, Thailand (constructed 1857).....	223
Figure 108: The “Ba Penh” pagoda, Phnom Penh, Cambodia (1373)	223
Figure 109: The “Mingun Pahtodawgyi” monastery, Mandalay, Myanmar (1790s)	223
Figure 110: Diagraming of the Acculturation Process in the Middle Region of ftnam.	241
Figure 111: The similarity in the feature of the trusses among types of architecture.	242

Chapter One

Introduction

Middle region of Vietnam represents a dynamic cultural and geographical transition zone where Northern Vietnamese settlers and indigenous Cham communities interacted and gradually shaped distinctive architectural traditions. The vernacular houses of this region embody this process of adaptation and cultural synthesis, reflecting both inherited and localized design values. This chapter outlines the foundation of the research by introducing the historical, geographical, and cultural background of The Middle Region of Vietnam, reviewing previous studies, and identifying key research gaps. It also defines the study area, research aims, and objectives, providing a logical framework for the thesis. The final section presents the overall structure of the dissertation, guiding readers through the subsequent chapters and clarifying how the study contributes to understanding architectural acculturation in Vietnam's vernacular housing tradition.

1.1 Study background

Vietnam, a peninsula country located at the geographic center of Southeast Asia, encompasses a total land area of 331,212 km² ranking 65th globally in terms of territorial size. The country's land boundaries extend 4,639 km, adjoining China to the north, Laos to the northwest, and Cambodia to the southwest, while its maritime borders are defined by the Gulf of Thailand, the Gulf of Tonkin, and the East Sea (see Figure 1).

As of June 2024, Vietnam's population is estimated at 99.48 million. The cultural heritage of the nation is the product of a long historical trajectory, shaped by the convergence of two prehistoric civilizations: the Dong Son Culture in the north and the Sa Huynh Culture in the south. This integration has given rise to a complex and diverse cultural landscape, characterized by rich traditions and distinctive architectural expressions. The study area is situated within a region historically identified as a significant hub of intercultural exchange, where local traditions have continuously interacted with external influences from various cultural spheres. (Tran, 2003, pp. 3-5)

The Middle Region of Vietnam, in particular, forms a narrow coastal plain bordered by the Truong Son Mountain range to the west and the East Sea

to the east. While its geographic position has historically facilitated maritime trade and cultural connectivity, it is also subject to the constraints of a tropical monsoon climate. This climatic regime is marked by pronounced seasonality and extreme weather events, including prolonged droughts, tornadoes, flash floods, and typhoons. Consequently, the central coastal zone represents both a critical area of cultural significance and one of considerable environmental vulnerability.

Geographically, the Middle Region of Vietnam is defined by distinct natural boundaries that have profoundly shaped its patterns of settlement and architectural traditions. To the north, it is bordered by Quang Binh Province, which faces Ha Tinh Province beyond the Gianh River. To the south lies Binh Thuan Province, opposite Binh Phuoc Province, marking the transitional zone into the southeastern region. The eastern boundary is formed by the East Sea, offering extensive coastal frontage and access to maritime trade routes, while the western frontier adjoins the territories of Laos and Cambodia along sections of the Truong Son Mountain range (see Figure 2, 7, 8, 9).

Stretching longitudinally from north to south, the region is characterized by a chain of narrow alluvial plains separated by rugged mountain passes that extend toward the sea. These plains, though limited in width, are enriched by fertile soils deposited by river systems originating in the Truong Son range. Flowing through steep valleys, these rivers discharge into the East Sea, sustaining agricultural production and settlement in otherwise topographically constrained areas.

The region's geographical form also exerts a strong influence on its climatic conditions. The narrow coastal plains, flanked by high mountains and open to the sea, are highly susceptible to the impacts of the tropical monsoon climate. Seasonal variations are marked by prolonged dry periods and intense wet seasons, often accompanied by extreme weather events such as typhoons, flash floods, and coastal erosion. These environmental pressures have historically compelled local communities to adapt their building practices—most notably in the design and orientation of traditional timber-frame architecture—to enhance durability, ensure ventilation, and mitigate climatic risks. Thus, the region's distinctive topography, hydrology, and climate form an interrelated framework within which its cultural and architectural heritage has developed.

Middle Region of Vietnam was historically the domain of the kingdom of Champa, which existed for nearly 15 centuries. The southern expansion of the Vietnamese began in the 14th century. Still, a significant turning point occurred when Lord Nguyen Hoang established the Thuan Hoa Prefecture in 1558, initiating civil migration activities to establish the new kingdom of Cochinchina (also known as the Kingdom of Dang Trong governed by Nguyen Lords)(Li, 1998, pp. 11-17,139-154; The National Department of History of Nguyen Dynasty, 2002, p. 107). This kingdom was a foundation for the subsequent establishment of the Kingdom of Vietnam under the Nguyen Dynasty (see Figure 1, 2) (Pluvier, 1995, pp. map 1, 12,28,29)



Figure 1: The Map of Vietnam nowadays (excluding the archipelagos and offshore islands)

(Source : <https://ontheworldmap.com/vietnam/vietnam-road-map.html>)

The territory land of the kingdom of Champa extending along the narrow central coast and supported by a network of riverine and coastal trade routes, was a significant cultural and political entity in mainland Southeast Asia. Its society was characterized by a synthesis of indigenous traditions and external influences, particularly from Indic civilizations, which were reflected in its religion, art, and architecture.

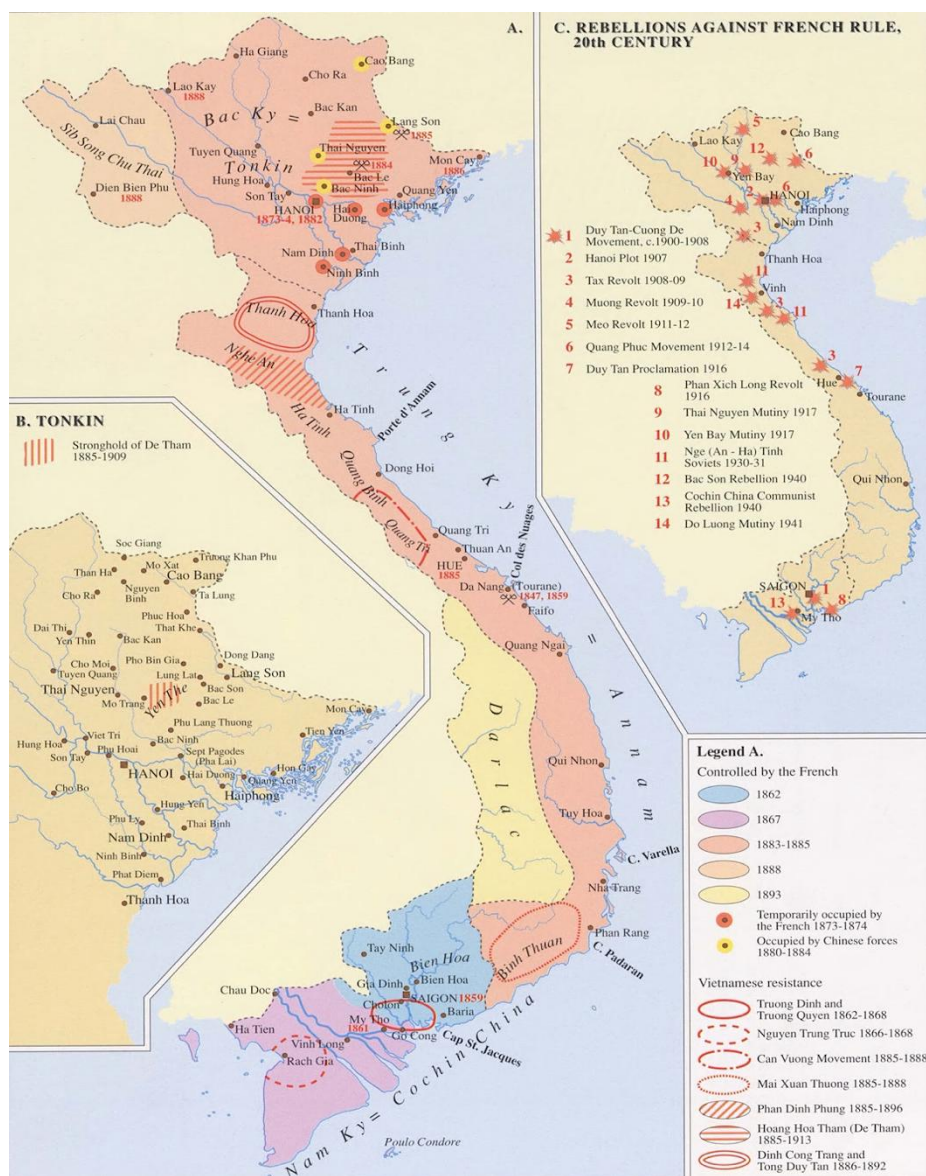


Figure 2: The Northern (Bac Ky = Tonkin), Central (Trung Ky = Annam), and Southern regions (Nam Ky = Cochin-china) of Vietnam during the French conquest (1884-1945) under the Nguyen Dynasty (Source : Jan M, Pluvier., (1995), map 45)

Vietnamese territorial expansion into this region began as early as the 14th century through intermittent military incursions and frontier settlement. However, the process remained gradual and sporadic until a decisive turning point occurred in 1558, when Lord Nguyen Hoang—appointed by the Le Dynasty—was sent to govern Thuan Hoa Prefecture. This political maneuver not only consolidated Vietnamese administrative control over the northern portion of the former Champa territories but also marked the beginning of organized southward migration on a large scale.

Under Lord Nguyen Hoang's leadership, strategic civil resettlement initiatives were implemented to populate and cultivate the newly acquired lands. These efforts laid the groundwork for the formation of the polity known as Dang Trong, or the Kingdom of Cochinchina, which was governed autonomously by the Nguyen Lords. Over the subsequent centuries, Dang Trong developed into a distinct political and cultural sphere, maintaining its own diplomatic relations, military organization, and economic systems, while gradually incorporating the remaining Cham territories into its domain. This kingdom ultimately served as the foundation upon which the unified Kingdom of Vietnam was established under the Nguyen Dynasty in the early 19th century.

The prolonged coexistence between the Vietnamese and the Cham populations, despite recurring episodes of political tension and armed conflict, constituted a significant driver of cultural adaptation and transformation in the Middle Region of Vietnam. While military encounters and territorial disputes were recurrent throughout their shared history, sustained interaction in periods of peace fostered opportunities for mutual exchange and integration. For the Vietnamese, settlement in former Cham territories required adaptation to unfamiliar environmental conditions, agricultural systems, and local resource constraints. In this process, they selectively absorbed and reinterpreted elements of Cham cultural practices, particularly those that enhanced resilience and survival in the coastal-maritime ecological setting.

This dynamic process of acculturation extended beyond pragmatic adjustments to encompass deeper layers of cultural life. It manifested in the incorporation of Cham vocabulary and linguistic structures into local dialects, the assimilation of certain religious beliefs and ritual practices, and, notably, the adaptation of architectural forms and construction techniques suited to the

region's climate and topography. Vietnamese builders integrated aspects of Cham spatial organization, structural detailing, and decorative motifs into their vernacular architecture, creating hybrid forms that retained both functional efficacy and symbolic meaning.

In this way, the Vietnamese–Cham acculturation process was not merely a passive absorption of influences but an active negotiation of identity, producing a distinctive cultural synthesis. This synthesis became embedded in the built environment, contributing to the architectural diversity of the Middle Region and serving as a tangible record of centuries of coexistence, conflict, and cultural dialogue.

Acculturation is a recurrent and historically pervasive phenomenon that tends to emerge naturally in regions where neighboring ethnic groups coexist in close geographic proximity or where relationships between larger, more dominant polities and smaller, subordinate communities are shaped by processes of territorial expansion, encroachment, and political dominance. Such sustained interaction—whether through trade, migration, intermarriage, or political subjugation—inevitably fosters the exchange, adaptation, and assimilation of cultural elements. Over time, these adopted elements become deeply embedded within the indigenous cultural framework of each community, often to the extent that distinguishing the original, pre-contact traditions from the subsequently incorporated influences becomes methodologically complex. This blurring of cultural origins is particularly evident in material culture, ritual practices, language, and artistic expression, where hybridized forms emerge as enduring markers of shared history.

The built environment offers a particularly tangible manifestation of this process. In the realm of Vernacular architecture, acculturation operates not only at the level of aesthetics—such as decorative motifs, stylistic profiles, or spatial compositions—but also within the sphere of technical and functional adaptation. Building materials, structural systems, and environmental design strategies are often borrowed, modified, and reinterpreted in ways that address the ecological, social, and symbolic needs of the adopting culture. Over successive generations, such architectural hybrids may become so integrated into local building traditions that their external origins are obscured, leading communities to regard them as wholly indigenous.

The challenge for architectural historians and heritage scholars lies in disentangling these layered influences to reconstruct the trajectory of cultural exchange. This requires not only stylistic and structural analysis but also an examination of historical contexts, socio-political relations, and patterns of cross-cultural contact. In this sense, vernacular architecture serves as both a physical record and an interpretive lens for understanding acculturation: It is simultaneously a product of cultural negotiation and a medium through which shared histories are materialized, preserved, and reinterpreted over time.

This research constitutes a comprehensive and in-depth investigation aimed at addressing a significant gap in scholarly understanding of vernacular architecture within the Southeast Asian context. While the region is rich in architectural diversity shaped by centuries of cultural exchange, conquest, and environmental adaptation, systematic comparative studies—particularly those focusing on interethnic influences—remain limited. In response to this scholarly lacuna, the present study adopts an analytical framework grounded in architectural typology and construction technology to explore the intricate patterns of interaction between the Vietnamese and the Chams during periods of prolonged coexistence.

By examining building forms, spatial organization, material selection, and structural techniques, the study seeks to identify and interpret instances of mutual influence, where architectural knowledge, design principles, and technical expertise were exchanged, adapted, and recontextualized. This approach recognizes that architecture is not merely a passive reflection of cultural identity but an active medium through which communities negotiate their social, environmental, and political realities. The Vietnamese–Cham case offers a particularly fertile ground for such inquiry, as their relationship was characterized by both cooperation and conflict, fostering conditions for selective borrowing, innovation, and hybridization in the built environment.

Central to the study is an exploration of acculturation as a process that extends beyond aesthetic borrowing to encompass the pragmatic adaptation of construction systems to local climates, topographies, and resource availabilities. The resulting architectural hybrids not only embody shared technological heritage but also serve as physical testimonies to a history of interethnic engagement.

Furthermore, this research positions the study of vernacular architecture within a broader sustainability discourse. Traditional building practices—developed through generations of empirical knowledge—offer valuable lessons for contemporary sustainable design. By uncovering and analyzing the principles underpinning Vietnamese–Cham architectural forms, the study seeks to inform strategies for heritage preservation that do not merely conserve the past but actively advance traditional values in ways that meet modern needs. This entails promoting a symbiotic relationship between humans, architecture, and the natural environment, wherein design decisions harmonize ecological stewardship with cultural continuity.

Ultimately, the findings aim to contribute not only to architectural history but also to ongoing debates in heritage conservation, environmental adaptation, and sustainable development, demonstrating that vernacular architecture—when properly understood—offers enduring solutions to the challenges of building in a rapidly changing world.

1.2 A brief history, geography, and culture of the Middle Regions of Vietnam

1.2.1 The establishment of the kingdom of Cochin-China (16th – 18th)

Historically, the territory corresponding to the Middle Region of present-day Vietnam—known between the 16th and 18th centuries as part of the Kingdom of Cochin-China—possesses a complex and layered political history shaped by successive waves of state formation, warfare, and cultural transformation (Hardy, 2005; Taylor, 2013). This region had originally been under the control of the Kingdom of *Lam Ap* (192–652 A.D.), a polity that emerged as a significant maritime and trading power in early Southeast Asia (Coedès, 1968; Southworth, 2001, pp. 1-30). Following political and territorial reorganization, *Lam Ap* was renamed the Kingdom of *Hoan Vuong* (653–874 A.D.), which continued to exert influence over the central coastal region through both military strength and maritime commerce (Vickery, 2005).

In 875 A.D., a new political entity arose—the Kingdom of *Champa* (also referred to in Vietnamese historical records as *Chiem Thanh*)—which succeeded *Hoan Vuong* and endured as a major regional power for nearly fifteen centuries (Miksic & Yian, 2016). Champa's geopolitical position, with a long coastline and fertile plains flanked by the Truong Son mountains, allowed it to engage actively in trade networks linking the South China Sea with the

Indian Ocean world. (Wade, 2020). However, this position also made it a focal point of military conflict. Throughout its history, Champa engaged in recurrent warfare with neighboring states: *Dai Viet* to the north, Laos, and Cambodia (historically referred to as Earth Chenla) to the west, and Funan (Water Chenla) to the south (Hall, 2011, pp. 37-54). These conflicts, while initially a testament to Champa's military resilience, gradually eroded its political and economic stability, transforming it from a dominant regional force into a weakened state vulnerable to external conquest. (Po, 2012, pp. 1-40)

The trajectory of Champa's decline accelerated following the emergence of *Dai Viet* as an autonomous kingdom in 938 A.D (Cabinet of Le dynasty, 2004c, p. 205). After centuries of Chinese rule (Taylor, 1998). From this point onward, *Dai Viet* pursued an expansionist policy that increasingly brought it into direct confrontation with Champa. A pivotal episode occurred in 982 A.D (Cabinet of Le dynasty, 2004c, p. 226), during the reign of King *Le Dai Hanh*, when Dai Viet launched a successful campaign against Champa, marking the first decisive stage of the Vietnamese southward expansion (Ngo, 1971; Tran & Lockhart, 2011). Another watershed moment took place in 1470 A.D., (Cabinet of Le dynasty, 2004a, p. 465) when King *Le Thanh Tong* led a large-scale military offensive that resulted in the occupation of significant portions of Champa's territory and the capture of its capital, Vijaya (Li, 1998).

The final phase of Champa's disintegration unfolded during the period of internal division within Dai Viet, when the Nguyen Lords began consolidating control over the southern territories (Cooke & Li, 2005). In 1558, Lord Nguyen Hoang, a high-ranking official of the Le Dynasty, was appointed governor of Thuan Hoa Prefecture, which became the power base for the Family of Nguyen. This territorial expansion intensified with the annexation of Quang Nam Province, including Ty Vien District, the southernmost region of the Cham heartland—corresponding to present-day Hoai Nhon District in Binh Dinh Province (Cabinet of Le Dynasty, 2004b, p. 137; The National Department of History of Nguyen Dynasty, 2002, p. 28)

In 1611, Nguyen Hoang mounted a military campaign that further reduced Cham autonomy, culminating in the complete annexation of Champa's remaining territory by 1693 A.D. (see Figures 3, 4, 5)(Southworth, 2001). This marked not only the geopolitical absorption of Champa into Dai Viet but also a profound cultural transformation, as centuries of Cham political sovereignty

gave way to Vietnamese administrative, agricultural, and settlement systems. (Tran & Lockhart, 2011).

From a broader historical perspective, the Vietnamese conquest of Champa must be situated within the larger patterns of territorial expansion and cultural assimilation in Southeast Asia. Much like the Khmer decline under Siamese pressure or the gradual reduction of Lan Xang under Lao–Siamese conflict, the fate of Champa illustrates the fluidity of political boundaries and the centrality of military power in shaping the cultural map of the region (Chandler, 2008; Evans.G., 2003). Moreover, the Vietnamese southward expansion was not merely a military process but also a cultural and demographic transformation, as Vietnamese settlers brought with them new agricultural practices, architectural traditions, and social institutions that would integrate with—and in some cases supplant—the existing Cham systems (Tran & Lockhart, 2011).

This process also set the stage for complex patterns of acculturation that are still visible today in the architecture, craft traditions, and intangible heritage of Middle Region of Vietnam (Taylor, 1998; Vickery, 2005). Understanding this layered history is therefore critical not only for reconstructing the geopolitical narrative of the region but also for analyzing the hybrid cultural landscapes that emerged from centuries of Vietnamese–Cham interaction.





Figure 3: Early 14th century (A part was cut to Dai Viet)

Figure 4: 16th – 18th centuries (Kingdom of Cochinchina)

Figure 5: 19th – 20th centuries (Kingdom of Vietnam)

(Source : Jan M, Pluvier., (1995), map 1, 28, 29)

The process of Vietnamese territorial expansion into the southern and central regions—commonly referred to as *Nam Tien* (the “Expand to the South”)—was a protracted historical trajectory that unfolded over nearly eight centuries (Taylor, 2013). While the initial stages of this expansion were characterized by sporadic military campaigns and fluctuating frontiers, the most transformative and enduring phase occurred under the governance of the *Nguyen* Lords in Cochinchina (1558–1777). (Li, 1998)

This period was marked not only by military consolidation but also by a deliberate policy of civil migration and agricultural colonization. Large waves of settlers, primarily from the provinces of Thanh Hoa, Nghe An, and Ha Tinh—bordering the northern and central regions—migrated southward under *Nguyen* patronage. Their movement was both strategic and opportunistic, driven by political allegiance to the *Nguyen* Lords, economic aspirations, and the promise of fertile lands in territories that had recently come under Vietnamese control following the decline of the Kingdom of Champa (Vickery, 2005).

The newly acquired lands, encompassing much of the former Cham domain (see Figure 6), were integrated into what became the Kingdom of *Dang Trong*, known in European sources as Cochin-China (Cooke & Li, 2005). This emerging polity was a dynamic multicultural realm in which the Vietnamese majority coexisted with residual Cham populations and significant communities of Chinese and Japanese merchants (Hall, 2011). Nowhere was this cultural and economic vibrancy more visible than in the port city of *Hoi An* (Faifo), (Li, 1998) which flourished as a major node in the international maritime trade networks of the 16th to 18th centuries. The presence of diverse ethnic and trading communities fostered a unique cultural synthesis, albeit one that also masked underlying tensions arising from asymmetries of political and economic power.

From a geopolitical perspective, the existence of the Nguyen-ruled *Dang Trong* constituted a sustained political counterweight to the Trinh-ruled *Dang Ngoai* in northern Vietnam (Whitmore, 1985). For nearly three centuries, from the 16th to the 18th centuries, the two polities maintained a fragile coexistence punctuated by intermittent conflict, a division that shaped the cultural and political landscape of early modern Vietnam.

It may be argued that the *Nguyen* Lords' expansionist strategies ultimately culminated in the complete conquest of Champa's remaining territories—a process effectively concluded by 1693. Under the subsequent *Nguyen* Dynasty (1802–1945), the imperial administration, particularly during the reign of Emperor *Minh Mang* (1820–1841), pursued an assertive policy of agricultural expansion and land appropriation (Marr, 1984). While this policy facilitated economic growth in Vietnamese-settled areas, it simultaneously precipitated the economic marginalization of the Cham people, eroding their autonomous socio-political structures and integrating them as a subordinate ethnic minority within the expanding Vietnamese state.



Figure 6 :Frontier map of Cham-Pa kingdom during the periods
(Source: L Musée de Sculpture Cham de Da Nang, edited by AFAO, Paris 1997)

The long-term consequences of this historical process are profound. The Cham, once a dominant maritime power in Southeast Asia, transitioned into a minority community whose cultural survival has depended on the selective preservation of linguistic, religious, and architectural traditions (Tran &

Lockhart, 2011). The integration of Cham populations into the Vietnamese polity illustrates both the assimilative capacity and the homogenizing pressures of state expansion. From the perspective of cultural history, this case offers a significant example of how political unification through conquest can simultaneously foster intercultural exchange and precipitate the erosion of indigenous autonomy—a dynamic observable across multiple regions of Southeast Asia.

1.2.2 Geographical features of the Regions

Middle Region of Vietnam constitutes a distinctive geographical formation, characterized by a long and narrow strip of land extending along the eastern seaboard, bordered by the East Sea to the east and the *Truong Son* Mountain range to the west. This elongated configuration produces a unique spatial dynamic: while the region maintains a continuous north–south axis, its breadth is markedly constricted in many areas, at times narrowing to a mere few dozen kilometers between mountain and sea.

Topographically, the terrain is fragmented by numerous mountain spurs that descend from the main *Truong Son* Mountain range toward the coastline, often running in a west–east orientation. This geomorphological pattern divides the land into a series of isolated and irregularly sized alluvial plains. These plains, although relatively small compared to the expansive deltas of the *Song Hong* - Red River and Mekong River, provide pockets of arable land amid a landscape otherwise dominated by rugged highlands and coastal dunes. The resulting alternation between mountainous barriers and fertile basins creates a visual and spatial contrast of considerable majesty, reinforcing the region's reputation for dramatic scenery.

Climatically, the Middle Region lies within the tropical monsoon zone, yet it experiences an intensity of seasonal variation that is among the most severe in mainland Southeast Asia. The region is exposed to both the northeast and southwest monsoon systems, which, in combination with its narrow geography, amplify climatic extremes. Prolonged dry seasons often lead to drought conditions, while the rainy season brings torrential downpours that regularly result in flash floods and riverine inundation. Moreover, the area lies directly in the path of tropical cyclones originating in the western Pacific, making typhoons and tornado-like windstorms an annual threat. The interplay

of these environmental factors creates a climate of high unpredictability and frequent natural hazards, posing substantial challenges to agricultural stability, settlement patterns, and infrastructural resilience (see Figure 7).

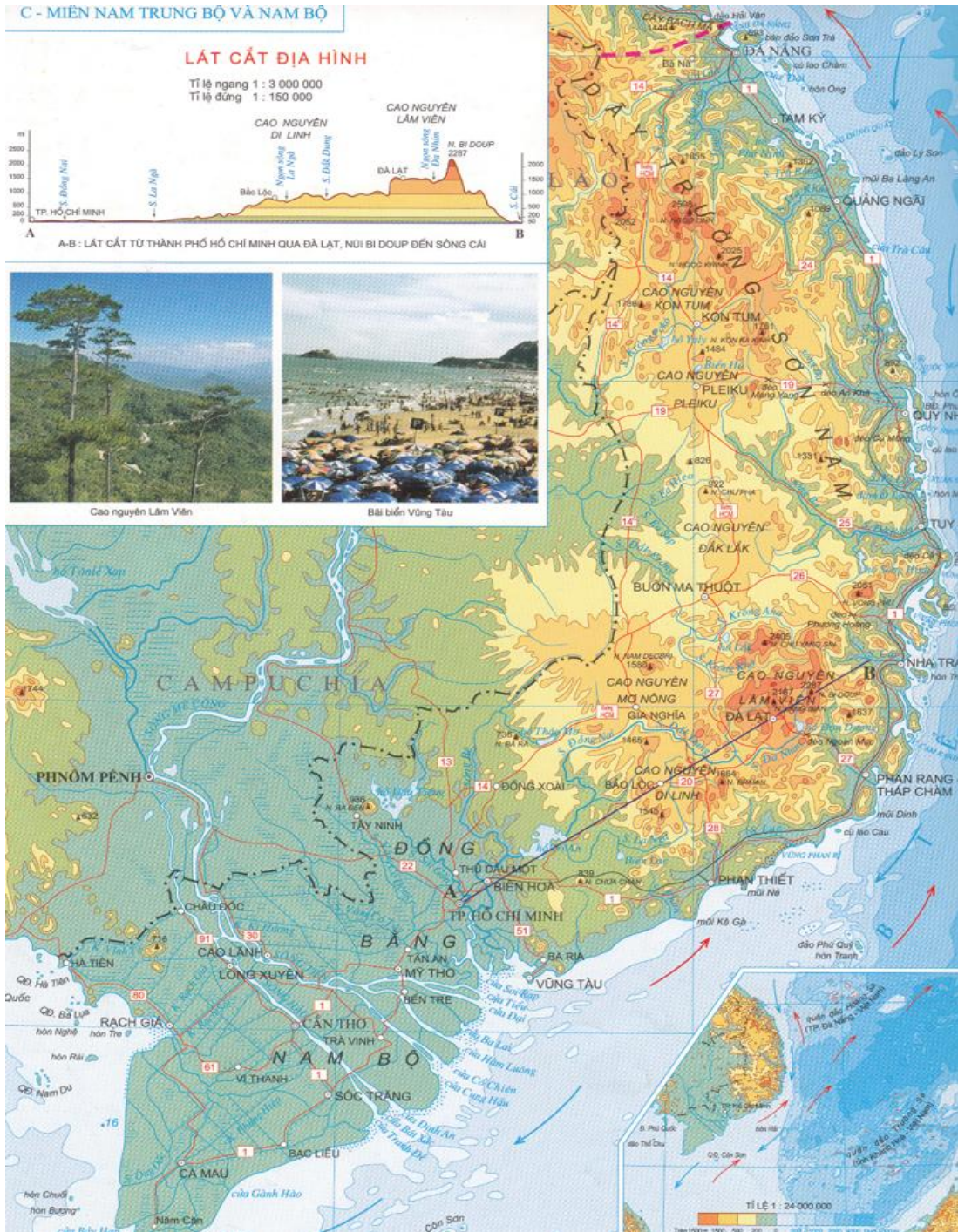


Figure 7 : Geographical features of the Middle regions
 (Source : <https://hoc247.net/tu-lieu/nhung-dieu-can-luu-y-khi-su-dung-atlat-dia-li-viet-nam-trang-mien-nam-trung-bo-va-nam-bo-tr-14-d-doc17896.html>,)

Despite these climatic hardships, the region possesses considerable natural resources, particularly in its upland forest zones. The forests of Middle Region of Vietnam are rich in biodiversity and have historically provided an array of economically and culturally significant materials. Of particular note are the numerous species of hardwood which are prized for their durability, workability, and aesthetic qualities, making them highly valued in both traditional and monumental architecture. In addition to timber, the forests yield bamboo, rattan, and various medicinal plants, as well as resinous and aromatic products that historically contributed to regional trade.

This interplay of geographic constraints, climatic adversity, and resource abundance has profoundly shaped the socio-economic development, architectural practices, and settlement patterns of the Middle Region of Vietnamese region. The scarcity of large continuous plains has historically fostered localized centers of population and governance, while the availability of high-quality timber resources has underpinned a distinctive architectural tradition, particularly in wooden heritage structures. In this sense, the environment has functioned not merely as a backdrop but as an active determinant in the cultural and technological evolution of the region.

From a sub-regional perspective, the central and northern parts of Vietnam exhibit marked variations in microclimatic conditions, shaped by a combination of latitudinal position, topography, and seasonal wind patterns. In the northernmost areas, particularly those influenced by the winter monsoon from the northeast, the climate during the cool season is characterized by a cold and dry air mass interspersed with persistent drizzle. This meteorological phenomenon, a drizzling rain, locally known as *Mua Phun*, results from the interaction between the cold, dry continental air from mainland East Asia and the moisture-laden atmosphere over the Gulf of Tonkin. The result is prolonged periods of dampness despite relatively low rainfall, conditions that can penetrate deeply into timber structures, accelerating fungal growth and wood decay if protective measures are not in place. To address these challenges, historical Vietnamese builders in this zone often employed steeply pitched roofs with generous eaves to facilitate rapid water runoff, raised timber floors to avoid ground moisture, and lime-based plasters to reduce damp penetration into wooden frames.

Transitioning southward into the north-central subregion, the climatic regime shifts toward a hot and humid profile, especially pronounced during the summer months when the southwest monsoon brings abundant moisture from the Indian Ocean. High relative humidity and elevated temperatures create an environment that fosters rapid deterioration of organic construction materials, including timber, bamboo, and thatch. In response, Nguyen Dynasty - era architects adapted structural proportions to enhance airflow within interiors, incorporating tall ceilings, large, shuttered openings, and open verandas to promote cross-ventilation. The use of dense hardwoods became essential for resisting termite damage and decay under these persistently humid conditions.

Further south, in the south-central subregion, the microclimate undergoes another transformation, becoming notably hot and dry for much of the year. This aridity is largely the result of the rain-shadow effect created by the *Truong Son* Mountain range, which intercepts moist air masses and leaves the leeward coastal plains deprived of precipitation during the southwest monsoon period. As a result, this area experiences extended dry seasons, with low annual rainfall and high evaporation rates. In these conditions, timber cracking and warping become primary concerns, especially for exposed elements such as beams and columns. Builders in this subregion historically mitigated these effects by selecting slow-seasoned hardwoods, avoiding overly thin members prone to warping, and applying repeated oil or resin treatments to stabilize the wood. Additionally, roof overhangs and pergola-like shading devices were more pronounced here, serving both to reduce solar gain and to protect structural members from direct exposure.

These region-specific adaptations demonstrate that *Nguyen* Dynasty's wooden architecture was never a static tradition; rather, it was a responsive and regionally differentiated system of building knowledge. The intersection of microclimatic constraints with material availability and construction technology fostered an architectural vocabulary that, while unified in typological principles, exhibited local variations in detail and assembly. This capacity for climatic adaptation not only ensured structural resilience but also contributed to the cultural identity and environmental harmony of the built heritage across the central and northern regions of Vietnam (Tran, 2001, p. 202).

Additionally, the regional culture is the result of the acculturation between the paddy-cultivating culture of the *Song Hong* - Red River delta, brought by Vietnamese immigrants moving southward, and the Chams culture. This fusion has led to the development of a unique cultural identity in the Middle Region of Vietnam. The formation of villages by Vietnamese immigrants and the local Chams ethnic group has resulted in settlements with distinct characteristics compared to the traditional villages in northern Vietnam. One notable difference is the shift from a sense of "stillness" to a more "mobile" trait, which is necessary to adapt to the regional geographic and climatic conditions. (Tran, 2001, p. 204)

1.2.3 The main Residents of the Regions and their Cultural characteristics

a) *The Culture of Vietnamese in the Northern Region*

The Vietnamese people—officially known as the *Kinh* to distinguish them from Vietnam's 54 recognized ethnic minority groups—constitute approximately 85–86% of the national population and speak Vietnamese, a member of the Vietic branch of Austroasiatic languages (General Statistics Office, 2019). Vietnamese has evolved through layers of contact with Mon-Khmer languages, ancient Chinese, French, and other Western tongues, reflecting its position at the crossroads between East Asian and Mainland Southeast Asian cultural spheres. The original homeland of the *Kinh* lies in the Red River delta and adjacent lowlands of northern Vietnam—geographically and politically connected at times to parts of southern China—nestled between four major cultural zones that facilitated migration, trade, and cultural exchange (General Statistics Office, 2019).

Scholars trace the ethnogenesis of the *Kinh* to multifaceted interactions between native Austroasiatic-speaking communities and later northern migrants associated with the Yue groups of southern China. Archaeological evidence from *Dong Son* sites—including ornamental bronze drums, wet-rice agriculture systems, and fortified villages—indicates an early, sophisticated cultural complex in the Red River region (Tran, 2001, p. 202).

A central myth in this narrative is the *Lac Long Quan* and *Au Co* legend: the union of a dragon lord and a fairy princess whose 100 offspring divided into upland (50) and lowland (50) branches—an allegorical metaphor for the early ecological, cultural, and regional differentiation among Vietnamese

communities (Britov, 2025). This origin story underlines the shared ancestral identity, legitimizes territorial claims, and symbolically integrates upland horticulturalists and wet-rice cultivators.

Historically, the polity of *Au Lac*, founded ca. 257 BCE by King *An Duong Vuong*, represents a critical merging of the *Au Viet* (Tai uplanders) and the *Lac Viet* (Austroasiatic lowlanders). Its capital, *Co Loa Citadel*, featured spiral earthen ramparts and large-scale fortifications—evidence of early urban planning and state formation (Higham, 1996; Kim et al., 2010). Archaeological findings include *Dong Son* bronze drums and weapons, suggesting a complex, centralized polity.

In 208 BCE, *Au Lac* was subsumed into the Nanyue (*Nam Viet*) kingdom under Zhao Tuo, inaugurating prolonged geopolitical and cultural integration with northern polities. While traditional historiography casts this as “Chinese influence,” contemporary scholars emphasize the bidirectional cultural exchange and persistence of indigenous socio-political structures under new administrative frameworks (Chamberlain, 1998).

Recent genetic research confirms the predominance of ancient Southeast Asian lineages in the *Kinh* genome, with limited northern admixture. This supports the view that the Vietnamese have maintained a largely Austroasiatic genetic foundation, despite long-standing proximity to Han Chinese populations (Liu et al., 2020). Genome-wide datasets have further revealed extensive interactions with other regional groups—Hmong-Mien, Tai-Kadai, and Austronesian—highlighting the cultural and genetic diversity within Vietnam.

Combined archaeological, linguistic, and genetic findings challenge migration-centrism by revealing a *Kinh* identity rooted in ancient Austroasiatic continuity and shaped through selective acculturation.

The environmental metaphor of water—symbolizing adaptability, continuity, and resilience—underpins a national philosophy. Vietnam’s geographic setting, with its riverine deltas, seasonal flooding, rice cultivation, and exposure to natural disasters, necessitated environmental responsiveness—a quality reflected in its social orientations, material culture, architecture, and symbolic systems (Britov, 2025).

The Vietnamese approach to their natural environment, often characterized as "depending on improvisation," mirrors the qualities of water: softness and flexibility (Tran, 2001, p. 203). In Vietnamese culture, water, symbolizing adaptability and resilience, holds special significance. It influences various aspects of life, including agricultural practices and other activities, shaping individual nuances in farming and production. Respect for nature is a primary characteristic of Vietnamese behavior, rooted in their understanding of nature's impact on their lives. To adapt to the challenging natural environment, Vietnamese focus on elements such as rain, sun, earth, and sky, learning from them to better organize their living and production activities. Another typical trait is their inclination to harmonize with nature, evident in the layout of vernacular architecture which incorporates open spaces intertwined with trees and water. They also use natural materials that blend seamlessly with the environment for construction purposes.

b) The Culture of the Chams in the Middle Region

The Cham–Pa people, commonly referred to as the Chams (also historically known as *Hoi* or *Cham H'roi*), are an Austronesian-speaking ethnic group whose origins lie in the maritime cultures of Island Southeast Asia—as evidenced in both linguistic and archaeological records.(Higham, 2014). Among Southeast Asia's mainland populations, they represent a unique case of Austronesian settlement, contrasting sharply with the surrounding Austroasiatic-speaking groups such as the *Kinh* and Khmer (Peng et al., 2010).

From the 2nd to the mid-15th century CE, the Chams organized into the Kingdom of Champa, a network of semi-autonomous coastal principalities operating under an Indianized *mandala* political model. This decentralized system evolved in dynamic response to shifting maritime trade routes, military competition, and agricultural prospects. Champa's strategic ports facilitated robust engagement in maritime commerce with China, India, and the Malay world (Whitmore, 1984).

The Cham language, an Austronesian tongue closely related to Acehnese, served as a repository of Cham cultural identity. Its epigraphic and inscriptional record—particularly in Old Cham and Sanskrit—illustrates Champa's deep ties to Indic traditions: Shaivite Hinduism became central, with Hindu temples and inscriptions reflecting this influence. Following Islamic trade contacts, many Chams later adopted Islam, enriching the region's

religious tapestry with a syncretic blend of Hindu, Islamic, and indigenous beliefs (Higham, 2014).

Anthropologically, the Chams' migration onto the mainland highlights remarkable cultural adaptation. In contrast to other Austronesian groups that thrived predominantly in island habitats, the Chams integrated with Austroasiatic populations in trade and conflict, leveraging Middle Region of Vietnam's coastline to sustain maritime economic networks. This mainland settlement extended and complicated premodern Southeast Asian identities, as cultural and political authority emerged from control over both land and sea.

Champa's decline began in the 11th century and accelerated with repeated conflicts against *Dai Viet*. By the late 15th century, much of the territory had fallen under Vietnamese control. Nevertheless, ethnically and culturally distinct Cham communities persisted in central and southern Vietnam, Cambodia, and abroad, maintaining their language, religion, and traditions.

From a broader historical perspective, the Cham journey—from Iron Age maritime settlers (*Sa Huynh* Culture, c. 1000 BCE–200 CE) through to a coastal kingdom and then marginalized minority—epitomizes the complex interplay of seafaring trade, cultural hybridity, and geopolitical competition in Southeast Asia. Archaeological evidence links Cham culture to *Sa Huynh* artifacts, such as iron tools, ceramics, and burials, demonstrating continuity between early communities and Champa.

Population genetic analyses suggest a primarily Mainland Southeast Asian maternal ancestry (Mon-Khmer affinities), with evidence for some paternal genetic input from Island Southeast Asian and South Asian lineages—suggestive of male-mediated migration aligned with trade and cultural exchange patterns (He et al., 2012). This genetic mosaic supports a model of assimilation of local communities alongside linguistic and cultural Austronesian diffusion, rather than wholesale population replacement. Within Vietnam, the Cham encompass multiple subgroups:

Western Cham (around 331,000), spread across Vietnam, Cambodia, and diasporas; predominantly Muslim (Sunni, Bani).

Eastern Cham (around 135,000), concentrated in Ninh Thuan and Binh Thuan provinces, practicing a blend of Hinduism and Islam.

Cham H'roi (around 45,000), residing in Phu Yen, Binh Dinh, and Gia Lai provinces; retaining distinct linguistic and cultural features shaped by highland contacts (Tuyen, 2023).

This internal diversity underscores how Cham communities adapted strategically to varying political pressures, religious influences, and ecological settings, demonstrating resilience and cultural plasticity despite centuries of Vietnamese southernward expansion and assimilation pressures.

Anthropologically, Cham culture reflects an adaptive synthesis shaped by environmental dualities. Their homeland—narrow coastal plains adjacent to the *Truong Son* highlands—offered both marine resources and mineral-rich uplands. Environmental challenges including cyclical monsoons necessitated agricultural innovations, irrigation, and multi-season livelihoods. Facing geopolitical pressures, Chams developed martial traditions—naval raiding, citadel-building, and coastal defence—tied directly to their coastal geography.

This integrated posture—environmental adaptability, economic enterprise, and military preparedness—fostered cultural resilience that allowed Cham communities to preserve key elements of identity, religion, and socio-political structure amidst successive waves of conquest and displacement.

It can be considered that the remaining Cham culture is constituted by three factors: indigenous Cham personality, the influence of regional culture, and the influence of Indian Balamonism composed of Brahma, Vishnu, and Siva (Phan et al., 1991).

The characteristics of Cham's indigenous culture can be described as having a "positive" substance. Due to living on the narrow strip of the central region, between the *Truong Son* Mountain range in the west and the deep East Sea in the east, with one side being the anode and the other the cathode, the contrasting natural elements provide advantages such as rich mineral resources. However, this also creates a harsh climate with rain and drought making the land arid. Under such conditions, people had to struggle with nature to survive and defend themselves against neighboring countries to ensure self-defense and prosperity. This dual struggle fostered a belligerent personality typical of the Chams (Inrasara., 2003).

Behavior with the social environment: However, living in the agricultural region of Southeast Asia, the Chams have absorbed the influences of regional

culture, which can be characterized as having a “negative” substance in their efforts to achieve a harmonious balance between negative and positive elements. This philosophy is reflected in their perception and the cult of “Linga-Yoni” in their belief system. Balamonism is a religion formed based on the Vedas scriptures introduced by the Aryans from northwestern India. Balamon worships Brahma, an abstract notion from the Vedas. Brahma is the lord and origin of the universe, possessing infinite power. Brahma is embodied in three forms, uniting the three gods: Brahma (god of creation), Vishnu (god of preservation), and Shiva (god of destruction). Influences from Indian culture play an important role in forming Cham culture, but they are not the only factors. Additionally, by inheriting the rich heritage of *Sa Huynh* Culture, Cham culture is inevitably a product of both regional and indigenous influences.

Cham culture is evident in the fields of architecture, sculpture, and religion. This achievement is reflected in the architectural works of temples (Kalan), temple sculptures, and towers that symbolize their religion. Thus, religion plays an extremely important role in the life of the Chams, materialized through architecture and sculpture.

1.3 Previous studies

The body of research on Vietnamese vernacular architecture—both domestic and foreign—has produced a substantial foundation of empirical data, typological classifications, and cultural interpretations. Pioneering works, from early ethnographic and geographical accounts by Pierre Gourou (1932, 1936) and Léo Craste (1939) to contemporary ethnographic, technological, and conservation-oriented studies, have collectively ensured that Vietnamese traditional houses are documented as important cultural and architectural heritage. Major survey initiatives, such as those conducted by Showa Women’s University (1997–2002) and Waseda University (2006–2009), further contributed comprehensive datasets, architectural drawings, and restoration experiences, thereby creating invaluable repositories for future scholarship.

Domestic scholars have also made significant contributions, particularly in systematizing terminology (Tran Thi Que Ha, 2005; Le Vinh An & Nguyen Thuy Vi, 2001), examining cultural values (Dinh Son Cao, 2006), and expanding ethnographic perspectives (Tran Ky Phuong, Shigeda Yukata &

Akiko Oyama, 2018). More recent works (Le Vinh An & Dinh Son Cao, 2023) have advanced the discourse by introducing an architectural technology approach and highlighting processes of acculturation between Vietnamese and Cham traditions, enriching the understanding of hybridized architectural identities.

Despite these achievements, several critical research gaps remain. First, the majority of existing studies are descriptive, typological, and terminological, focusing on classification, cultural interpretation, and morphological documentation, but offering limited engagement with the technical logic of construction. Essential dimensions such as structural load distribution, joinery systems, material selection, and the integration of carpenter's embodied knowledge into formalized design processes are often underexplored. Second, while surveys provide extensive quantitative data, few studies have progressed toward analytical frameworks capable of reconstructing indigenous design methodologies in a systematic, testable manner. Third, although cultural acculturation has been recognized as a defining characteristic of Middle Region vernacular houses, the mechanisms of technical exchange and adaptation between Vietnamese and Cham traditions remain insufficiently studied. Finally, existing research has yet to fully integrate architectural technology with interdisciplinary methods from engineering, ethnography, and digital prototyping that would enable both deeper historical understanding and practical applications in conservation or contemporary design.

In sum, while previous scholarship has been instrumental in documenting, classifying, and situating Vietnamese vernacular houses within cultural and historical contexts, the next stage of research must move beyond descriptive and ethnographic accounts toward systematic technical analysis and methodological reconstruction. Addressing these gaps will not only enrich academic knowledge but also strengthen applied strategies for the conservation, revitalization, and sustainable reinterpretation of Vietnam's wooden architectural heritage.

1.4 Gaps in Research and Significance of Research

Despite the breadth of scholarship on Vietnamese vernacular architecture, important gaps persist that limit both academic understanding and practical applications. These gaps fall into several critical areas:

(1) Construction logic and structural principles

While many studies have provided descriptive accounts and visual documentation of house types, few have investigated the underlying structural logic. Questions such as how loads are transferred through columns and beams, how diagonal bracing enhances stability, or how joinery systems manage tension and compression remain largely unanswered. The lack of analysis of mechanical behavior means that existing knowledge cannot fully explain why certain structural solutions persisted or how they adapted to local environmental pressures.

(2) Material knowledge and selection criteria

Documentation of timber use is common, but most works stop at listing species rather than examining the criteria of selection, preparation, and treatment. Details such as how timber dimensions were determined, how artisans judged durability, or how materials were integrated with roofing systems (clay tiles, thatching, or double roofs) remain obscure. Without this, it is difficult to understand the technological reasoning behind material efficiency or longevity in vernacular buildings.

(3) Indigenous measurement and proportioning systems

Although anthropometric units and body-based measurements have been mentioned, their role in shaping architectural proportions has not been systematically explored. The connection between units of measure, spatial layout, and structural scale remains fragmentary. No study has yet reconstructed the consistent rules by which carpenters transformed human-based units into architectural modules, leaving an incomplete picture of design logic.

(4) Acculturation mechanisms between Vietnamese and Cham traditions

Existing scholarship acknowledges cultural hybridity but rarely specifies the technical processes by which Cham elements were incorporated. It remains unclear which Cham techniques were directly adopted, which were modified, and which were symbolic borrowings rather than functional transfers. For example, while Cham-inspired truss systems and double-roof methods are frequently mentioned, there is little evidence about how they were technically

reconfigured to fit Vietnamese floor plans. This lack of clarity obscures the dynamics of negotiation between the two traditions.

(5) Role of artisan guilds and knowledge transmission

Although artisan guilds are recognized as central to the building process, their role in codifying, standardizing, and disseminating hybrid forms has not been systematically studied. The mechanisms by which building knowledge circulated—through apprenticeship, guild regulations, or mobility of craftsmen—are poorly documented, leaving a gap in understanding how hybrid forms achieved stability and continuity across regions.

(6) Methodological narrowness

Most previous studies rely heavily on ethnographic description, architectural surveys, or cultural interpretation. While valuable, these approaches lack integration with technical or quantitative methods such as structural analysis, engineering evaluation, or digital reconstruction. As a result, many conclusions remain interpretive rather than demonstrable, limiting their explanatory and predictive power.

This research holds significance on multiple levels—scholarly, methodological, cultural, and practical—by advancing the understanding of vernacular architecture in Vietnam’s Middle Region within both national and transnational contexts.

The study enriches the historiography of Vietnamese architecture by identifying the vernacular houses of Types B, C, and D as products of sustained intercultural encounters between Vietnamese settlers and the Cham. Unlike previous descriptive accounts, this research demonstrates how hybridization was not a peripheral phenomenon but a central mechanism through which architectural traditions evolved. By framing these houses as cultural artifacts embodying negotiation and adaptation, the study challenges linear, assimilationist narratives and contributes to broader theoretical

Through the documentation of endangered techniques—such as clay roofing practices, the Keo diagonal beam, and specialized carpentry tools—the research safeguards forms of indigenous knowledge that are at risk of disappearance. Its focus on the technical logics and structural reasoning behind these methods advances scholarship beyond mere description, offering a deeper

appreciation of how material choices, construction systems, and proportioning rules were embedded in cultural and environmental contexts.

By integrating typological classification, spatial and structural analysis, and contextual interpretation, the study establishes a multilayered methodological framework that bridges empirical observation with theoretical insight. This approach offers a transferable model for studying vernacular architecture elsewhere, enabling comparative analysis across Southeast Asia and beyond. The methodological contribution thus extends the relevance of the study from a regional case to a globally applicable research paradigm.

The research underscores the importance of vernacular houses not only as functional dwellings but also as repositories of collective memory and cultural continuity. By revealing their connections to civic and ceremonial architecture—including dinh halls and certain imperial structures—the study situates vernacular knowledge within broader state-level architectural expression. This highlights the continuum between everyday building traditions and official heritage, reinforcing the cultural significance of vernacular practices in shaping identity and sovereignty.

The findings have direct implications for contemporary conservation, restoration, and adaptive reuse. By uncovering the structural logic and environmental adaptability of these hybrid forms, the study provides evidence-based strategies that align cultural preservation with sustainability imperatives. In the face of modernization and climate change, this contribution is especially valuable for heritage practitioners, architects, and policymakers seeking resilient and contextually grounded solutions.

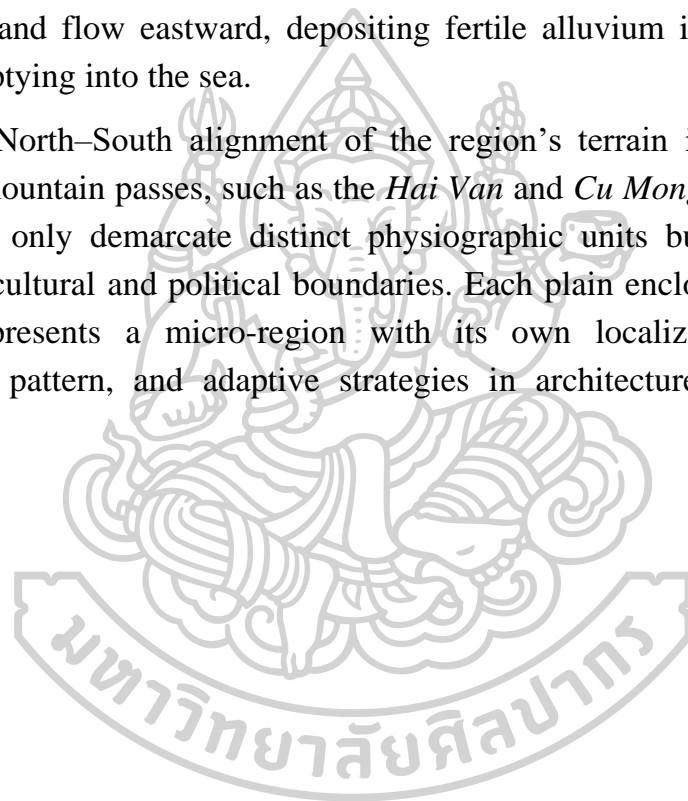
Finally, the research supports curriculum development in architecture, heritage studies, and cultural history. It enriches academic training by introducing a nuanced case study that bridges technical, cultural, and environmental perspectives. Moreover, by empowering community-based initiatives and professional programs, it fosters intergenerational transmission of endangered skills, thereby strengthening the link between research, pedagogy, and practice.

1.5 Area of study

Middle Region of Vietnam constitutes a distinctive coastal zone characterized by its elongated, narrow form running parallel to the East Sea.

Geographically, its northern boundary lies at Quang Binh Province, contiguous with Ha Tinh Province (see Figure 8, 9), while its southernmost extent reaches Binh Thuan Province, which adjoins Binh Phuoc Province (see Figure 8, 10). To the east, the region opens to the maritime expanse of the East Sea, whereas to the west, it borders the territories of Laos and Cambodia. This configuration creates a spatial corridor where coastal plains, narrow in breadth yet elongated in form, are interspersed with mountainous promontories extending from the *Truong Son* Mountain range directly into the sea. These promontories are interlaced with deep river valleys, formed by major rivers that originate in the highlands and flow eastward, depositing fertile alluvium in their floodplains before emptying into the sea.

The North–South alignment of the region’s terrain is segmented by a series of mountain passes, such as the *Hai Van* and *Cu Mong* Mountain passes, which not only demarcate distinct physiographic units but also historically served as cultural and political boundaries. Each plain enclosed between these passes represents a micro-region with its own localized resource base, settlement pattern, and adaptive strategies in architecture, agriculture, and trade.



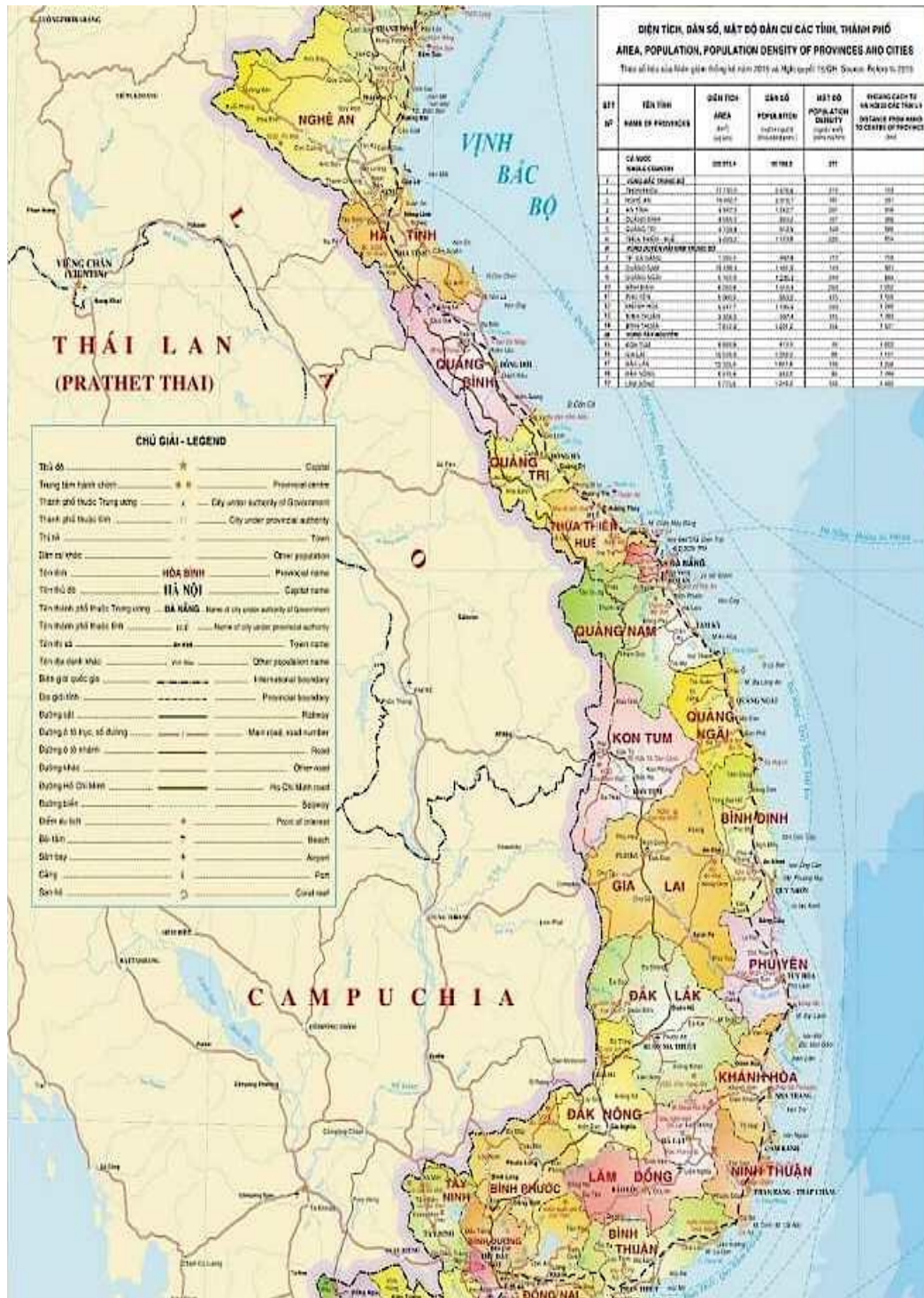


Figure 8 Map of the Middle Region of Vietnam
 (Source : <https://meeymap.com/tin-tuc/ban-do-mien-trung>.)



Figure 9: Study areas in the North-Middle Region of Vietnam
 (Source : <https://nguoiquansat.vn/2-tinh-o-mien-trung-du-kien-khong-sap-nhap-trong-lich-su-tung-hop-nhat-dien-tich-gap-75-lan-maldives-208007.html>.)



Figure 10: Study areas in the South-Middle Region of Vietnam
 (Source: <https://docx.com.vn/tai-lieu/chu-de-mien-trung-bo-bac-trung-bo-duyen-hai-nam-trung-bo-co-so-van-hoa-145426>)

For the purposes of this study, the research area is delineated from the southern bank of the *Gianh* River in Quang Binh Province to the southern extremity of Binh Thuan Province. Historically, this stretch-formed part of the polity known as *Dang Trong*, or Cochinchina, during the 16th to 18th centuries—a period of significant cultural interaction, maritime trade, and architectural innovation. The region’s vernacular architecture evolved under the combined influences of indigenous building traditions, transregional cultural exchanges, and the specific environmental conditions of the central coast.

The scope of the present investigation focuses on three of the most representative types of vernacular dwellings still extant in the region today: *Nha Roi*, *Nha Ruong*, and *Nha La Mai*. Each of these forms embodies a distinct set of architectural, structural, and cultural attributes, reflecting adaptations to climate, available materials, social hierarchy, and functional needs.

Nha Roi is typically associated with coastal fishing communities and reflects a pragmatic approach to construction using lightweight, easily replaceable materials, suitable for a lifestyle shaped by the rhythms of the sea and seasonal storms.

Nha Ruong, by contrast, is a highly refined timber-framed house form often associated with the landed elite and administrative classes. Its mortise-and-tenon joinery, symmetry, and modular proportions represent a culmination of craftsmanship and are closely linked to Confucian spatial principles and the cultural identity of Middle Region of Vietnam.

Nha La Mai is distinguished by its steeply pitched roof of thatch or palm leaves, designed to shed heavy monsoonal rains quickly, while its plan and materials speak to a deep-rooted continuity with pre-modern rural life.

The selection of these three vernacular house types as the focus of study is deliberate and grounded in both scholarly and practical considerations. First, they represent a spectrum of social and economic contexts—from modest fishing households to elite residences—providing a holistic view of architectural adaptation across class boundaries. Second, their construction methods collectively illustrate the technical range of Middle Region of Vietnamese carpentry and vernacular building practices, from expedient, replaceable frameworks to complex joinery systems requiring highly skilled artisans. Third, despite their differences, these houses share a common

geographical and climatic context, allowing for meaningful comparative analysis of how architecture mediates between human needs and environmental constraints.

Furthermore, these house types are of particular relevance to heritage conservation efforts. They encapsulate the historical layering of cultural influences—Cham, Vietnamese, Chinese, and maritime Southeast Asian—while remaining deeply rooted in the ecological and social realities of the central coast. Studying them not only contributes to architectural history but also supports the preservation of a living tradition that continues to adapt, albeit under increasing pressure from modernization, urbanization, and climate change.

In sum, the chosen geographic scope and typological focus together provide a robust framework for investigating the architectural heritage of Middle Region of Vietnam, enabling a nuanced understanding of how vernacular forms arise from the interplay of environment, culture, and history.

This research constitutes an in-depth extension of the existing body of knowledge on vernacular architecture in Southeast Asia, addressing a significant gap in understanding the architectural traditions of the region. It adopts a dual perspective—architectural typology and construction technology—to critically examine the mutual influences and technical exchanges between the Vietnamese and Cham communities during their prolonged yet often reluctant coexistence. Through this lens, the study seeks to identify both the distinctive characteristics and the shared techniques that emerged from centuries of cultural interaction, whether through adaptation, assimilation, or selective appropriation.

The rationale for this investigation lies in the recognition that the Vietnamese–Cham architectural encounter represents a unique case of regional acculturation in which political, economic, and environmental conditions shaped not only the built environment but also the technical know-how embedded within it. This acculturation process—manifested in hybrid forms, construction methods, and spatial organization—offers valuable insights into how architectural cultures evolve under the pressures of intercultural contact, resource constraints, and environmental challenges.

Beyond the historical and typological analysis, this study aims to formulate a theoretical framework for understanding architectural acculturation

that can be applied more broadly in Southeast Asian heritage research. This framework will serve as a basis for proposing strategies for the conservation and revitalization of what may be termed “fossil values”—the enduring cultural, technical, and aesthetic qualities preserved in vernacular architecture despite the passage of time. These strategies are grounded in the concepts of sustainability and symbiosis, emphasizing the interdependent relationship between human communities, their architectural heritage, and the natural environment.

In doing so, the research not only documents and interprets historical architectural practices but also addresses contemporary concerns. It proposes that future conservation efforts should not merely preserve static forms but should foster a living continuity in which traditional knowledge informs modern sustainable design. In this way, the Vietnamese–Cham architectural legacy becomes not only an object of preservation but also a model for a resilient, culturally rooted architecture capable of addressing the needs of future societies.

1.6 Research Aims and Objectives

Acculturation is a multifaceted process that unfolds through various mechanisms, including cultural exchange, adaptation, assimilation, and, at times, resistance. In architectural contexts, it entails the transfer and transformation of cultural elements such as stylistic preferences, construction techniques, material usage, and ornamental motifs from one community to another. These exchanges rarely occur in a uniform or unilateral manner; rather, they are mediated by a combination of interaction, negotiation, and selective appropriation, shaped by the social, political, and environmental realities of the time. The principles underlying such acculturation processes include sustained interpersonal and intergroup communication, the necessity to adapt to new geographical and climatic conditions, and the gradual blending—or, in some cases, juxtaposition—of distinct architectural traditions.

In the Middle Region of Vietnam, the vernacular houses that have persisted to the present day are the tangible outcomes of such an acculturative process, reflecting both the ingenuity of their builders and the complexity of historical interactions between different cultural groups. Interestingly, comparable vernacular forms are conspicuously absent in the northern and southern regions of Vietnam, prompting critical questions regarding their

origin, their process of creation, and the social frameworks that governed their ownership and transmission. These inquiries form the core of this study, which specifically focuses on the historical and cultural interplay between Vietnamese migrants to the Middle Region and the indigenous Cham communities.

The overarching aim of this research is to investigate the dynamics of architectural acculturation in this context, thereby contributing to a more nuanced understanding of Southeast Asian vernacular heritage. More specifically, the study pursues the following objectives:

- (1) Documentation and classification – to systematically collect statistical data and establish a comprehensive architectural catalog of vernacular house types within the study area (this documentation, presented in Chapter 3, serves as the empirical foundation for subsequent analytical work.)
- (2) Technical origins and historical development – to trace and clarify the technical origins, construction methods, and evolutionary trajectories of these vernacular house types over time (this analysis, detailed in Chapter 5, contextualizes the architectural forms within broader technological and cultural shifts.)
- (3) Identification and analysis of acculturation phenomena – to identify, categorize, and interpret the manifestations of acculturation in architectural form, layout, and construction techniques resulting from Vietnamese–Cham interactions (this examination, presented in Chapter 6, highlights both the shared and divergent elements in the two traditions.)
- (4) Underlying factors influencing acculturation – to explore the socio-political, economic, and environmental factors that have influenced the acculturation process as it pertains to vernacular houses in the Middle Region of Vietnam (this synthesis, developed in Chapter 7, aims to elucidate the broader contextual forces shaping architectural exchange.)

By framing the investigation around these objectives, the study not only documents physical structures but also deciphers the cultural narratives embedded within them. In doing so, it advances the argument that vernacular architecture should be understood as an evolving cultural artifact—one that encapsulates the historical processes of negotiation, adaptation, and mutual

influence between distinct communities. The findings are expected to contribute to both heritage conservation strategies and theoretical models of architectural acculturation applicable to other regions in Southeast Asia.

1.7 Structure of the Thesis

The thesis is organized into eight comprehensive chapters supported by five detailed appendices, designed to systematically address the research objectives while providing a robust theoretical, historical, and technical foundation for understanding vernacular architecture and acculturation phenomena in the Middle Region of Vietnam.

Chapter One: Introduction

This chapter sets the stage for the entire study by introducing the research background and rationale. It begins with an overview of the historical, geographical, and cultural context of the Middle Region of Vietnam, highlighting its distinctive environmental conditions, socio-cultural heritage, and its historical position as a zone of cultural interaction between the Vietnamese and the Chams. The chapter also clearly defines the scope of the study, research aims, and objectives, ensuring that the reader understands the academic significance and practical relevance of the investigation. The final section outlines the overall structure of the thesis, providing a roadmap for subsequent chapters.

Chapter Two: The state of knowledge on vernacular houses in Vietnam and the concept of acculturation

This chapter reviews the state of knowledge on Vietnamese vernacular architecture with an emphasis on indigenous traditions. It first examines the architectural heritage of the two primary cultural groups relevant to this study: the Vietnamese and the Chams. The section on Vietnamese culture and vernacular houses addresses their structural typologies, spatial logic, and symbolic meanings, while the section on Cham culture explores their distinct architectural language, construction methods, and ornamental traditions. The chapter then surveys the historiography of vernacular architecture in the Middle Region through historical records, domestic scholarly work, and foreign research. A crucial component of this chapter is the theoretical framework on acculturation, including its definitions, mechanisms, and historical manifestations. Special attention is given to architectural

acculturation between the Vietnamese and the Chams, with an additional discussion on socio-cultural acculturation as a broader backdrop for architectural exchange.

Chapter Three: Research methodology

This chapter outlines the methodological framework adopted for the study, ensuring a rigorous and systematic approach to investigating the vernacular architecture of the middle regions of Vietnam and the phenomena of architectural acculturation between the Vietnamese and the Chams. The research design integrates both qualitative and quantitative strategies, grounded in historical, ethnographic, and architectural analysis, including:

- (1) **Research Approach:** The study employs a multidisciplinary approach, combining architectural typology, cultural anthropology, and historical technology studies. This integrative framework allows for the examination of both tangible and intangible heritage elements, facilitating a comprehensive understanding of design traditions, construction techniques, and the mechanisms of cultural exchange.
- (2) **Research Methods, including:**
 - **Comprehensive Literature Review of Primary and Secondary Sources:** A critical examination and synthesis of scholarly works, archival records, and ethnographic accounts are conducted to establish the historical, cultural, and technical context of vernacular architecture in the study area. The review encompasses both domestic and international research to ensure a balanced, comparative, and interdisciplinary foundation.
 - **Integrated Data Collection Methodology:** This process combines archival database exploration with on-site investigations and systematic field surveys. Fieldwork activities involve precise measurement of structural elements, detailed architectural sketching, high-resolution digital documentation of components, and extensive photographic recording. These procedures capture both technical specifications and aesthetic qualities, ensuring the completeness of the data set.
 - **Oral History and Expert Testimony Acquisition:** In-depth, semi-structured interviews are conducted with traditional master carpenters and long-term house owners. These conversations

document intangible heritage, such as construction rituals, generational craftsmanship techniques, and indigenous design philosophies that cannot be fully reconstructed through archival sources alone.

- Inventory Compilation and Advanced Data Analysis: Collected data are organized into structured inventories, followed by statistical classification, thematic categorization, and comparative analysis across typologies. This stage is supported by theoretical argumentation and the development of diagrammatic models to visually interpret and explain the stages, mechanisms, and patterns of architectural acculturation.
- (3) Expected Outcomes of the Methodology: By applying these methods, the research aims to produce a robust architectural-ethnographic dataset capable of supporting both analytical interpretation and future conservation planning. The approach ensures that findings are historically grounded, technically precise, and culturally contextualized, thereby reinforcing the academic value and practical applicability of the study.

Chapter Four: Characteristics of vernacular houses in the middle region

This chapter presents a detailed architectural typology of vernacular houses in the study area, classified into four primary types: *Nha Ke-Bay* (Type A), *Nha Roi* (Type B), *Nha Ruong* (Type C), and *Nha La Mai* (Type D). Each type is analyzed in terms of:

- (1) Architectural Concepts: The underlying design philosophies, cultural symbolism, and functional principles that inform the creation of vernacular houses, including the integration of environmental, social, and cultural considerations into architectural form.
- (2) Site Planning and Orientation: The strategies and principles guiding the selection, preparation, and organization of building sites, with particular attention to orientation in relation to climate, prevailing winds, sunlight, and cultural or geomantic beliefs.
- (3) Floor Plan and Spatial Arrangement: The configuration of internal spaces, circulation patterns, and functional zoning within the

dwelling, reflecting both practical household needs and the influence of social customs, traditions, and hierarchical structures.

- (4) **Building Structure, including Truss Systems and Load-Bearing Frameworks:** The structural composition and engineering solutions employed in vernacular construction, emphasizing the variety of truss systems, joinery techniques, and load-bearing frameworks that ensure both stability and adaptability of the building.
- (5) **Roofing Techniques and Materials:** The construction methods, material selection, and craftsmanship associated with roofing, including typologies of roof forms, weatherproofing strategies, and the symbolic or aesthetic significance of roofing in the regional context.
- (6) **An architectural form and Façade composition:** together define the physical and visual identity of a building. The architectural form encompasses the three-dimensional massing and spatial organization of the structure. Façade composition, by contrast, concerns the arrangement and articulation of the building's external surfaces, and the integration of ornamental elements. While form establishes the building's volumetric presence, the façade mediates between the internal functions and the external environment, conveying stylistic expression and cultural meaning.

The analysis not only describes physical characteristics but also examines their environmental adaptability, cultural symbolism, and functional suitability in relation to the socio-economic lives of the inhabitants.

Chapter Five: Traditions in the construction of vernacular houses

This chapter examines the intangible cultural heritage embedded within the construction practices of vernacular houses in Vietnam's central region. It foregrounds the ways in which building activities are not solely technical undertakings but are also deeply rooted in cultural values, symbolic meanings, and social relationships. In particular, it explores how traditional carpentry knowledge has been preserved, transmitted, and adapted through time, and how these processes have shaped the architectural character of the region.

The discussion begins by analyzing traditional modes of knowledge transmission, which historically relied on apprenticeship systems, kinship-

based training, and the mentoring of young artisans by master carpenters. Such practices ensured the continuity of skills across generations, while also embedding moral codes, work ethics, and cultural narratives into the learning process. Communal construction rituals, often involving the participation of multiple households and community members, are also investigated. These rituals—such as groundbreaking ceremonies, raising the main beam, or offering rituals to the carpentry deity—position the act of building within a framework of collective identity, spiritual belief, and environmental respect.

A central focus of this chapter is the regional differentiation in carpentry traditions. The study identifies and analyzes three primary traditions:

- (1) Northern Vietnamese Carpentry Traditions – Characterized by highly formalized structural systems, standardized module proportions, and sophisticated mortise-and-tenon joinery techniques rooted in Confucian-influenced design principles.
- (2) Middle Vietnamese Carpentry Traditions – Distinguished by a flexible approach to proportions, a pragmatic adaptation to local materials, and a hybridized design language reflecting both Vietnamese and Cham influences.
- (3) Cham Carpentry Traditions of the South-Middle Region– Defined by distinctive truss configurations, unique joinery solutions, and symbolic ornamentation informed by indigenous cosmology and maritime cultural heritage.

The chapter concludes with a comparative discussion that systematically evaluates the similarities and divergences among these carpentry traditions. By tracing their technical origins and stylistic developments, the analysis reveals possible routes of technological diffusion and adaptation—whether through migration, intermarriage, trade, or direct apprenticeship exchanges between communities. This comparative lens not only illuminates the historical processes of acculturation but also underscores the resilience and adaptability of vernacular building traditions in the face of cultural contact and environmental constraints.

Chapter Six: Aspects of acculturation in the vernacular houses

This chapter investigates the complex and multi-layered processes through which cultural interaction has shaped the architectural character of

vernacular houses in Vietnam's central region. It situates these houses within their broader geographical, cultural, and social contexts, recognizing that architectural forms are never static but are continually redefined through contact, exchange, and adaptation.

The analysis identifies the conditions that facilitated architectural borrowing and transformation—including patterns of migration, interethnic interaction, shared resource environments, and the coexistence of distinct socio-religious traditions. Within this framework, attention is directed toward specific dimensions of architectural expression, such as:

- (1) Geographical, cultural, and social aspects in the acculturation phenomenon.
- (2) Spatial organization and the adaptation of interior layouts to accommodate new functional, cultural, and symbolic requirements.
- (3) Carpentry tools and design logic, reflecting both inherited craftsmanship and innovations prompted by intercultural encounters.
- (4) Constructional techniques, particularly in structural frameworks, joint systems, and roofing methods.
- (5) Architectural scale and proportional systems, revealing shifts in building norms under the influence of different traditions.
- (6) Chronological transformations, tracing how these elements evolved over time in response to both environmental adaptation and cultural integration.

By juxtaposing these aspects, the chapter isolates tangible markers of acculturation in the built environment and explains the mechanisms by which architectural knowledge, materials, and symbolic meanings were exchanged across communities. This approach not only clarifies how architectural hybridity emerged but also offers insights into the resilience and adaptability of vernacular design traditions when confronted with cultural diversity and change.

Chapter Seven: Discussion on acculturation in vernacular houses

This chapter synthesizes the findings presented in the preceding chapters to develop a comprehensive interpretation of acculturation processes in the vernacular architecture of Vietnam's central region. Drawing upon the

architectural, technical, and cultural evidence, the discussion traces how sustained intercultural contact shaped the evolution of local building traditions.

The analysis is organized into three distinct historical phases, each reflecting a different mode and intensity of cultural interaction:

- (1) The Period of Exchange and Symbiosis – A formative stage in which Vietnamese and Cham communities coexisted within overlapping geographical and economic spheres. This period was marked by mutual borrowing in construction techniques, spatial arrangements, and symbolic ornamentation, facilitated by shared environmental challenges and resource networks.
- (2) The Early Period of Acculturation – A transitional phase characterized by selective adaptation and experimentation, during which builders began to integrate foreign elements into existing frameworks. Innovations were tested in material usage, carpentry techniques, and façade treatments, producing experimental hybrids that retained clear traces of their original sources.
- (3) The Later Period of Acculturation – The stage in which hybridized forms and methods became normalized within the vernacular tradition. By this point, earlier distinctions between “local” and “foreign” had blurred, and the architectural language reflected a mature synthesis—structurally efficient, climatically responsive, and culturally emblematic of a shared heritage.

By reconstructing this trajectory, the chapter not only illuminates the mechanisms of cultural and technological exchange but also critically assesses their implications for architectural identity, continuity of tradition, and contemporary heritage preservation. The discussion highlights how acculturation has produced a layered architectural legacy—one that both preserves traces of its composite origins and adapts to the demands of changing cultural and environmental contexts.

Chapter Eight: Conclusion and future directions

This concluding chapter consolidates the key findings of the study and reflects on their theoretical significance and practical applications. It begins by revisiting the original research objectives, evaluating the extent to which they

have been achieved through the integration of historical analysis, field investigation, and comparative architectural study.

The chapter then distills the principal insights regarding the processes of acculturation in the vernacular architecture of Vietnam’s central region, emphasizing how cultural exchange, environmental adaptation, and craftsmanship traditions have intersected to shape a distinctive architectural heritage. Building upon these insights, it advances strategic recommendations for the sustainable conservation, adaptation, and revitalization of vernacular houses—ensuring that preservation efforts respect traditional values while accommodating contemporary needs.

Finally, the discussion extends beyond the Middle Region to outline future research directions within the wider Southeast Asian context. This includes the potential for cross-regional comparative studies, the application of digital documentation technologies, and deeper investigations into intangible heritage practices. In doing so, the chapter positions the research as a foundation for ongoing scholarly engagement and practical heritage management across diverse cultural landscapes.

Appendices

A systematic inventory of Nha Roi, Nha Ruong, and Nha La Mai, accompanied by complete architectural documentation.

Bibliography

A complete bibliography of primary and secondary sources cited in the thesis, providing a foundation for scholarly verification and further inquiry.

1.8 Chapter conclusion 1

The study of vernacular architecture holds a pivotal position within the broader discourse of cultural heritage research, as it encompasses both the tangible and intangible dimensions of human settlement patterns. Beyond the physical fabric of built environments, vernacular architecture serves as a living repository of collective memory, embodying the spatial, material, and symbolic expressions of ethnic identity. This doctoral thesis, entitled “*Acculturation in Traditional Vernacular Architecture between the Vietnamese and the Chams in Middle Region of Vietnam (16th–18th Centuries)*”, undertakes a comprehensive investigation into the complex processes and multifaceted

outcomes of cultural interaction between these two historically significant communities.

Anchored in the interdisciplinary framework of architectural history, cultural anthropology, and heritage studies, the research examines the interplay between Vietnamese and Cham building traditions, with particular emphasis on three interrelated domains: (1) architectural morphology and stylistic vocabulary, (2) construction techniques and material culture, and (3) spatial organization in relation to sociocultural functions. The study not only documents the physical characteristics of these vernacular forms but also interprets them as cultural texts—articulating negotiated identities, adaptive strategies, and the resilience of localized traditions in the face of intercultural contact.

Central to this inquiry is the conceptual model of acculturation, operationalized through a tripartite sequence: Cultural Exchange → Symbiotic Culture → Acculturation, that provides a temporal and analytical lens for tracing the evolution of architectural hybridity. This model is applied to the Middle Region of Vietnam, a geographically and historically liminal zone where the Vietnamese northward expansion intersected with the Cham cultural sphere between the 16th and 18th centuries. Through this lens, the thesis elucidates how cross-cultural dynamics were materially inscribed in the built environment, resulting in architectural forms that simultaneously preserve, transform, and integrate elements from both traditions.

By interrogating the architectural record as both material evidence and cultural narrative, this research contributes to a deeper understanding of acculturation as a spatial phenomenon, offering theoretical insights into the mechanisms of cultural synthesis while enriching the empirical knowledge base.

Chapter Two

The State of Knowledge on Vernacular Houses in Vietnam and Concepts of Acculturation

This chapter establishes the theoretical and cultural foundation for the study. It first outlines the traditional housing of Vietnam's main ethnic groups, focusing on the Vietnamese and the Chams to define the cultural background for later comparison. It then reviews domestic and international research on vernacular architecture in Middle Region of Vietnam to highlight existing knowledge and gaps. The latter part of the chapter discusses key theories of acculturation in both global and Vietnamese contexts, emphasizing their relevance to architectural and socio-cultural exchange. The chapter concludes by explaining the necessity of this study and how acculturation theory underpins the analysis in the following chapters.

2.1 Indigenous people and their traditional housing in Vietnam

2.1.1 Vietnamese culture and their traditional housing

From the 16th to the 18th centuries, during the southward migration known as *Nam Tien*, the Vietnamese brought with them not only their material possessions but also a deeply ingrained set of cultural values, social structures, and traditions that had evolved over millennia in the Red River delta and other northern regions. These intangible cultural frameworks, shaped through centuries of agricultural labor, community organization, and adaptation to the natural environment, served as both the foundation for settlement in new territories and as a lens through which the Vietnamese engaged with the unfamiliar landscapes and peoples of the central and southern regions. The cultural heritage they carried can be summarized through four interrelated domains.

First, Vietnamese society was anchored in a distinctive family system structured around the concepts of the "Big family" and the "Small family". The Big family functioned as the moral core of Vietnamese life, embodying the collective ethical code, ancestral reverence, and the preservation of long-standing customs. It acted as a socio-moral framework ensuring the transmission of shared values and responsibilities across generations. The Small family, by contrast, represented the intimate unit of daily life and the

immediate locus of care, obligation, and identity, yet was still deeply embedded in the larger kinship network. Within this dual structure, lineage was meticulously organized into four generational strata: the primary family root, the ancestral family root, the ancestral family, and the family branch. This hierarchical organization reinforced both social cohesion and the continuity of ancestral traditions, creating a cultural system highly resilient to displacement and migration.

Second, the concepts of “Village” and “Hamlet” held profound significance in Vietnamese society, functioning as the primary units of social organization and collective identity. Villages were not simply geographical settlements; they were self-regulating socio-cultural organisms, complete with local governance, religious institutions, and communal land systems. The importance of the village was magnified during the period of territorial expansion, as entire communities often migrated collectively, transplanting their socio-cultural framework into new environments. This process preserved patterns of communal landholding and mutual support, while also reinforcing the moral economy of reciprocity. Over time, these transplanted villages became key agents in shaping the socio-spatial structure of new territories, ensuring that even in distant southern lands, a sense of “Home” remained rooted in the communal bonds of the village (Cadière, 2000).

Third, Vietnamese traditional culture, while unified by core values, was and remains deeply regionalized. Variations in climate, topography, and historical experience have produced distinct regional identities, particularly between the northern, central, and southern regions. Yet, beneath these variations lies a shared cultural matrix, expressed through the interdependence of “Home”, “Family”, “Village”, and “Country”. This conceptual framework reflects the Vietnamese worldview in which domestic, communal, and national spheres are organically linked changes in one inevitably reverberate through the others. This interconnectedness provided a stabilizing force during the southward migration, ensuring that while environmental and social conditions changed, the underlying cultural logic remained intact (Inrasara., 2003; Li, 1999).

Fourth, Vietnam’s geographical position as a crossroads between continental and maritime Asia made it a focal point for cultural encounters and exchanges. Situated at the intersection of trade routes and migratory flows,

Vietnam was exposed to cultural influences from China, India, Southeast Asia, and beyond. This interaction was not passive assimilation but rather an active process of selective borrowing, adaptation, and synthesis—a phenomenon that can be termed “fusion in cultural exchange.” Over centuries, the Vietnamese developed a capacity to incorporate external elements while reshaping them to fit local needs, thereby reinforcing cultural resilience. During the southward expansion, this adaptability became especially relevant as the Vietnamese encountered the Cham civilization in the central region. Cham architecture, religion, and craftsmanship presented both challenges and opportunities for integration, setting the stage for a dynamic process of acculturation in which Vietnamese vernacular traditions absorbed, modified, and reinterpreted Cham elements within their own socio-cultural framework.

Taken together, these four cultural pillars—family structure, village organization, regional variation within unity, and cultural adaptability—formed the intangible infrastructure that guided Vietnamese settlement and adaptation in the Middle Region from the 16th to the 18th centuries. They shaped not only social relations and community life but also the very forms of vernacular architecture that emerged from the encounter with Cham culture. In this sense, the study of these cultural foundations is not merely a matter of social history but also a key to understanding the material legacy of this period, as manifested in the hybridized architectural forms that still mark the landscape today.

Furthermore, the cultural landscape of Middle Region of Vietnam can be understood as the product of a long process of acculturation between two fundamentally distinct yet complementary cultural systems: the wet-rice agricultural culture of the Red River delta—rooted in the ancient *Dong Son* civilization—and the maritime-oriented culture of the Cham people. The former, carried southward by successive waves of Vietnamese migrants during the sixteenth to eighteenth centuries, embodied an agricultural ethos deeply tied to the seasonal cycles of paddy cultivation, communal village organization, and an elaborate system of social rituals. The latter, shaped by centuries of maritime trade, Hindu-Buddhist influences, and localized adaptations to the arid coastal environment, expressed itself through distinctive architectural forms, artisanal techniques, and symbolic traditions.

The interaction between these two cultural frameworks gave rise to a unique regional identity that diverged from the socio-cultural patterns of

northern Vietnam. In the central region, the formation of settlements by Vietnamese immigrants occurred in close proximity—and often in interdependence—with the indigenous Cham communities. This spatial and social integration generated hybrid settlement patterns that retained certain structural and organizational principles of northern Vietnamese villages, yet incorporated environmental adaptations, material preferences, and symbolic expressions characteristic of Cham cultural practice. As a result, the vernacular settlements of the region came to embody a layered heritage—simultaneously a continuation of northern traditions and a localized reconfiguration shaped by sustained intercultural contact.

Historically, the population of Middle Region of Vietnam can be traced to successive waves of migration from the provinces of *Thanh Hoa*, *Nghe An*, and *Ha Tinh*—collectively known as the *Thanh–Nghe* region. This area, situated at the transitional boundary between the northern and central parts of Vietnam, has long served as both a conduit and a cultural buffer in the historical southward expansion of Vietnamese settlement. The migrants from *Thanh–Nghe* brought with them a deeply rooted architectural tradition shaped over centuries in response to the climatic conditions, available materials, and social structures of their homeland.

Within the *Thanh–Nghe* region, vernacular dwellings are predominantly of the *Nha Ke-Bay* house (hereafter designated as Type A) (Tran, 2005). This typology is characterized by a distinctive modular timber framework, proportional balance between roof and wall height, and spatial organization optimized for multifunctional domestic use. Such features distinguish it sharply from the traditional dwellings encountered further south in the middle region.

In contrast, the vernacular architecture of the Middle Region proper is marked by a broader typological diversity, most notably including *Nha Roi* house (hereafter designated as Type B) (see Figures 11, 12, 13), *Nha Ruong* house (hereafter designated as Type C) (Crate, 1939, pp. 29-39). (see Figures 11, 12, 14), and *Nha La Mai* house (hereafter designated as Type D) (see Figure 15). These forms exhibit structural resilience against the region's severe climatic challenges—frequent typhoons, seasonal flooding, and high humidity—through features such as elevated floors, flexible timber joinery, and steeply pitched roofs designed to shed rain efficiently. Among these, Types B and D are of particular interest because their distribution extends beyond the

Middle Region into the south-central provinces, most prominently *Ninh Thuan* Province.

The presence of these typologies in *Ninh Thuan* and surrounding areas cannot be understood solely as a matter of internal Vietnamese migration. Rather, it must be viewed within the broader historical process of cultural interaction between Vietnamese settlers and the indigenous Chams population. From the 16th to the 18th centuries, this region functioned as a zone of sustained intercultural contact, where the paddy-based agricultural culture of the Vietnamese—rooted in the *Dong Son* tradition of the Red River delta—encountered the long-established maritime-oriented culture of the Chams. This interaction led to a process of acculturation in which architectural forms, settlement patterns, and construction techniques were selectively adopted, adapted, and synthesized.

In this context, the establishment of villages by Vietnamese migrants alongside or in proximity to Chams settlements produced distinctive spatial and social configurations that diverged from those of traditional northern Vietnamese villages. These new settlements often reflected a hybridized cultural identity, evident not only in the physical form of the houses but also in their orientation, spatial hierarchy, and use of materials. Thus, the spread of Types B and D into the South-Middle Region serves as both architectural evidence and a material record of the deeper historical processes of migration, adaptation, and cultural fusion.

The combination of types B, C, and D led to a modified wooden structure of traditional houses that no longer exist today. This disappearance may be attributed to the difficulties and constraints encountered during construction or restoration (see Figure 16).

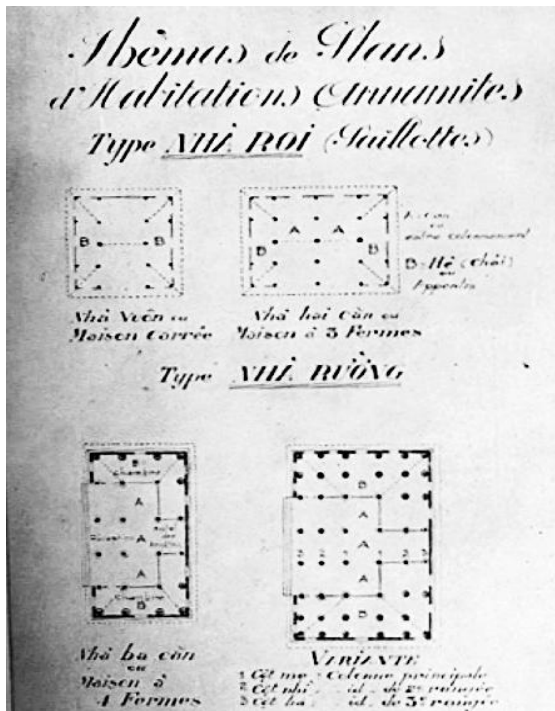


Figure 11: Floor plan of the “Nha Roi” and the “Nha Ruong”.
(Source: Craste, L., (1939)).

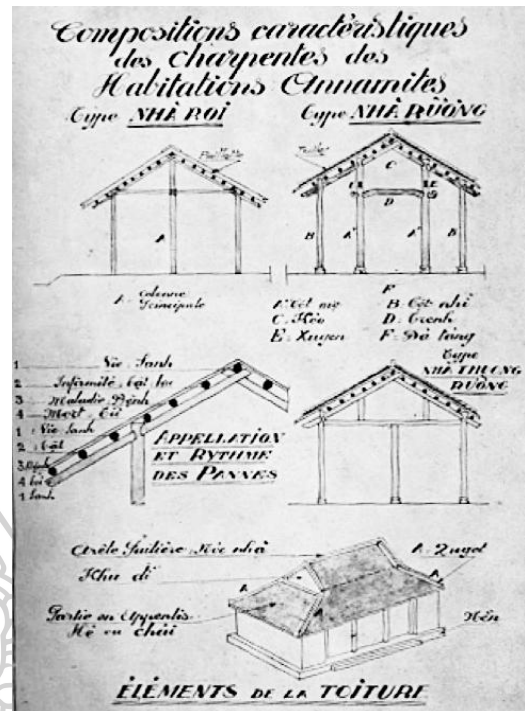


Figure 12: Structure of the “Nha Roi” and the “Nha Ruong”.
(Source: Craste, L. (1939)).

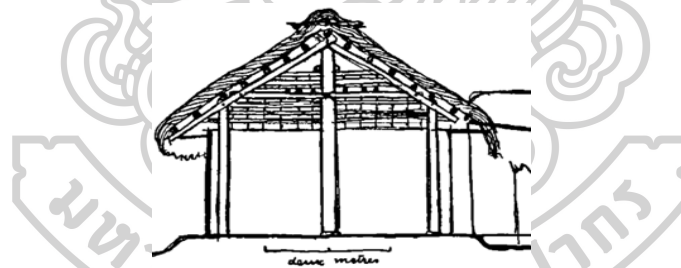


Figure 13: Structure of “Nha Roi” (Type B)
(Source: Gournou, P., (1936))

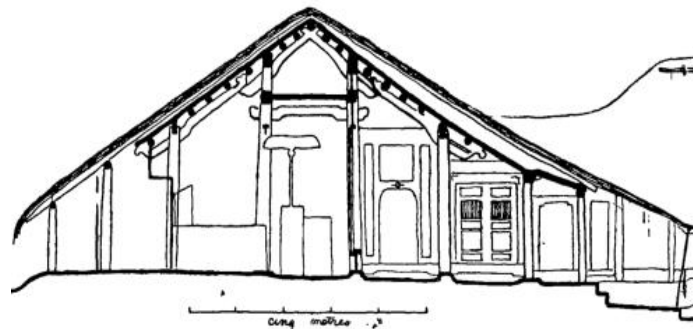


Figure 14: Structure of “Nha Ruong” (Type C)
(Source: Gournou, P., (1936))

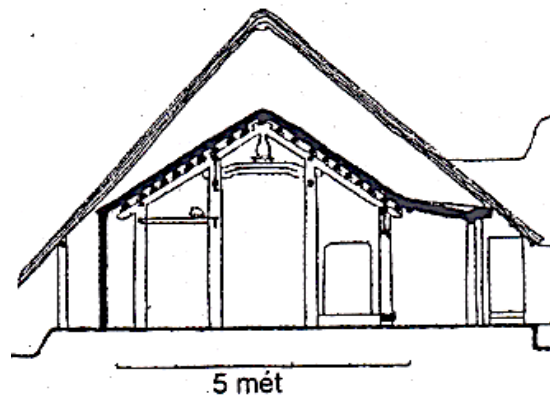


Figure 15: Structure of “Nha La Mai” (Type D)
(Source: Gournou, P., (1936))

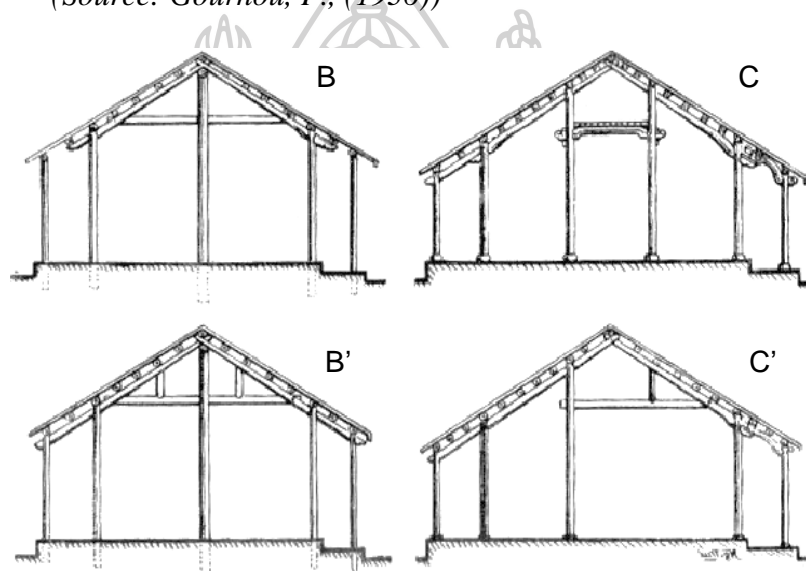


Figure 16: Feature of “Vi “Keo”” trusses of the “Nha Roi” (B), “Nha Ruong” (C) and their variation types (B’ and C’)
(Source: Gournou, P., (1936))

In traditional Vietnamese architecture, the primary entrance of a house is typically aligned with the front main roof, which also serves as the direction of access to the family’s ancestral altar. This spatial arrangement holds deep cultural and spiritual significance, as the orientation of the main house ideally faces south. In this orientation, the left side corresponds to the east, the right side to the west, and the rear to the north. Among Vietnamese communities in the central region, particularly those with roots in patriarchal traditions, there exists a nuanced symbolic interpretation of cardinal directions. The east, representing the direction of the sunrise, symbolizes the beginning of the life cycle and is customarily associated with women and girls. Conversely, the west, representing the direction of the sunset, symbolizes the conclusion of the

life cycle and is therefore assigned to men and boys. It is important to note, however, that this layout principle predominantly applies to vernacular residential architecture and differs significantly from the spatial organization found within imperial palaces, where ceremonial and hierarchical considerations take precedence over familial symbolism.

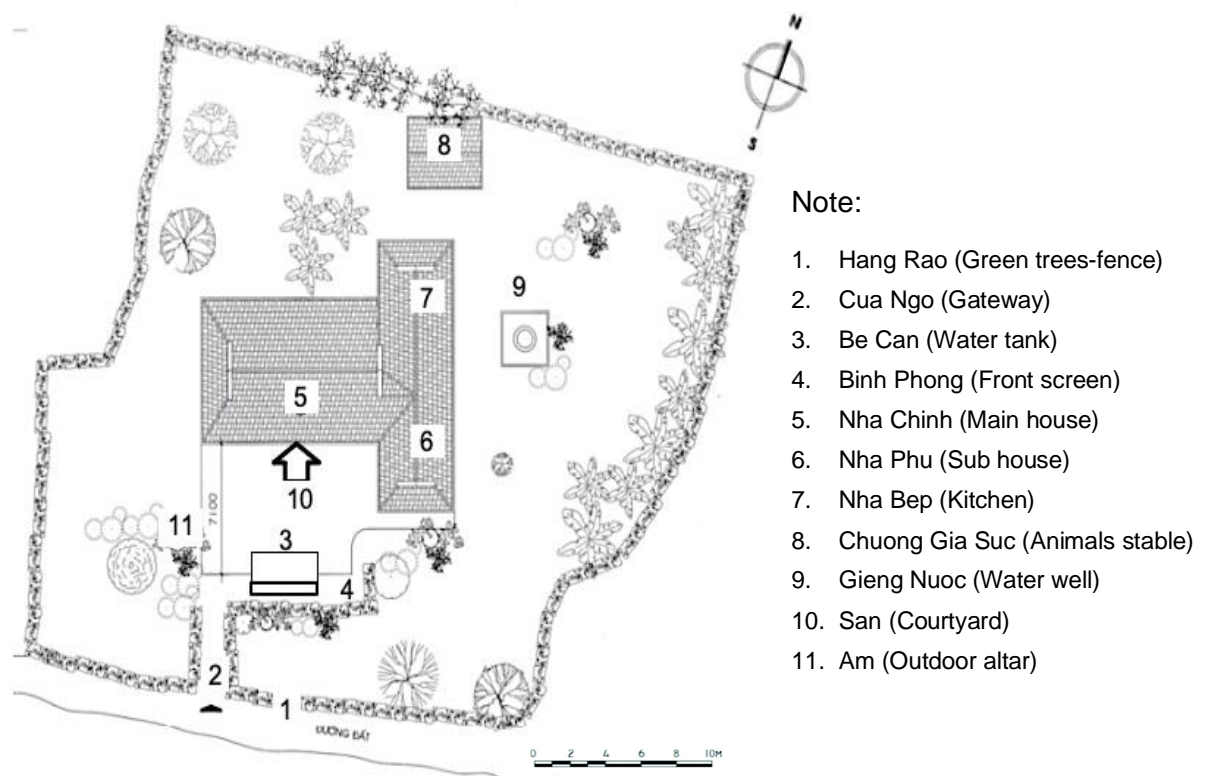
The composition of a traditional Vietnamese household compound commonly includes several distinct architectural and landscape elements, each serving a specific functional or symbolic role (see Figures 17). Among these components, (1) the “Hang Rao” is a boundary fence often constructed from natural, living greenery such as trees or shrubs, serving both as a physical demarcation of property and a protective barrier (see Figure 18); (2) the “Cua Ngo” functions as the main gateway, marking the formal entrance to the household (see Figure 18). Water management and symbolic purification are addressed by the inclusion of (3) the “Be Can,” which is a water tank or a small pond typically situated within the compound (see Figure 19); (4) the “Binh Phong,” a decorative front screen, is strategically placed in front of the main house to provide privacy and act as a windbreaker, reflecting both practical and aesthetic considerations (see Figure 19).

At the heart of the household is (5) the “Nha Chinh,” or main house (see Figure 17), which traditionally serves as the domain of the male head of the family. This central structure often incorporates an ancestral worship space, underscoring the importance of filial piety and religious ideals in Vietnamese culture. Adjacent to the main house is (6) the “Nha Phu,” a secondary building designated for women and children, reflecting gendered spatial arrangements within the household; (7) the “Nha Bep” or kitchen is another essential structure, typically located to minimize smoke and odors in the main living areas while facilitating food preparation.

The compound also accommodates practical facilities such as (8) the “Chuong Gia Suc,” an animal stable essential for livestock management, and (9) the “Gieng Nuoc,” a water well that provides a natural and reliable source of water for daily use. Central to the household’s social and functional life is (10) the “San” courtyard, which acts as a multi-purpose open space for various domestic activities. Additionally, (11) the “Am” is an outdoor altar dedicated to the worship of heaven, earth gods, and occasionally to local spirits or “helpless

spirits” — reflecting the complex syncretism of spiritual beliefs in Vietnamese culture (Nguyen, 2000, pp. 105-117).

In Vietnamese society during the 16th–18th centuries, two cultural layers coexisted: the royal culture of Hue, influenced by Chinese civilization, and the indigenous culture rooted in ancient Southeast Asia. In royal culture, the left side (when viewed from the inside out) was considered more honorable than the right side and was typically reserved for men or civil officials, while the right side was designated for women or military officials (Truong et al., 2024). In contrast, within folk culture, the left side was reserved for women and children—based on the belief that women, as bearers of life, and children, as the young shoots representing the future generation, held greater importance. This side, oriented toward the East, symbolized the rising sun, while the right side, often facing West, was associated with men and the setting sun (see Figure 17, no. 6, 7).



*Figure 17: Site Plan of Vietnamese residence in the Middle Region of Vietnam
(Source: Author)*



*Figure 18: The Green-tree-fence, Gateway and the Main house.
(Source: Author)*



*Figure 19: Front screen and Water tank.
(Source: Author)*

Together, these elements not only fulfill practical needs but also embody cultural values and social structures, illustrating how traditional Vietnamese housing represents a holistic integration of environmental adaptation, spiritual beliefs, and familial organization.

2.1.2 Chams culture and their traditional housing

The extant culture of the Cham people in Vietnam is shaped by the complex interplay of three principal factors: the indigenous Cham identity, the pervasive influence of regional Southeast Asian cultures, and the doctrinal and ritualistic legacy of Indian Balamonism, which centers on the worship of the Hindu trinity—Brahma, Vishnu, and Shiva (Phan et al., 1991). The indigenous Cham cultural identity can be characterized by what may be termed a “positive” cultural substance, reflecting deeply rooted local values, customs, and worldviews that have historically defined the Cham’s unique social and spiritual fabric. However, situated within the broader agricultural milieu of Southeast Asia, the Cham have also assimilated diverse influences from neighboring regional cultures, which may be described as bearing a “negative” cultural substance. This duality has led the Cham to strive for a philosophical and cultural synthesis, seeking an equilibrium between these positive and negative forces in their social life and cosmology.

This dialectical philosophy is notably manifested in the Cham’s religious symbolism, particularly in their veneration of the “Linga-Yoni” cult. The Linga-Yoni, emblematic of generative and regenerative power, encapsulates the Cham’s nuanced worldview balancing creation and destruction, masculinity and femininity, as fundamental cosmic principles. Central to Cham religious identity is Balamonism, a localized variant of Hinduism that traces its origins to the Vedic scriptures introduced by the Aryans from northwestern India. Balamonism venerates Brahma, conceptualized as the abstract supreme entity described in the Vedas. Brahma is revered as the sovereign origin and sustainer of the universe, possessing boundless creative power. This supreme deity is articulated through the triune embodiment of the Hindu gods: Brahma, the creator; Vishnu, the preserver; and Shiva (or Siva), the destroyer. While Indian cultural and religious paradigms have significantly contributed to the formation and evolution of Cham culture, it is crucial to recognize that they constitute only one dimension of a multifaceted cultural identity (Duong, 2013).

Furthermore, the Cham culture represents a historical continuum that inherits and transforms the rich material and spiritual heritage of the Sa Huynh culture, an ancient indigenous civilization of Middle Region of Vietnam. This synthesis renders Cham culture a dynamic product of both indigenous innovations and regional intercultural exchanges. The material expressions of Cham culture are most prominently discernible in the domains of architecture, sculpture, and religious practice. The architectural legacy is epitomized by the construction of monumental temple complexes, known as Kalan, accompanied by intricate temple sculptures and towering edifices (towers) that serve as both religious symbols and embodiments of Cham cosmology and identity. These structures not only function as sacred spaces but also as enduring cultural markers, demonstrating the profound centrality of religion in Cham social life (Le, 2023).

In contemporary times, the remaining Cham population in Vietnam's Middle Region primarily consists of communities practicing two major religions: Balamon Hinduism and Islam. Notably, Cham society is characterized by a matriarchal social structure, where women possess considerable authority and influence within familial and communal contexts, distinguishing their social organization from many neighboring ethnic groups.

Spatial symbolism is also integral to Cham vernacular architecture and cosmology. For the Cham, the east holds profound religious significance, symbolizing the divine and the origin of life. Correspondingly, traditional Cham houses are oriented with the main facade facing south, a direction that embodies the essence of life and vitality. Two vernacular house types, known as *Nha Roi* (Type B) and *Nha La Mai* (Type D), typify Cham village architecture today. These forms encapsulate not only functional residential needs but also serve as tangible manifestations of the Cham's spiritual beliefs, cosmological understandings, and social values.

In summary, Cham culture represents a rich tapestry woven from indigenous traditions, regional Southeast Asian influences, and Indian religious heritage, materialized through its unique religious practices, architectural achievements, and social organization. This synthesis underscores the resilience and adaptability of the Cham people in preserving their identity amid the dynamic cultural currents of the region.

Cham traditional housing compounds are characterized by a distinctive spatial organization and a variety of specialized structures, each serving specific familial, functional, and symbolic purposes. The principal components of a Cham household typically include the following: (1) the “Thang Yo,” an ancillary house designated for the youngest daughter; (2) the “Thang Gar” or “Thang Lam,” which functions as the main house and symbolically represents the mother’s central role within the family; (3) the “Thang Gink,” the kitchen building, strategically located on the western side of the residence to accommodate culinary activities; (4) the “Thang Toy,” a guesthouse that serves dual purposes as a reception area and as accommodation for elderly parents or visiting guests; (5) the “Thang Khan,” an ancillary house assigned to the eldest daughters; (6) and (7) additional subsidiary structures used primarily for the storage of agricultural tools and equipment; (8) an open courtyard that facilitates communal activities and household interactions; (9) a water well that ensures a sustainable water supply; and (10) the gateway, which functions as the formal entrance to the compound (see Figures 20, 21, 22) (Le et al., 2011, pp. 59-64; Vietnamese National Association of Architects, 2002, pp. 188-189).

Of particular significance are the elemental houses—namely the Thang Yo, Thang Gar (or Thang Lam), and Thang Khan (see Figure 20, no. 1, 2, and 5)—which are often situated adjacently and are architecturally integrated through a shared gutter system. This design channels rainwater to a communal water feature known as the “Diem Hoa” holds profound symbolic and functional importance in Cham residential architecture. According to Cham belief, water flowing into the Diem Hoa possesses the capacity to neutralize and dissipate heat, thereby fostering familial harmony and preventing interpersonal conflicts within the household (see Figure 20). This concept underscores a fundamental philosophical principle in Cham domestic construction, wherein the management of natural elements such as water is intricately linked to social well-being and spiritual balance.

The orientation of the main house also carries symbolic meaning. The entrance often faces the “Khu Di” gable—a term which explicitly references female genitalia and metaphorically denotes the maternal figure in the family. This gable is distinguished by a characteristic triangular shape at its apex. The alignment of the main house follows an east-west axis along the top ridge beam, reflecting a deliberate spatial symbolism tied to gender and cosmology within Cham culture (Cao et al., 2025).

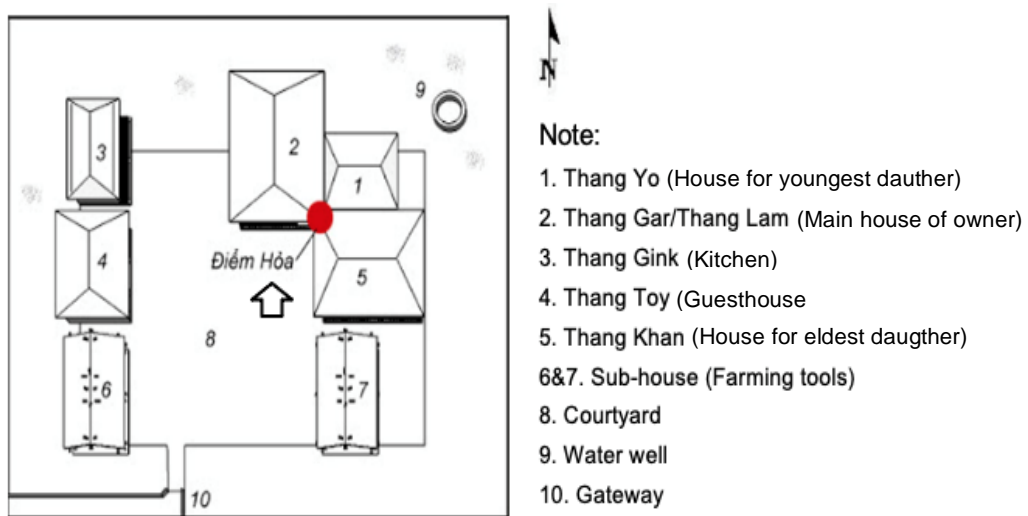


Figure 20: Site Plan of the Chams residence in Ninh Thuan Province. (South-Middle region). (Source: Author)



Figure 21: The residence bounded by the Dry-tree-fence. (Source: Author)



Figure 22: Main gateway of the Chams housing.
(Source: Author)

Cham dwellings are typically enclosed by fences constructed from dry tree materials (see Figures 21, 22), distinguishing them from Vietnamese houses that more commonly employ living vegetation or other materials for boundary delineation (see Figures 18, 19). The entrance gate to the compound generally faces south but is often deliberately oriented at an angle toward the southwest corner. This orientation may be understood as part of a broader geomantic practice aimed at optimizing auspicious spatial relations and harmonizing the household with natural and spiritual forces.

Together, these architectural features reveal a sophisticated integration of practical, symbolic, and cosmological considerations in Cham vernacular housing. They demonstrate how Cham architecture not only fulfills functional needs but also embodies complex cultural values related to family structure, gender roles, spiritual beliefs, and environmental harmony.

In assuming, this study analyzes the process of cultural acculturation through the interaction between the inherited culture of the indigenous Cham communities on their ancestral land and the culture of Vietnamese migrants who settled in the Cham territories. It investigates what “Cultural Baggage” these migrants from the North brought with them to the new land in order to adapt to the climatic and environmental conditions of Middle Region of Vietnam. Identifying this cultural baggage is essential for clearly recognizing all the inherited elements that the Northern Vietnamese introduced. Defining these ancestral elements as cultural baggage establishes an important baseline and an inherent point of inertia for clearly comparing the adaptive changes observed in Middle Region of Vietnam, particularly as manifested in the above-mentioned traditional houses of Type C and Type D.

2.2 Studies of vernacular houses in the Middle Region of Vietnam

2.2.1 Domestic studies

a) Tran Thi Que Ha (2005)

Tran Thi Que Ha, formerly a doctoral candidate at Showa Women’s University, contributed significantly to the study of Vietnamese vernacular architecture through her involvement in a comprehensive research project. This project incorporated extensive survey data collected from ten provinces and cities throughout Vietnam between 1997 and 2002, complemented by her own meticulous field investigations. Her doctoral dissertation, entitled *The History of Vietnamese Traditional Folk House Architecture*, was successfully completed in 2004 at Tokyo Metropolitan University. In addition to her dissertation, Tran published an influential article titled *The Origin and Evolution of Vietnamese Vernacular Architecture* in the journal of the National University of Singapore, (Tran, 2005) further disseminating her findings to the academic community.

The focus of Tran’s research lies primarily in the structural analysis, classification, and systematization of the wooden top-ridge beam—known locally as the *mai dong*—within Vietnamese vernacular houses. Her work is grounded in extensive empirical surveys conducted across Vietnam’s diverse climatic and cultural regions, spanning from the northern to the southern parts of the country. This wide geographical scope has enabled her to develop a nuanced typology and naming convention for structural components, as well as detailed dimensional characterizations, which serve as valuable references for

scholars and practitioners engaged in the study and conservation of traditional Vietnamese wooden architecture.

However, despite the significant contributions made by Tran Thi Que Ha, particularly in the realms of terminology and morphological documentation, her research does not yet comprehensively address the intricate technical dimensions of traditional architectural design and construction methodologies. Specifically, aspects such as joinery techniques, material selection criteria, structural load distribution, and the integration of vernacular knowledge systems into the construction process remain underexplored. This gap highlights the need for further interdisciplinary investigations that combine architectural history, engineering analysis, and ethnographic study to fully elucidate the complex construction logic underlying Vietnamese traditional wooden architecture.

Consequently, Tran's work provides a critical foundation and a rich empirical database that can inform subsequent research aimed at deepening the understanding of both the tangible and intangible heritage embedded in Vietnam's vernacular building traditions. Future studies building upon her framework could enhance conservation practices and contribute to the sustainable preservation of these culturally significant architectural forms.

b) Research by Le Vinh An and Nguyen Thi Thuy Vi (2001)

The published studies by Le Vinh An and Nguyen Thi Thuy Vi (2001, 2002) (Le & Nguyen, 2002a, 2002b; Nguyen & Le, 2001) focus on the terminology and fabrication technologies related to the traditional Nha Ruong architecture of Hue. Their work provides detailed accounts of the design instruments and crafting tools used in the production of structural components, as well as conceptualizations of spatial organization, architectural typologies, and the classification of roof frame systems within the Nha Ruong. These studies contribute significantly to the documentation and understanding of the traditional craftsmanship involved in this architectural form. However, despite this comprehensive treatment of terminology and fabrication tools, the research stops short of exploring the actual design methodologies and construction techniques employed in the building process. Thus, critical aspects such as architectural design procedures, structural assembly methods, and the practicalities of onsite construction remain underexplored in their work.

c) Research by Tran Ky Phuong, Shigeda Yukata, and Akiko Oyama (2018)

The 2018 article by Tran Ky Phuong, Shigeda Yukata, and Akiko Oyama examines the traditional houses known as Nha Ruong in the Quang Nam region through an architectural ethnographic lens. (Tran, 2018) This study primarily focuses on describing the architectural forms and systematically cataloging the vernacular terminology and component names associated with Nha Ruong construction. By emphasizing the local folk nomenclature and typologies, the paper offers valuable insights into the cultural significance and indigenous knowledge systems surrounding these traditional structures. However, the scope of the study is largely descriptive and terminological, with limited engagement in analyzing the underlying construction principles or technical aspects of Nha Ruong architecture. The ethnographic approach enriches the understanding of the sociocultural context of these houses but leaves opportunities for further technical and structural analysis.

d) Master thesis of Cao Dinh Son (2006)

Cao Dinh Son's 2006 master's thesis at the Ho Chi Minh City University of Architecture, *A Study on the Cultural Values of the Nha La Mai Vernacular Architecture in the South-Central Coastline of Vietnam*, examines the architectural, cultural, and environmental foundations shaping the Nha La Mai house type. (Cao, 2006)

The South-Central Coastline, a narrow coastal strip bordered by the East Sea and west-east mountain ranges, presents a challenging tropical climate with storms, floods, and droughts. Its inhabitants—descendants of Vietnamese settlers and indigenous Cham people—developed adaptive architectural solutions that embody both resilience and cultural hybridity.

The Nha La Mai typology exemplifies this adaptation. Architecturally, its hallmark is the “Trunk” roof truss system, which reduces structural components to enhance stability against strong winds. This system also integrates Cham cultural motifs, such as the “mortar” symbol, evolving into a distinctive regional identity.

Environmental responsiveness is reflected in site planning, material use, and construction methods. Earthen walls, layered roofs, and flexible spatial layouts improve climate control and functional adaptability while maintaining harmony with nature. Socially and spiritually, the houses blend Vietnamese and Cham traditions through ancestral worship spaces, wooden ornamentation, and Feng-Shui-based design principles.

Despite their cultural richness, Nha La Mai houses face pressures from modernization and neglect. Son's thesis calls for integrating traditional restoration techniques with modern technologies to sustain authenticity and durability. He further advocates for incorporating vernacular wisdom into contemporary design to shape a distinctly Vietnamese architectural identity rooted in tradition yet responsive to modern life.

e) Database of An Khang Company (2014)

From 2002 to 2014, An Khang Company ¹ undertook a systematic documentation project covering more than 170 traditional houses, primarily in the provinces of *Hue*, *Quang Nam*, and areas surrounding *Ho Chi Minh City*. Beyond domestic architecture, the company also carried out in-depth surveys of over 20 village communal halls and pagodas in *Thua Thien Hue* and *Quang Tri* provinces. Extending its research beyond the Middle Region of Vietnam, An Khang expanded the survey to include 25 additional communal halls and pagodas in northern provinces, thereby establishing a comprehensive and regionally diverse database of vernacular and religious architectural heritage.

The documentation process employed a combination of traditional and modern techniques to ensure accurate and detailed records of the surveyed structures. Fieldwork included meticulous hand sketching, precise Auto CAD-generated architectural drawings, and extensive digital photographic records. These methods captured multiple architectural elements, including master site plans, detailed floor plans, cross-sectional views, elevations, and both exterior and interior spatial configurations. Such comprehensive data collection provides a foundational resource not only for architectural analysis but also for the development of accurate three-dimensional models and simulations.

The resulting database serves as an invaluable repository for scholars, conservationists, and architects engaged in the study, preservation, and restoration of Vietnamese vernacular architecture and associated communal religious structures. By systematically cataloging these diverse building types, An Khang Company contributes significantly to safeguarding intangible cultural values embedded in traditional spatial organization, construction techniques, and aesthetic expressions. Furthermore, their work facilitates

¹ A Consulting Company (established in October 2009, located at 14 Tu Xuong street, Tay Loc ward, Hue city, Thua Thien Hue province, Vietnam), specializing in cultural heritage preservation, has undertaken extensive surveys and developed numerous preservation and restoration projects focused on traditional Vietnamese architecture in the The Middle Region of Vietnam.

informed decision-making in heritage management and promotes the integration of traditional architectural knowledge into contemporary conservation practices.

f) Research by Le Vinh An and Cao Dinh Son (2023)

The article authored by Le Vinh An and Cao Dinh Son (*Le & Cao, 2023*), offers a comprehensive review of significant prior scholarship concerning Vietnamese vernacular architecture, engaging with the works of prominent researchers such as Pierre Gourou, Léo Craste, Nguyen Bat Tuy, Tran Thi Que Ha, Kiyoshi Hirai, Hiromichi Tomoda, Tran Ky Phuong, Shigeeda Yutaka, Akiko Oyama, Nguyen Khac Tung, Nguyen Thi Thuy Vi, Vu Huu Minh, Le Vinh An, and Hayashi Hideaki. These foundational studies span a considerable temporal range, reflecting evolving perspectives and methodological approaches in the study of vernacular architecture. However, it is important to acknowledge that the vernacular buildings documented in these studies have often experienced significant transformations due to accelerating urbanization and economic development processes. Such changes have frequently led to a gradual erosion of traditional architectural values and practices, thereby underscoring the urgency and importance of contemporary research aimed at documentation, analysis, and conservation.

The majority of these earlier studies primarily concentrate on aspects of architectural typology, ethnological and sociological contexts, historical chronology, and construction techniques. These thematic focuses have collectively contributed a rich body of knowledge essential for understanding the complexity and diversity of Vietnamese vernacular architecture. Their detailed typological classifications, ethnographic insights, and technical descriptions provide valuable frameworks and comparative references that inform and support ongoing research in the field.

In their paper entitled *Study on Vietnamese Design Methods of Traditional Vernacular Architecture and Discussion on Their Technical Origins*, Le and Cao investigate the last remaining typical categories of Vietnamese traditional vernacular architecture, specifically focusing on the *Dinh* communal halls and the *Nha Ruong* vernacular houses. Although these structures are associated with the ethnic Vietnamese population, they embody distinctive indigenous architectural expressions unique to their regional contexts and derive from different technical origins. This differentiation

highlights the heterogeneity within Vietnamese vernacular architecture, reflecting varied cultural, environmental, and historical influences.

Le and Cao's research adopts an architectural technology perspective, emphasizing the technical foundations underpinning traditional design and construction methods. Their methodology integrates multiple empirical approaches, including extensive site surveys, in-depth interviews with master carpenters practicing traditional craftsmanship, and systematic analysis of carpentry tools and design processes. Furthermore, the authors employ prototyping techniques and experimental modeling to reconstruct and test design hypotheses, thereby elucidating the structural logic and material logic inherent in these vernacular architectures.

A key contribution of this study is the identification and characterization of the design methods employed in Vietnamese traditional vernacular architecture and the elucidation of their potential technical origins. Through their multi-disciplinary approach, the authors reveal how these indigenous-design methods embody accumulated knowledge adapted to local environmental conditions, material availability, and cultural values.

Moreover, the study addresses the phenomenon of architectural acculturation between the Vietnamese and the Cham peoples during the 16th to 19th centuries in Middle Region of Vietnam. This intercultural exchange led to hybridized architectural forms that simultaneously preserved ethnic identity and accommodated new influences, thereby enriching the architectural landscape of the region. By situating their research within this historical and cultural context, Le and Cao contribute to a more nuanced understanding of vernacular architecture as a dynamic and evolving cultural product rather than a static heritage form.

2.2.2 Foreign studies

a) Research by Pierre Gourou (1932, 1936)

Pierre Gourou was a distinguished French geographer renowned for his pioneering contributions to the study of rural societies and vernacular environments in Southeast Asia. In recognition of his significant achievements, he was awarded the prestigious Patron's Medal by the Royal Geographical Society in 1984. Among his earliest and most influential works is *The Peasants*

of the Tonkin Delta, originally published in 1936, which provided an in-depth examination of rural life in northern Vietnam.

Relevant to the study of vernacular houses in the Middle Region of Vietnam, Gourou authored the seminal paper titled *Esquisse d'une étude de l'habitation annamite dans l'Annam septentrional et Central du Thanh Hoa au Binh Dinh*, published by Art et Histoire in Paris in 1936. In this work, he conducted a comprehensive survey and analysis of the vernacular dwellings of the Vietnamese populations inhabiting the northern bank of the *Gianh* River and those residing within the middle delta region—historically the territory of the Cham people—focusing in particular on the architectural practices in Binh Dinh province.

This study represents one of the earliest scholarly resources to systematically document and differentiate the folk housing typologies of Vietnam's northern and central regions prior to 1932. Given that vernacular architecture traditionally served ordinary rural communities, often marginalized and undervalued in historical discourse, research on this subject was exceptionally scarce at the time. Consequently, Gourou's investigation is considered highly unusual for its period and remains invaluable as foundational historical evidence in the architectural history of Vietnam.

Through meticulous fieldwork and architectural ethnology methods, Gourou delineated the distinctive characteristics that separate the folk houses of the northern provinces of *Ha Tinh*, *Thanh Hoa*, and *Nghe An*—located on the northern bank of the *Gianh* River—from those found in the central provinces extending from *Quang Binh* to *Thua Thien Hue* provinces. Northern vernacular houses are particularly distinguished by their roofing techniques and specific wooden structural systems, which markedly contrast with those employed in the central region. In addition to structural and technical differences, the study identified significant variations in the use of construction materials, architectural concepts, and timber nomenclature.

Furthermore, Gourou's work highlights the typological distinctions within the Middle Region itself: vernacular houses in *Quang Nam* and *Quang Ngai* provinces are predominantly recognized as *Nha Ruong* houses, whereas in *Binh Dinh* province, the *Nha La Mai* house is prevalent (Gourou, 2001a). These typologies embody not only architectural differences but also reflect localized cultural adaptations and indigenous construction knowledge.

Given that Gourou's study was conducted in the early twentieth century, prior to 1932, it provides a rare and rich repository of empirical data and descriptive information about Vietnamese folk houses as they existed at that time—many of which have since disappeared due to modernization, urbanization, and socio-economic transformations. Although Gourou approached his analysis primarily from an architectural ethnological perspective, his documentation offers an essential reference point for subsequent researchers investigating the evolution, typology, and cultural significance of vernacular architecture in Vietnam.

In summary, Pierre Gourou's pioneering research lays critical groundwork for understanding the regional diversity of Vietnamese vernacular housing, serving as an indispensable historical record and scholarly foundation. His insights into the architectural distinctions across northern and Middle Region of Vietnam continue to inform contemporary studies on vernacular traditions and heritage preservation within the broader field of Southeast Asian architectural history.

b) Research by Léo Craste (1939)

Léo Craste (1887–1970) was a prominent French artist and scholar affiliated with the Indochina Fine Arts High School during the colonial period between 1925 and 1945 (Nguyen, 2017). In addition to his artistic contributions, including the renowned oil painting *Kenh Tau Hu Saigon* (1939),² Craste made significant scholarly contributions to the study of Vietnamese vernacular architecture. His pivotal publication, *Étude sur l'habitation Annamite à Hué et dans les environs*, appeared in the 1939 edition of the *Bulletin des Amis du Vieux Hué* (B.A.V.H.), where he undertook a systematic architectural study of folk houses in Hue and its surrounding regions (Craste, 1939).

Craste approached the study of *Hue's* vernacular dwellings through the lens of an architect, offering a comprehensive analysis that encompassed site planning, spatial organization within the houses, design principles, and construction methodologies, all deeply embedded within the local cultural context of *Hue*. His research was grounded in rigorous fieldwork, including interviews with master carpenters and the collection of oral histories, which

² <http://www.artnet.com/artists/leo-craste/>

provided invaluable insights into indigenous knowledge systems and building practices. Through careful observation and documentation, Craste produced detailed sketches and architectural drawings of the houses and their constituent elements, such as the *Tam Quan* gateway, *Binh Phong* screens, and traditional garden layouts, thus creating a rich visual and technical record of vernacular architecture in the region.

In addition to architectural form and spatial arrangements, Craste's study extensively examined the construction techniques and material use in wooden structures, noting the precise dimensions and proportions favored by local carpenters. He emphasized the significance of the *Thuoc Moc*, a traditional carpenter's measuring system that embodies the cultural and symbolic values inherent in Hue's architectural heritage. Furthermore, Craste documented the local customs related to construction rituals, including the selection of auspicious dates for building activities and the ceremonial worship of deities during construction, highlighting the integration of spiritual beliefs and craftsmanship in the building process.

Craste's detailed investigation provides a vital contribution to understanding the technical aspects of vernacular architecture in Middle Region of Vietnam. His focus on construction techniques and carpenter customs offers critical distinctions between the architectural technologies of the northern and middle regions of Vietnam, illuminating regional variations in building traditions and design methodologies. This nuanced perspective is especially relevant for studies aimed at architectural technology, as it bridges ethnographic observation with technical analysis, thereby informing contemporary research on vernacular architectural design and conservation.

By incorporating Craste's findings, scholars and practitioners gain a more profound appreciation of the culturally embedded construction knowledge that underpins *Hue's* vernacular architecture. His work serves as a foundational reference for advancing the study of traditional building technologies and supports the preservation and revitalization of indigenous architectural heritage in Vietnam.

c) *Research by Showa Woman's University (1997-2002)*

The collaborative research project titled *Investigation of Traditional Folk Houses Surveying Nationwide in Vietnam* was jointly undertaken by Showa

Women's University ³ in partnership with several prominent Vietnamese institutions, including the Department of Cultural Heritage under the Ministry of Culture of Vietnam, the Vietnam Association of Architects, Hanoi University of Architecture, and Ho Chi Minh City University of Architecture. This extensive survey initiative was financially supported by scientific research funding programs from the Japanese Ministry of Education and was conducted over the period from 1997 to 2004. The program was led by Professors Kiyoshi Hirai and Hiromichi Tomoda, who served as representatives and principal investigators.

A rigorous selection process by a panel of architectural and cultural heritage experts identified ten provinces across Vietnam for comprehensive field surveys between 1997 and 2002. These provinces spanned the geographical breadth of the country, encompassing *Bac Ninh, Ha Tay, Nam Dinh, Thanh Hoa, Nghe An, Thua Thien-Hue, Quang Nam, Quang Ngai, Dong Nai, and Tien Giang*. The survey methodology involved detailed documentation of vernacular residential architecture, with the first phase focusing on an extensive inventory of houses in each province. Specifically, the number of houses surveyed included 729 in *Bac Ninh*, 418 in *Ha Tay*, 300 in *Nam Dinh*, 350 in *Thanh Hoa*, 384 in *Nghe An*, 687 in *Thua Thien-Hue*, 361 in *Quang Nam*, 307 in *Quang Ngai*, and 401 combined in *Dong Nai* and *Tien Giang*, culminating in a total survey count exceeding 4,730 traditional houses. (Showa Woman's University and Vietnam Ministry of Construction, 1997)

The second phase of the project, conducted from 2002 to 2004, involved the establishment of detailed records and databases for over 350 selected houses identified by a collaborative team of Japanese and Vietnamese experts as being of significant architectural, historical, and cultural value. This phase aimed to facilitate in-depth analysis and conservation planning for these representative examples of Vietnam's vernacular heritage.

Chronological analysis of the surveyed structures revealed notable regional differences in the age and preservation of vernacular houses. In northern Vietnam, only a small fraction—less than 5%—of the houses surveyed were constructed during the 16th and 17th centuries. Among these, the oldest documented house is the residence of the Nguyen Thac family in Dinh Bang village, Tien Son commune, Bac Ninh province, precisely dated to

³ <https://en.swu.ac.jp/about/this-is-showa/>.

1734. Approximately 10% of northern houses date to the 18th century, while the majority were built during the 19th century and the early decades of the 20th century.

In contrast, vernacular houses in the central and southern regions predominantly date from the 19th century and the first half of the 20th century, accounting for more than 70% of the surveyed buildings. In Thua Thien Hue province, the residence of Mr. Nguyen Han in Kim Long, Hue City, constructed in 1853, stands as the oldest surviving house documented during the survey. Progressing further south to the provinces of *Quang Nam, Quang Ngai, Dong Nai, and Tien Giang*, the oldest vernacular houses are relatively more recent than those in *Hue*, reflecting differing patterns of settlement and development.

This comprehensive nationwide survey provides an invaluable empirical foundation for understanding the distribution, typology, and chronological development of Vietnamese traditional vernacular architecture. The data collected not only enhances scholarly knowledge but also supports ongoing heritage preservation efforts, particularly in regions where rapid urbanization and socio-economic change threaten the survival of historic structures. Moreover, the project highlights the need for regionally tailored conservation strategies that respect local architectural traditions and cultural contexts while accommodating contemporary needs.

d) Research by Waseda University (2006-2009)

Waseda University, in collaboration with the Department of Cultural Heritage under the Ministry of Culture of Vietnam and the Hue Monuments Conservation Center, conducted an extensive study and survey of monument records in *Hue* between 1995 and 2010. This research initiative included a detailed technical analysis of architectural heritage and the documentation of conservation and restoration proposals. Notably, the project encompassed the comprehensive restoration of the Worshipping Hall of *Dien Phuoc* Eldest Princess, located at 24 *Kim Long* Street, *Kim Long* Ward, *Hue* City. This restoration was carried out by the UNESCO Heritage Research Institute at Waseda University, Japan, over the period from September 2012 to November 2013.

The documentation produced during this restoration project offers invaluable insights into traditional construction techniques and provides

detailed information on the design methods of vernacular folk houses in *Hue*. It includes precise data on restoration methodologies, construction practices, and the artisanal skills of local carpenters, thus serving as an essential resource for scholars and practitioners engaged in the study and preservation of Vietnamese vernacular architecture. The meticulous recording of carpentry techniques, material usage, and design rationale illuminates indigenous knowledge systems that have sustained vernacular building traditions over centuries.

This body of research is particularly significant given the rapid decline in the number of traditional houses across Vietnam in recent decades, largely driven by accelerated economic development, urbanization, and the widespread adoption of modern construction technologies. Between 1997 and 2002, the documented surveys captured a critical snapshot of traditional residential architecture nationwide, preserving information about structures that are increasingly endangered or have already disappeared. As such, these archival records represent one of the most comprehensive and rich repositories of vernacular architectural knowledge available today.

Moving forward, the data and insights gleaned from Waseda University's collaborative efforts are poised to serve as foundational references for future heritage conservation, architectural research, and education. They support informed strategies that balance the preservation of cultural identity with the demands of modernization. Furthermore, this research underscores the urgency of safeguarding remaining vernacular houses and promotes the transmission of traditional craftsmanship techniques to new generations, ensuring the continuity and sustainability of Vietnam's architectural heritage.

e) Research by Hayyashi Hideaki (2010)

Research conducted by Hayashi Hideaki (2010),(Hayashi et al., 2009) along with graduate students and doctoral candidates at Waseda University, Japan, between 2006 and 2009, has contributed significantly to the understanding of traditional wooden architectural design methods in Middle Region of Vietnam. This body of work primarily focused on the *Nha Ruong* house typology, employing qualitative methodologies such as in-depth interviews with experienced traditional carpenters and experimental model studies to reconstruct and analyze the underlying design principles.

Through these investigations, the researchers were able to outline an initial framework of the *Nha Ruong* house's design methodology, capturing

aspects of carpentry techniques, spatial organization, and traditional construction processes as transmitted through generational craftsmanship. The use of experimental models allowed for a theoretical exploration of structural and aesthetic features, providing valuable insights into the vernacular design logic that governs these indigenous wooden dwellings.

Despite these important contributions, the research remains predominantly theoretical in nature, as it lacks comprehensive empirical analysis of the proportional systems and structural configurations found in extant *Nha Ruong* houses. The absence of rigorous measurement and structural evaluation of actual buildings limits the applicability of these findings to practical architectural conservation, restoration, or contemporary design adaptation. Consequently, the studies have yet to fully bridge the gap between conceptual design understanding and real-world architectural practice.

Moving forward, it is imperative that future research incorporates detailed field measurements, structural analyses, and material assessments of existing *Nha Ruong* houses to complement the theoretical models. Such an integrated approach would enhance the applicability of research outcomes, facilitating more informed conservation strategies, accurate restoration efforts, and the potential for adaptive reuse or innovative reinterpretation of traditional design methodologies within contemporary architectural contexts. This progression from theoretical to applied research is essential for the sustainable preservation and revitalization of Middle Region of Vietnam's wooden vernacular architecture.

2.3 Theory and Concepts of Acculturation

2.3.1 Acculturation theory in the Global context

Acculturation theory occupies a central position in the study of cultural interaction, migration, and identity formation. At its core, the concept of acculturation refers to the processes of cultural change that occur when two or more cultural groups come into sustained contact, leading to transformations in practices, values, and social institutions. Although originally developed within anthropology in the early twentieth century, acculturation theory has since evolved into an interdisciplinary framework that engages anthropology, sociology, psychology, education, and architectural studies. The term “acculturation” was first systematically articulated in the 1936 Memorandum of the Social Science Research Council, which defined it as the

“phenomena which result when groups of individuals having different cultures come into continuous first-hand contact, with subsequent changes in the original cultural patterns of either or both groups.” Early studies tended to adopt a unilinear perspective, often framing acculturation as a process of assimilation into a dominant culture. This reflected the intellectual and political milieu of colonial and postcolonial contexts, where cultural contact was frequently unequal and coercive (Redfield et al., 1936).

From the latter half of the twentieth century, scholars such as John W. Berry advanced a more nuanced and multidimensional understanding of acculturation, emphasizing that cultural exchange does not necessarily lead to total assimilation (Berry, 1997). Berry’s model identifies four primary strategies: assimilation (adoption of the dominant culture), separation (retention of original culture), integration (maintenance of original culture while adopting elements of the dominant one), and marginalization (loss of both). This model has been widely applied in migration studies, cross-cultural psychology, and education, highlighting the agency of individuals and groups in negotiating cultural identities (Oliver, 2007).

Recent scholarship critiques earlier assimilationist paradigms and stresses the bidirectional and interactive nature of acculturation. Cultural contact is increasingly seen as a process of mutual transformation, where both dominant and minority groups can undergo change. This perspective is particularly relevant in contexts of globalization, transnational migration, and diaspora studies, where cultural flows are multidirectional rather than hierarchical.

Acculturation theory has also been extended to material culture and architecture, where hybrid forms and techniques emerge from prolonged intercultural exchanges (Waterson, 1990). In vernacular architecture, for instance, acculturation can manifest in building typologies, structural systems, or symbolic ornamentation that combine elements of different cultural traditions. Such interpretations move beyond treating architecture as a static cultural marker, instead framing it as an evolving outcome of negotiation, adaptation, and resilience.

In a world increasingly defined by cultural interconnectedness, acculturation theory provides critical tools for analyzing how communities maintain, transform, or reconfigure their cultural practices. Its insights contribute not only to academic debates on identity, hybridity, and cultural

resilience, but also to policy making in areas such as multicultural education, urban planning, and heritage conservation. By acknowledging both the tensions and creative potentials inherent in cultural encounters, acculturation theory underscores the dynamic processes through which global societies continuously reshape themselves.

2.3.2. Acculturation in Architecture and Heritage studies

In architecture and heritage studies, acculturation theory has been employed to explain how built environments embody processes of cultural negotiation, hybridization, and continuity. Unlike in psychology or sociology, where acculturation often emphasizes individual or community identity, in architecture it is manifested materially — in construction techniques, spatial organization, decorative vocabularies, and symbolic expression.

Architectural acculturation is evident in contexts of migration, colonization, trade, and intercultural contact, where local building traditions assimilate, adapt, or hybridize with external influences. Scholars emphasize that this process rarely produces unilateral assimilation; instead, it generates hybrid forms that balance resilience, functionality, and symbolic identity (González-Ruibal, 2006). These hybrids are not static; rather, they evolve through iterative adaptation, negotiation of meanings, and responses to environmental or socio-political pressures.

In Southeast Asia, architectural acculturation has been studied in colonial hybridizations (e.g., Dutch–Javanese houses in Indonesia), vernacular adaptations (e.g., Chinese shop-houses in Singapore and Malacca), and indigenous exchanges (e.g., Cham–Vietnamese houses in The Middle Region of Vietnam). These cases demonstrate how indigenous techniques such as timber joinery, roofing systems, or climatic adaptations were preserved or transformed within new socio-cultural frameworks (Kusno, 2010; Nas, 2006).

In heritage studies, acculturation frameworks are used to understand the layered identities of monuments and vernacular settlements. Built heritage is often the material evidence of sustained cultural contact, where preservation must address both the tangible (construction systems, spatial forms) and intangible (knowledge systems, rituals, meanings) aspects of acculturated architecture (Logan, 2002). This approach challenges static notions of “authenticity” by recognizing hybridity and intercultural synthesis as intrinsic to heritage value (Harrison, 2012).

From a conservation perspective, acculturation theory underscores the importance of safeguarding hybrid traditions as living testimonies of intercultural resilience. These traditions not only embody aesthetic and technical ingenuity but also illustrate how communities negotiated identity and adaptation in historically pluralistic societies.

2.3.3 Acculturation phenomenon between Vietnamese and the Chams

The prolonged coexistence between the Vietnamese and the Chams—often marked by intermittent hostility—played a significant role in shaping the cultural and architectural landscape of Middle Region of Vietnam (see Figures 23, 24). This dynamic interaction compelled the Vietnamese settlers to adapt to unfamiliar environmental and social conditions and to assimilate aspects of Cham cultural knowledge, thereby enhancing their ability to survive and thrive in the region. The phenomenon of acculturation between these two ethnic groups manifested across multiple dimensions of daily life, with language, religious beliefs, and architecture being the most prominent arenas of cultural exchange (see Figures 24, 25, 26, 27, 28).

Among the various forms of cultural transmission, the influence of Cham agricultural and aquacultural practices on the Vietnamese immigrants stands out as particularly noteworthy. The Chams' advanced knowledge in rice cultivation, irrigation systems, and fish-breeding techniques was gradually adopted by the Vietnamese settlers, contributing to the development of a sustainable agrarian economy well-suited to the diverse and often challenging natural environment of the middle region (Li, 1998). These technological and ecological adaptations were crucial in enabling the Vietnamese communities to establish permanent settlements and maintain food security in a region characterized by monsoonal climates and complex terrain.



Figure 23: The Van Mieu Temple worship for Confucius (Hue City, Thua Thien Hue Province)
(Source: collected by Phan Thuan An)



Figure 24: The Thien Mu Pagoda (Pagoda of the Celestial Lady) worship for Buddhist in Hue City, Thua Thien Hue Province
(Source: collected by Phan Thuan An)



Figure 25: The Po Klong Galai Cham's Tower in Phan Rang City, Ninh Thuan Province.

(Source: Author)



Figure 26: The interior of Po Klong Galai Cham's Tower
(Source: Author)



Figure 27: The Cham's stone reliefs at the Chien Dan Tower in Quang Nam Province.

(Source: Author)



Figure 28: Linga Shiva stone sculpture at the Chien Dan Tower.

(Source: Author)

Conversely, historical accounts suggest that the Chams exhibited a degree of cultural insularity and resistance to adopting new knowledge introduced by the Vietnamese, which contributed to their gradual socio-political decline and marginalization (Taylor, 2013). Despite this, the Vietnamese did assimilate critical architectural and construction techniques from the Chams, notably the sophisticated methods of building fortified brick structures—strongholds designed to withstand both military aggression and environmental stresses—as well as vernacular architectural solutions optimized for the region’s extreme weather conditions. (Tran & Lockhart, 2011)

This intercultural exchange in architectural technology arguably catalyzed the evolution of distinctive vernacular house types within the middle region, reflecting a hybridization of indigenous Cham and Vietnamese building traditions (Hardy et al., 2009). The process of acculturation, driven by centuries of mutual coexistence and gradual assimilation, thus fostered the emergence of new architectural typologies that integrated the structural resilience and spatial organization characteristic of Cham design with Vietnamese cultural and functional requirements (Le & Cao, 2023; Oliver, 2007).

The acculturation phenomenon between the Vietnamese and the Chams underscores the complex interplay between cultural dominance, adaptation, and resistance in multiethnic contexts (Berry, 1997). While the Vietnamese settlers displayed pragmatism and openness in adopting Cham knowledge—particularly in agricultural and architectural domains—the relative cultural conservatism of the Chams may be interpreted as a response to the pressures of Vietnamese expansion and sociopolitical marginalization (Waterson, 1990).

From an architectural perspective, the blending of Cham and Vietnamese building techniques reveals how vernacular architecture functions not only as a material expression of cultural identity but also as a dynamic repository of intercultural negotiation and innovation (Tran & Lockhart, 2011). The hybrid vernacular forms that resulted from this exchange exemplify how environmental exigencies, cultural values, and technical knowledge converge to shape built environments that are both adaptive and meaningful to their inhabitants.

This historical case invites broader reflection on the role of acculturation in architectural evolution. It highlights the importance of understanding vernacular architecture not as a static artifact but as a living tradition subject to

continuous reinterpretation and synthesis. Moreover, the legacy of Vietnamese-Cham acculturation offers valuable lessons for contemporary architectural conservation and design, emphasizing the potential for intercultural dialogue to inform resilient, contextually grounded architectural solutions in regions characterized by ethnic diversity and environmental challenges.

The Vietnamese acquired significant architectural and construction expertise from the Chams, particularly in the construction of resilient brick fortifications and vernacular building techniques specifically adapted to endure the extreme climatic conditions characteristic of Vietnam's central region. This transfer of technical knowledge and building practices played a critical role in shaping the evolution of vernacular architecture in the area. Over centuries of sustained coexistence and cultural interaction, this exchange facilitated the emergence of innovative housing typologies that synthesized indigenous Cham construction methods with Vietnamese architectural traditions. The resulting hybrid forms not only enhanced the structural durability and environmental responsiveness of vernacular dwellings but also embodied the complex processes of cultural assimilation and adaptation, reflecting a dynamic interplay between functionality, identity, and environmental exigency (Quang, 2005; Tran & Lockhart, 2011).

The prolonged coexistence of Vietnamese immigrants with the indigenous Cham populations in Vietnam's Middle Region profoundly influenced the cultural, social, and economic fabric of the settlers. This intercultural engagement led to significant transformations in the customs, production methods, and religious practices of the Vietnamese communities, contributing to a gradual cultural differentiation from their northern counterparts (Le, 1955; Taylor, 2013). The assimilation and adaptation processes reflected the necessity to negotiate new environmental conditions and social realities distinct from those of the Red River delta and northern Vietnam, thereby fostering the emergence of a unique regional identity within Middle Region of Vietnam (Hardy, 2005).

Concurrently, the political dynamics of the period played a crucial role in shaping the historical trajectory of the region. The persistent desire among Vietnamese elites to escape the authoritarian control exerted by the Le Kings and the Trinh Lords in the Kingdom of Tonkin spurred strategic initiatives aimed at securing political autonomy. The Nguyen Lords capitalized on this

impetus, implementing effective governance and military strategies that ultimately culminated in the establishment of the Family of Nguyen's dominion over the central region. This development marked a pivotal turning point in Vietnamese history, as it laid the foundation for a semi-independent polity that would evolve into the Nguyen Dynasty, thereby reshaping the political landscape of Vietnam and influencing its socio-cultural evolution in subsequent centuries.

The dual processes of cultural adaptation and political consolidation in Middle Region of Vietnam during this period underscore the complex interplay between ethnic interaction and state formation. The Vietnamese settlers' cultural divergence from northern traditions illustrates how migration and settlement in a heterogeneous environment catalyze regional distinctiveness. This phenomenon aligns with broader theoretical frameworks on cultural hybridity and regionalism, wherein communities develop differentiated identities through selective assimilation and innovation in response to localized conditions.

Politically, the Nguyen Lords' assertion of autonomy from the northern feudal monarchy reflects the shifting power dynamics within pre-modern Vietnam and highlights the role of regional leadership in contesting centralized authority. Their successful establishment of an independent domain in the Middle Region not only altered Vietnam's internal political geography but also influenced patterns of cultural exchange and integration, as the emergent polity sought to legitimize itself through both indigenous traditions and external influences.

Together, these cultural and political transformations illustrate the central region's critical role as a site of negotiation, resistance, and innovation, shaping Vietnam's historical trajectory. The nuanced understanding of this period contributes to a more comprehensive historiography of Vietnam, emphasizing the significance of regional interactions in the formation of national identity and statehood (Lockhart, 2011, pp. 100-125).

2.3.4 Acculturation in the field of Socio-culture of Vietnamese and the Chams

The Vietnamese relationship with their natural environment is often characterized by the above-mentioned philosophy of "depending on improvisation," a concept that metaphorically aligns with the qualities of

water—softness, flexibility, and resilience. Within Vietnamese cultural paradigms, water holds profound symbolic significance, representing adaptability and endurance in the face of constant change. This symbolism permeates multiple dimensions of Vietnamese life, notably influencing agricultural practices, production methods, and broader socio-economic activities. The inherent flexibility attributed to water manifests in nuanced approaches to farming and resource management, where practitioners continuously adjust their techniques in response to seasonal variations and environmental uncertainties (Jamieson, 1993).

A fundamental aspect of Vietnamese cultural behavior is a deep-seated respect for nature, grounded in a holistic understanding of the environment's impact on human well-being and survival. This reverence informs a sustainable interaction with the natural world, emphasizing coexistence rather than domination. Particularly in the Middle Region of Vietnam, where climatic challenges such as monsoonal rains, intense sun exposure, and variable topography prevail, the Vietnamese have developed sophisticated adaptive strategies. These strategies foreground the critical elements of rain, sun, earth, and sky, guiding the organization of residential layouts, agricultural calendars, and production cycles to align harmoniously with natural rhythms (Nguyen, 1993).

The vernacular architecture of this region further exemplifies this symbiotic relationship with nature. Traditional Vietnamese houses are deliberately designed to integrate open spaces, verdant vegetation, and water features, fostering natural ventilation, shading, and microclimatic regulation. Construction materials are predominantly sourced locally, utilizing timber, bamboo, thatch, and clay, which not only ensure environmental compatibility but also maintain cultural continuity. This architectural ethos reflects a broader cultural inclination towards harmonizing built environments with the surrounding ecosystem, minimizing ecological disruption while optimizing human comfort.

The settlement patterns in the Middle Region illustrate the interplay between migration, environmental adaptation, and intercultural exchange. Vietnamese immigrants, expanding southward over more than a millennium, transported northern customs and socio-cultural frameworks, yet these were continually modified in response to the distinct microclimatic and geographic

conditions of the region. The presence of the indigenous Cham population further enriched this dynamic, as prolonged coexistence led to reciprocal influences in cultural practices, spatial organization, and material culture. This interaction catalyzed the evolution of a vernacular lifestyle markedly distinct from that of northern Vietnam.

One salient cultural shift observable in the Middle Region is the transition from a traditional ethos of “stillness”—characterized by static, permanent architectural forms, and settlement patterns—to a “mobile” or more flexible orientation (Tran, 2001). This shift reflects practical adaptations to the region’s variable environmental conditions, including seasonal floods, typhoons, and soil instability. The resultant architectural and social practices prioritize adaptability, resilience, and fluidity, enabling communities to better navigate ecological challenges while maintaining social cohesion.

In sum, the Vietnamese engagement with the natural environment in the Middle Region embodies a complex interplay of cultural symbolism, environmental pragmatism, and intercultural synthesis. This multifaceted relationship has produced distinctive architectural typologies, settlement patterns, and socio-cultural practices that both honor ancestral traditions and respond innovatively to the exigencies of a challenging landscape. Understanding these adaptive strategies provides valuable insights into the sustainable vernacular heritage of Vietnam and offers relevant paradigms for contemporary environmental design and cultural preservation.

2.3.5 Acculturation in Vernacular Architecture of Vietnamese and the Chams

Vernacular architecture emerges as the tangible manifestation of a complex interplay of cultural activities, simultaneously serving as both a physical artifact and an embodiment of the intangible values and traditions cherished by ethnic communities. This architecture reflects a broad spectrum of influences, including but not limited to the natural environment, occupational practices, social hierarchies and relations, cultural sophistication, customary rituals, religious doctrines, and aesthetic ideals. Moreover, processes of cultural exchange and acculturation among neighboring and coexisting ethnic groups further shape the distinctive characteristics embedded within indigenous architectural expressions. As such, vernacular architecture functions as a dynamic cultural repository, faithfully encapsulating the lived experiences, identity, and worldview of the communities that produce it.

From the perspective of the history of construction technology, an intriguing paradox emerges: the durability and longevity of architectural materials often stand in inverse relation to the temporal persistence of the technologies that produce them. In the context of Middle Region of Vietnam, this paradox is especially pronounced. Traditional architectural materials such as bamboo and wood, while culturally and environmentally appropriate, possess limited lifespan under the region's harsh climatic conditions characterized by intense humidity, typhoons, and seasonal monsoons. This environmental vulnerability has precipitated a conservatism within traditional construction technologies, manifesting as an adaptive response aimed at mitigating the ephemeral nature of architectural works. Consequently, the technological frameworks and methods underlying construction are often far more ancient and enduring than the physical structures they produce, underscoring a continuity of knowledge transmission that transcends the material impermanence of vernacular buildings (Rapoport, 1969).

When examining the architectural history and regional cultural identity of Middle Region of Vietnam, the vernacular house typologies discussed herein represent phenomena unique to this geographical area. These forms exhibit distinctive architectural morphologies, structural logics, carpentry tools, and design methodologies that markedly diverge from the wooden architectural traditions of Northern Vietnam, which are predominantly rooted in Southern Song dynasty Chinese techniques. Furthermore, they differ substantially from the vernacular wooden architectures of other East Asian cultures that similarly derive from Chinese civilization, including Japan and the Korean Peninsula. Comparatively, when juxtaposed against the indigenous architectural traditions of Southeast Asian countries influenced historically by Indian civilization—such as Champa, Myanmar, Thailand, Cambodia, and Laos—the vernacular houses of Middle Region of Vietnam continue to display significant dissimilarities in form, function, and construction technology (Le & Cao, 2023).

This divergence raises fundamental questions regarding the origins and historical emergence of Middle Region of Vietnam's vernacular architectural forms. If these houses neither derive from Chinese construction paradigms nor directly evolve from regional indigenous architectural lineages, what are their true origins? When did these unique typologies first appear within the architectural landscape of the region? Addressing these questions necessitates a

multidisciplinary approach, combining cultural, social, and ethnological scholarship to construct a robust theoretical framework that contextualizes these architectural phenomena.

Moreover, the acculturation processes occurring over centuries—manifested through historical interactions among diverse ethnic communities, including Vietnamese and Cham populations—must be concretely illustrated through the material culture of architecture. Within this context, it becomes imperative to discern which of the three fundamental architectural dimensions—function, structure, or aesthetics—serve as the principal vectors of acculturation, and which external or intrinsic factors most significantly influence the formation and persistence of indigenous vernacular architectures observed today.

Typically, architectural form is regarded as the most malleable aspect, susceptible to changes in aesthetic preferences, social trends, and intercultural fashions, varying notably across temporal and spatial contexts. In contrast, architectural function and structure are comparatively conservative elements, deeply rooted in practical knowledge and experiential wisdom accrued through successive generations of construction practice. These elements demonstrate a resilience that preserves the core principles of architectural production despite evolving external influences.

Therefore, to ensure methodological rigor and evidentiary validity, this research adopts an architectural technology approach as its foundational analytical framework. This approach prioritizes the investigation of construction methods, material properties, structural systems, and design rationales, thereby offering a more stable and objective lens through which to understand the developmental trajectories and mutation patterns of vernacular architecture in the Middle Region of Vietnam.

The investigation of vernacular architecture through an integrated lens of cultural anthropology, ethnology, and architectural technology facilitates a nuanced understanding of how built environments encode complex social and environmental interactions. The conservatism observed in structural and functional elements across diverse vernacular houses suggests that technical knowledge—particularly relating to structural integrity and climatic adaptability—constitutes a critical domain of cultural continuity. Meanwhile, variations in architectural form and decorative aesthetics may be interpreted as

dynamic cultural expressions that respond to shifting social values and external influences, including trade, migration, and political change.

Furthermore, the unique architectural identity of the Middle Region of Vietnam, as distinguished from neighboring regions and countries, underscores the importance of localized innovation within vernacular traditions. This localization reflects both ecological exigencies and socio-cultural negotiations, revealing how communities actively construct environments that are simultaneously functional, symbolic, and adaptive.

Ultimately, this study affirms that a comprehensive understanding of vernacular architecture must transcend purely stylistic or typological analyses to embrace the interplay between enduring technical knowledge and evolving cultural practices. Such an approach not only enriches architectural historiography but also informs contemporary preservation efforts and sustainable design strategies that honor indigenous wisdom while accommodating modern needs.

2.4 Necessary of the study topic

Cultural acculturation is a pervasive and dynamic process that naturally arises from prolonged interaction between neighboring ethnic groups within a shared geographical region or between dominant and subordinate societies in contexts of territorial expansion, political dominance, or economic influence. Over time, the tangible and intangible products of such acculturation—ranging from language and customs to material culture and social institutions—become intricately woven into the fabric of each group's indigenous identity. This complex intermingling often renders the clear delineation of original cultural traits challenging, as borrowed elements are adapted, reinterpreted, and localized to produce hybrid forms that transcend simple categorizations of similarity or difference.

Within the domain of architecture, cultural acculturation manifests vividly, reflecting the interplay of human creativity, environmental adaptation, and socio-spiritual imperatives. Architectural forms and construction methods serve as both practical responses to accommodation needs and as symbolic expressions of collective identity, belief systems, and cultural values. The phenomenon of acculturation in architecture raises critical questions: How does cultural exchange and assimilation transpire within the built environment? Are there discernible patterns or governing principles that regulate the transmission

and transformation of architectural knowledge and practices? What foundational factors underlie the process of acculturation, and how do these factors facilitate the emergence of novel architectural values that resonate with and serve contemporary society?

This study adopts a focused lens on architectural technology to elucidate these questions. By examining the shared and divergent construction techniques, design methodologies, and material usage between the Vietnamese and Cham communities during centuries of coexistence, the research seeks to identify the mechanisms and rules underpinning architectural acculturation. The emphasis on technological aspects—encompassing carpentry tools, structural systems, and spatial organization—offers a concrete basis for tracing the flow of knowledge and adaptation beyond mere stylistic imitation.

Furthermore, the study situates architectural acculturation within a broader conceptual framework that highlights the imperative of sustainability—a multifaceted principle encompassing cultural continuity, environmental stewardship, and social resilience. Recognizing architecture as an interface between humans and their natural surroundings, the research underscores the necessity of maintaining a symbiotic relationship that honors traditional ecological wisdom while responding innovatively to contemporary challenges.

The outcomes of this inquiry are twofold. First, they provide a systematic articulation of acculturation patterns that inform the understanding of vernacular architectural evolution in Middle Region of Vietnam context. Second, they inform strategic frameworks for the conservation and development of cultural heritage values, advocating for preservation approaches that balance respect for historical authenticity with adaptability to present-day societal needs. This integrative perspective aims to inspire architectural practice and policy that sustain the living legacy of indigenous cultures while fostering innovation in harmony with environmental and social imperatives.

2.5 Chapter conclusion 2

Vietnamese culture is fundamentally underpinned by Buddhism as its spiritual foundation and Confucianism as its moral framework. Within this context, Vietnamese society is traditionally patriarchal, with social order

maintained through the principles of filial piety and reinforced by religious beliefs. This patriarchal structure profoundly influences cultural practices related to domestic architecture and funerary customs. Specifically, when constructing houses and tombs, the Vietnamese customarily consult geomancers or Feng-Shui specialists to evaluate the land's topography, seeking sites aligned with the concept of "Long Mach" — a geomantic notion denoting land that promises prosperity and well-being for the family. The selection of the site and the orientation of the main house are therefore governed by a complex set of Feng-Shui principles, which emphasize harmony with natural forces and cosmic order. This intricate spatial planning is not merely practical but is deeply embedded in Vietnamese spiritual life, symbolizing the interconnectedness of the physical environment and the family's fortune.

In contrast, the remaining Cham communities in Middle Region of Vietnam follow different religious and social paradigms, principally adhering to Balamon Hinduism and Islam. Cham society is characterized by a matriarchal social structure, wherein women and elders hold preeminent positions of authority and respect, diverging markedly from the Vietnamese patriarchal model. The Cham emphasize the practical functionality of each architectural element within their living spaces, eschewing the complex geomantic doctrines such as Feng-Shui that are integral to Vietnamese housing design.

The distinctions between Cham and Vietnamese residential architecture are also reflected in the orientation and symbolic significance of the main house entrance. For the Cham, the entrance typically aligns with the "Khu Di" gable—positioned along the top-ridge beam—and symbolically represents femininity and motherhood, thereby underscoring the matriarchal orientation of their society. Conversely, the Vietnamese main house entrance is oriented perpendicular to the ridge beam, directing access toward the ancestral altar, and thereby manifesting the patrilineal and patriarchal emphasis of their social structure.

Material and spatial configurations further differentiate the two cultures' housing traditions. Vietnamese homes commonly feature green tree fences composed of living plants, reinforcing a symbolic connection to nature and vitality. In contrast, Cham households utilize fences constructed from dry tree materials, which may reflect different ecological adaptations and cultural

aesthetics. Additionally, Vietnamese multi-generational families often reside within a single integrated household, fostering cohabitation and continuity of lineage. The Cham, however, traditionally occupy multiple discrete structures within a compound, each designated for specific family members or functions.

Religious practices within domestic spaces also vary significantly. Vietnamese households typically engage in the worship of ancestors alongside a pantheon of polytheistic deities, incorporating multiple layers of spiritual observance within the home. By contrast, the Cham concentrate their religious veneration predominantly in communal temples, where their religious symbols and rituals are performed, distinguishing between sacred and domestic spheres.

These comparative cultural and architectural distinctions illustrate how religious beliefs, social organization, and cosmological principles manifest materially in vernacular housing, reflecting the divergent worldviews of the Vietnamese and Cham peoples.

Previous research on traditional Vietnamese housing, particularly vernacular architecture in the middle delta region of Vietnam, has largely focused on typological descriptions, cultural contexts, and ethnographic observations. However, these studies have not sufficiently addressed the critical technical dimensions of vernacular architecture—specifically, the design methodologies, construction techniques, and the underlying technical origins that characterize this distinct architectural form. This lacuna presents significant questions that remain underexplored: Why are certain types of vernacular houses uniquely found in the middle delta region, while other architectural typologies predominate in the northern and southern regions of Vietnam? What are the historical and cultural origins of these middle delta architectural forms? When did these structures first emerge, and through what processes were they developed? Moreover, who were the original owners, craftsmen, or cultural agents responsible for their creation and transmission?

These inquiries highlight fundamental gaps in the current body of scholarship and underscore the need for a more comprehensive and technically grounded investigation into the vernacular architecture of this region. Such an investigation must move beyond surface-level typology and delve into the intricate relationships between cultural identity, environmental adaptation, and technological innovation that inform architectural production.

Within this research landscape, the master's thesis of Dinh Son CAO emerges as a particularly valuable foundation. CAO's study offers critical insights into the cultural values and architectural features of the Nha La Mai vernacular house—one of the key typologies within the middle delta region. This thesis not only provides rich empirical data but also frames the Nha La Mai architecture as a pivotal site of cultural acculturation between Vietnamese settlers and the indigenous Cham population. Building upon CAO's findings, the present study seeks to inherit and extend this knowledge through comparative analyses with other vernacular forms in the region, thereby advancing a nuanced understanding of the interplay between ethnic identities, environmental exigencies, and architectural expression.

Central to this research is the concept of acculturation—a complex process by which cultural groups exchange, adapt, and transform material and immaterial cultural traits over time. The vernacular architecture of the middle delta region stands as a tangible testament to centuries of interaction between the Vietnamese and Cham peoples, reflecting both the tensions and syntheses that characterize their shared history. This study aims to systematically elucidate the principles and mechanisms of architectural acculturation manifested in building forms, construction technologies, spatial organization, and aesthetic expressions.

Addressing these questions holds significant academic value within the broader field of Southeast Asian architectural history. It contributes to a deeper understanding of how vernacular architecture operates as a dynamic cultural artifact shaped by migration, environmental challenges, social structures, and intercultural dialogue.

In sum, this study aspires not only to fill existing scholarly gaps but also to articulate a comprehensive theoretical framework for interpreting the architectural heritage of the middle delta region. By doing so, it enriches the discourse on cultural hybridity, technological transmission, and the enduring legacy of vernacular architecture in Southeast Asia.

Chapter Three

Research Methodology

This chapter explains the methodological framework adopted in this study. It outlines the overall research approach, defines the scope of the site investigations, and presents the methods used to collect and analyze data. The discussion includes literature review strategies, fieldwork procedures, and analytical techniques applied to interpret both qualitative and quantitative information. By clarifying these methodological steps, the chapter ensures the transparency, reliability, and validity of the research process that supports the findings in subsequent chapters.

3.1 Research approach and scope of the site investigation

This study adopts a multidisciplinary research approach grounded in the perspectives of architectural typology and the technological history of architecture. It integrates various methodologies including historical research—drawing upon Han-Nom documents and archival written records—alongside qualitative interviews with traditional carpenters and homeowners who maintain generational knowledge of vernacular construction. Complementing this, a systematic statistical classification of the vernacular houses has been undertaken, alongside detailed analyses of architectural design principles and construction techniques, with particular focus on timber framing and roofing systems.

The geographic scope of this investigation is delineated from the southern bank of the *Gianh* River in the former *Quang Binh* Province extending southward to the northern boundary of the former Binh Thuan Province. This corridor is distinguished by its rich preservation of diverse traditional vernacular house types and represents a significant cultural and historical zone. Notably, this area was historically part of the Cham principalities prior to the 16th century and subsequently became a vibrant settlement zone for Vietnamese, Cham, Japanese, and Chinese communities during the 16th to 19th centuries. *Hoi An*, in particular, located in the former *Quang Nam* Province, emerged as a key node of intercultural interaction. The prolonged coexistence and exchange among these ethnic groups catalyzed a profound process of cultural acculturation, which is palpably reflected in the material culture and architectural heritage of present-day Middle Region of Vietnam.

According to architectural historians, the phenomenon of architectural acculturation between the Vietnamese and the Cham peoples commenced as early as 1558, coinciding with Lord Nguyen Hoang's governance over the regions of *Thuan Hoa* and *Quang Nam*. This political realignment established the Kingdom of Cochin-China on the erstwhile territory of the Cham principalities and initiated a sustained process of cultural synthesis and adaptation. This acculturation process represents one of the most enduring and influential cultural interactions in the region. Alongside Vietnamese-Cham acculturation, similar intercultural exchanges occurred among the Vietnamese, Japanese, and Chinese communities, particularly evident in the urban fabric of *Hoi An Ancient Town* (historically known as *Faifo*), *Thanh Ha Port*, and the *Gia Hoi Ancient Quarter* of the Imperial Capital of *Hue* during the Nguyen Dynasty era (1802–1945).

The primary objects of investigation in this study encompass vernacular residential architectures, including the *Nha Roi*, *Nha Ruong*, and *Nha La Mai* house typologies, as well as their regional variants and adaptations. These architectural typologies collectively span a historical timeframe exceeding one century and, although many have undergone restoration or renovation by their custodians, they retain distinct architectural forms, typological features, and construction techniques endemic exclusively to the Middle Region of Vietnam.

The uniqueness of these vernacular architectures is underscored by their divergence from both northern and southern Vietnamese traditional housing forms, as well as their differentiation from broader East and Southeast Asian architectural traditions. This study therefore positions these vernacular buildings as a critical focus for understanding the intersection of ethnic identity, historical acculturation, environmental adaptation, and technological evolution in Vietnamese architecture. Through an in-depth examination of their morphological, technical, and cultural dimensions, this research aims to contribute to the broader discourse on regional architectural history and heritage conservation, elucidating how vernacular forms serve as living testimonies to Middle Region of Vietnam's complex intercultural past and its ongoing cultural resilience.

The foundational research undertaken by the aforementioned scholars has offered essential insights and methodological frameworks that significantly inform and guide the present study. Building upon their contributions, this

research has systematically categorized the extant vernacular buildings within the Middle Region of Vietnam. This classification process has facilitated the development of a comprehensive typological inventory, allowing for the precise identification and documentation of individual vernacular building types. The resulting categorization not only provides a structured framework for analyzing the architectural diversity of the region but also serves as a critical tool for heritage preservation efforts. Detailed classifications and representative examples of these vernacular building types are presented in Table 1 and Figure 29, offering an organized reference that supports further comparative analysis and underscores the unique architectural characteristics inherent to Middle Region of Vietnam's vernacular heritage.

Although most of the houses selected for survey and analysis in Table 1 below were built during the late 19th and early 20th centuries—thus not corresponding exactly to the time frame of the Cochin-China Kingdom (16th–18th centuries) discussed in this study—it can be inferred that these traditional houses were constructed using materials and techniques that had been cultivated and transmitted from earlier centuries.

It is evident that when building materials such as bamboo, wood, and leaves are perishable and prone to decay or loss, a conservative technical mindset tends to emerge in order to preserve traditional construction knowledge accumulated over thousands of years. Therefore, even if the physical existence of architectural works has completely disappeared, the knowledge related to them—such as design methods and construction techniques—has been retained, allowing for the possibility of their reconstruction. The traditional houses surveyed and listed in the table below are likely no exception to this continuity

Table 1: List of the investigated Vernacular houses in the Middle regions.

No	House owner	Year	Cross section			Floor plan			Province
			Type of truss	Column row	Layer of roof	Entrance	Compartment	Wing	
1	Duong Van Manh	1890	C	6	Single	Altar	3	2	Quang Tri
2	Nguyen Tai	1848	C	6	Multi	Altar	1	2	Thua Thien Hue
3	Nha Tho Ho Chau	1908	C	6	Multi	Altar	1	2	Thua Thien Hue
4	Le Trong Dien	1940	C	6	Multi	Altar	1	2	Thua Thien Hue
5	Ton Nu Khanh Nam	1889	C	6	Multi	Altar	3	2	Thua Thien Hue
6	Luong Thi Hen	1930	C	6	Multi	Altar	1	2	Thua Thien Hue
7	Phan Thuan An	1921	C	6	Multi	Altar	3	2	Thua Thien Hue
8	Nguyen Huu Thong	1891	C	6	Multi	Altar	3	2	Thua Thien Hue
9	Hoang Nang Tran	1911	C	6	Multi	Altar	3	2	Thua Thien Hue
10	Ngo Thi Chau	1906	C	6	Multi	Altar	3	2	Thua Thien Hue
11	Nguyen Hua Van	1906	C	6	Multi	Altar	3	2	Thua Thien Hue
12	Dao Thi Xuan Yen	1894	C	6	Multi	Altar	3	2	Thua Thien Hue
13	Nguyen Thi Ty	1894	C	6	Multi	Altar	3	2	Thua Thien Hue
14	Le Viet Cuong	1923	C	6	Multi	Altar	3	2	Thua Thien Hue
15	Nguyen Tang Hoan	1890	C	6	Multi	Altar	3	2	Thua Thien Hue
16	Truong Duy Thanh	1890	C	6	Multi	Altar	3	2	Thua Thien Hue
17	Le Hoi	1898	C	6	Multi	Altar	3	2	Thua Thien Hue
18	Nguyen Thi An	1830	C	6	Single	Altar	3	2	Quang Nam
19	Tran Dong	1880	C	6	Single	Altar	3	2	Quang Nam
20	Nguyen Duc Bay	1890	C	6	Single	Altar	3	2	Quang Nam
21	Nguyen Vinh Phuc	1895	C	6	Single	Altar	3	2	Quang Nam
22	Le Ngoc Anh	1902	C	6	Single	Altar	3	2	Quang Nam
23	Nguyen Kiet	1900	C	6	Single	Altar	3	2	Quang Nam
24	Nguyen Thi Tung	1905	C	6	Single	Altar	3	2	Quang Nam
25	Le Van Quan	1870	C	6	Single	Altar	3	2	Quang Nam
26	Nguyen Kinh Thach	1880	C	6	Single	Altar	5	2	Quang Nam
27	Vo De	1901	C	6	Single	Altar	3	2	Quang Nam
28	Do Dinh Hao	1910	C	4	Single	Altar	3	2	Quang Ngai
29	Nguyen Van Lanh	1904	C	4	Single	Altar	3	2	Quang Ngai
30	Phan Tan	1880	C	4	Single	Altar	3	2	Quang Ngai
31	Tran Xuan Cam	1840	C	4	Single	Altar	3	2	Quang Ngai
32	Ton That De	1832	C	4	Single	Altar	3	2	Quang Ngai
33	Pham Thi Cuc	1926	C	4	Single	Altar	3	2	Quang Ngai
34	Truong Ngoc Son	1900	C	4	Double	Altar	3	2	Quang Ngai
35	Le Van Ho	1886	D	4	Double	Altar	3	2	Quang Ngai
36	Nguyen Van Bay	1900	C	4	Double	Altar	3	2	Quang Ngai
37	Duong Thi Huong	1931	D	4	Double	Altar	3	2	Quang Ngai
38	Duong Tu	1900	C	4	Double	Altar	3	2	Quang Ngai
39	Nguyen Cuu	1945	D	4	Double	Altar	3	2	Quang Ngai
40	Tran Van Dan	1905	D	4	Double	Altar	3	2	Binh Dinh

41	Nguyen Tam	1920	D	4	Double	Altar	1	2	Binh Dinh
42	Ho Van Chau	1862	D	4	Double	Altar	1	2	Binh Dinh
43	Ha Van Son	1880	D	4	Double	Altar	3	2	Binh Dinh
44	Mai Tong Que	1875	D	4	Double	Altar	3	2	Binh Dinh
45	Nguyen Ba Hong	1928	D	4	Double	Altar	3	2	Binh Dinh
46	Huynh Thi Do	1906	D	4	Double	Altar	1	2	Binh Dinh
47	Ha Nhuan	1900	D	4	Double	Altar	3	2	Binh Dinh
48	Le Kim Giai	1850	D	4	Double	Altar	1	2	Binh Dinh
49	Nguyen Van Giang	1850	D	4	Single	Altar	3	2	Binh Dinh
50	Nguyen Pham Quan	1874	D	4	Double	Altar	3	2	Binh Dinh
51	Nguyen Trong Tuyen	1900	D	4	Single	Altar	3	2	Binh Dinh
52	Ho Thi Gai	1850	D	4	Double	Altar	3	2	Binh Dinh
53	Tran Cong Tru	1854	D	4	Double	Altar	3	2	Binh Dinh
54	Dang Ngoc Mai	1880	D	4	Double	Altar	3	2	Binh Dinh
55	Vo Thi Huan	1853	D	4	Double	Altar	3	2	Binh Dinh
56	Do Suong	1890	D	4	Double	Altar	3	2	Binh Dinh
57	Vo Ngoc Lien	1911	D	4	Double	Altar	3	2	Binh Dinh
58	Le Thi Tam	1900	D	4	Double	Altar	3	2	Phu Yen
59	Nai Nha	1937	B	4	Single	Gable	2	2	Ninh Thuan
60	Luu Thi Trang	1902	B	5	Double	Gable	2	2	Ninh Thuan
61	Dang Ngoc	1941	B	3	Single	Gable	2	2	Ninh Thuan
62	Quang Dai Hoang	1905	B	5	Double	Gable	2	2	Ninh Thuan



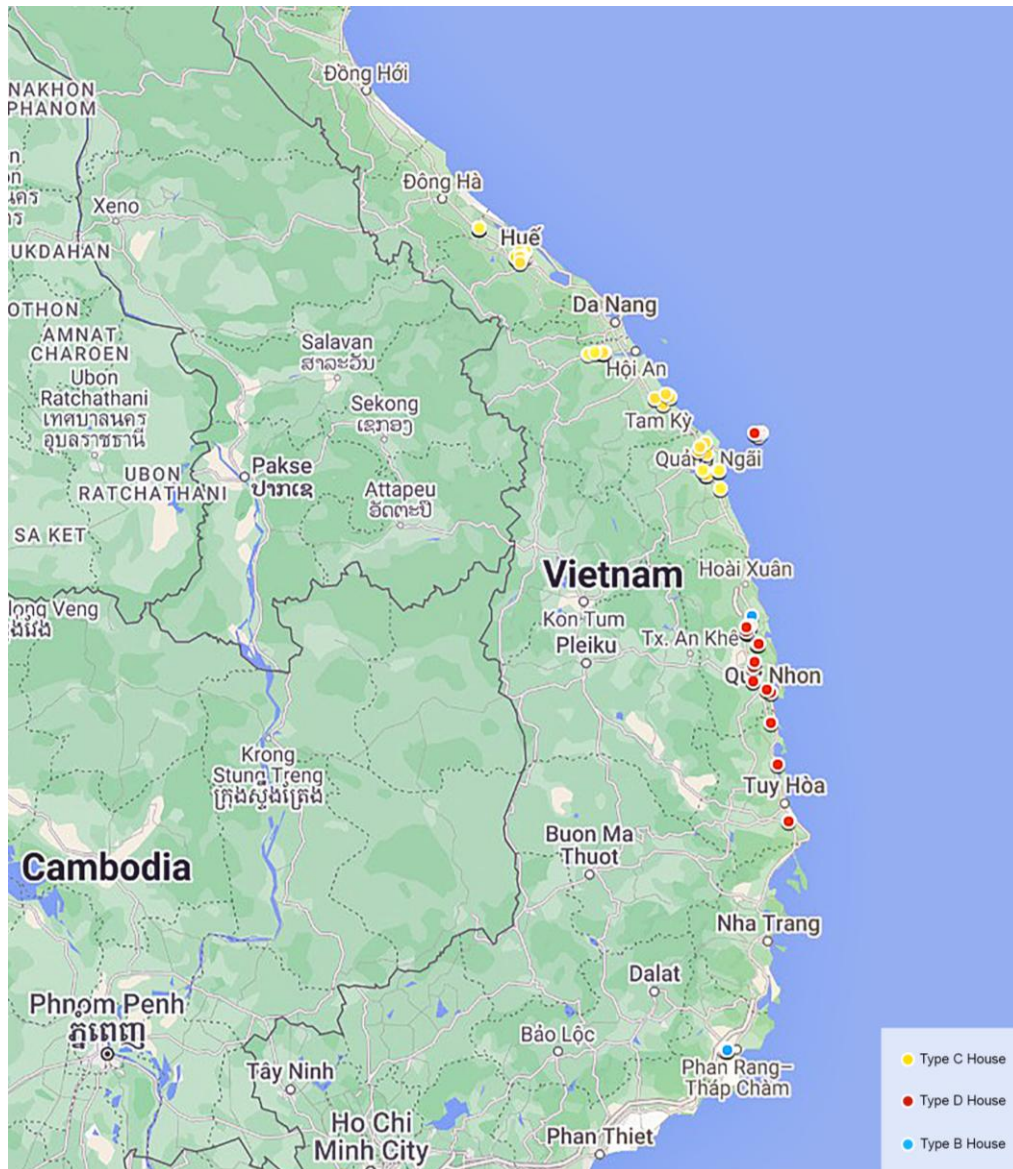


Figure 29: Location of the Vernacular houses in the Middle Region (namely Type B is Nha Roi, Type C is Nha Ruong, and Type D is Nha La Mai).
(Source: Author)

3.2 Research methods

3.2.1 Literature reviews

No direct references pertinent to the subject of this study have been identified within the extant historical documents of Vietnam's final feudal dynasty. This absence may be attributed to the sensitive nature of the acculturation phenomena between ethnic Vietnamese and Cham communities, which may have been deliberately omitted from official records to maintain political or social stability. Alternatively, the interactions and cultural

exchanges between ordinary Vietnamese settlers and indigenous Cham populations may have been perceived as peripheral to the concerns of the ruling dynasty, lacking sufficient impact on the kingdom's security or governance to warrant formal documentation.

Moreover, the process of acculturation that naturally transpired between the Vietnamese migrants in the Middle Region and the indigenous Chams occasionally yielded beneficial outcomes for the Vietnamese community. Such interactions were, in effect, informally tolerated or even tacitly encouraged by the dynasty as a means to sustain peaceful coexistence and social harmony. Consequently, the most enduring and tangible evidence of this acculturation is preserved not in official chronicles but in the material culture—specifically, the vernacular architecture that continues to embody these historical processes.

The aforementioned scholarly publications have addressed a range of pertinent topics related to vernacular architecture and cultural exchange. However, these studies were conducted over extended timeframes, during which rapid urbanization and economic development have exerted significant influence, leading to the gradual erosion of the traditional values and authenticity of vernacular architectural forms. The majority of existing research approaches the subject through lenses of architectural typology, ethnology, sociology, chronology, and construction techniques. While these perspectives provide indispensable foundational knowledge, they also highlight critical gaps that this study seeks to address. By integrating these multidisciplinary insights, the present research aims to deepen understanding of the technical origins and cultural dynamics underlying vernacular architecture in Middle Region of Vietnam, thereby contributing to its preservation and informed revitalization.

3.2.2 Data collection

a) *Data sources*

This study builds upon extensive survey data on traditional housing collected by Showa Women's University (Japan), which encompassed ten provinces and cities across Vietnam: Bac Ninh, Ha Tay, Nam Dinh, Thanh Hoa, Nghe An, Thua Thien Hue, Quang Nam, Quang Ngai, Binh Dinh, and Tien Giang. Between 1997 and 2004, Showa Women's University, in collaboration with the Department of Cultural Heritage under the Ministry of Culture of Vietnam, the Vietnam Association of Architects, Hanoi University of Architecture, and Ho Chi Minh City University of Architecture,

systematically surveyed over 4,730 vernacular houses. From this extensive dataset, more than 350 houses were identified as possessing significant remaining architectural value and were meticulously documented.

Further complementary data were gathered by An Khang Company during the period of 2010 to 2014, expanding the national inventory of traditional houses across Vietnam. However, these datasets, amassed over a prolonged period, inevitably reflect the dynamic influences of urbanization and rapid economic development in Vietnam, which have contributed to the progressive erosion of the traditional values and authentic features of many vernacular houses.

In response to these challenges, this study strategically selected 24 villages within the Middle Region of Vietnam, an area recognized for retaining a relatively higher concentration of traditional architectural heritage. Within these villages, a total of 62 vernacular houses, identified as maintaining their original structural and cultural integrity, were chosen for in-depth investigation. These houses were surveyed through a combination of detailed interviews with homeowners—providing invaluable oral histories and insights—and comprehensive inventories cataloging architectural elements, construction techniques, spatial organization, and material usage.

By focusing on these carefully selected case studies, this research aims to capture and analyze the enduring characteristics of vernacular architecture that have resisted the homogenizing pressures of modernization. This approach facilitates a nuanced understanding of the architectural, cultural, and technological continuities present in Middle Region of Vietnam's traditional housing, offering a critical foundation for both heritage preservation efforts and informed contemporary architectural practices.

b) Field survey: measuring, sketching, and digitalizing of databases

The methodology employed in this study combined traditional fieldwork techniques with modern surveying technologies to ensure both accuracy and comprehensiveness in documenting vernacular architecture. Initial data collection involved hand-sketching and direct measurement on-site, using essential instruments including the Leica T410 total station for high-precision spatial data acquisition, compasses for determining building orientation, long tape measures for linear dimensions, and digital cameras for photographic documentation.

The fieldwork began with the preparation of preliminary sketches capturing the site layout, floor plans, elevations, and cross-sectional views for each vernacular house under investigation. Subsequently, the compass was utilized to ascertain the precise orientation of the houses and their entry gates, an important factor for understanding spatial organization and cultural symbolism embedded within the architecture. Following orientation determination, a theodolite was employed to measure land boundaries, structural circumferences, and building heights, providing accurate geospatial references for each site.

To achieve detailed dimensional accuracy at the component level, a laser distance meter was applied to capture measurements of structural elements, joinery, and architectural details, enabling the production of refined floor plans, elevations, sections, and construction details. Complementing these measurements, digital photography was systematically conducted to record the exterior landscapes, façades, intricate architectural details, and interior spatial configurations, thus enriching the visual dataset and supporting qualitative analysis.

In contexts where advanced instrumentation was limited by site constraints—such as narrow spaces or components inaccessible to electronic devices—the study relied on traditional manual measurement techniques. These included drawing sketches directly on-site, marking the central axes of primary timber elements with white chalk for reference, and utilizing a 7.5-meter ruler for partial measurements. Such manual methods achieved a measurement tolerance within the range of 8 to 10 millimeters, demonstrating acceptable accuracy for architectural documentation in vernacular contexts.

Post-fieldwork, all collected data were systematically processed through digital drafting using AutoCAD 2015 software, facilitating precise and scalable representations of the architectural elements. This digital workflow not only streamlined the compilation and analysis of the architectural data but also informed the design of structured questionnaires aimed at gathering further qualitative information from homeowners and craftsmen.

This integrated methodological framework—blending manual techniques, precision instruments, and digital modeling—provided a robust foundation for capturing the intricate design and construction nuances of vernacular houses. It also ensured the reliability and reproducibility of the architectural

documentation, which is crucial for subsequent analytical, conservation, and educational applications within the broader scope of cultural heritage preservation.

c) Interview with traditional master carpenters and house owners

In conducting field research, we engaged in structured interviews with key household members responsible for the stewardship and preservation of the traditional vernacular houses. Typically, interviewees included the household head—often the husband or eldest son—or, alternatively, the daughter-in-law, each possessing intimate knowledge of the house’s historical and cultural context. The interview protocol was designed to elicit comprehensive information concerning the house’s chronology, including the original year of construction and the identities of the builders involved, with particular attention to the roles of traditional carpenters. In addition, detailed inquiries addressed the types of construction materials employed, documented restoration efforts, and the chronological progression of functional modifications undertaken throughout the house’s lifespan. Family histories were also explored to understand generational continuities and the social context surrounding the house’s occupation.

Parallel to this, a specialized questionnaire was developed and administered to traditional master carpenters (see Table 2), recognized as custodians of indigenous carpentry knowledge and practice. This instrument sought to capture biographical data such as the carpenters’ villages of origin and their apprenticeship trajectories, focusing on the historical methods and cultural frameworks through which carpentry skills were transmitted intergenerationally. The questionnaire further aimed to document specific technical knowledge, including traditional design principles, the systematization of architectural proportions, and the selection criteria for timber and other local construction materials. Particular emphasis was placed on identifying the vernacular nomenclature of timber species, reflecting localized botanical knowledge integral to carpentry practices.

Moreover, the interviews aimed to elucidate the repertoire of traditional tools and instruments employed by master carpenters in both design and construction phases, encompassing measurement techniques, joinery methods, and layout procedures. This qualitative inquiry was instrumental in reconstructing indigenous architectural design methodologies and in

understanding how empirical knowledge was embedded within the material culture of vernacular architecture. Collectively, these interviews provided critical insights into the intangible cultural heritage that underpins the tangible-built environment, thereby informing both the academic understanding of traditional Vietnamese carpentry and the development of culturally sensitive conservation strategies.

Table 2: List of the interviewed Traditional Master Carpenters in the regions.

No.	Name of Carpenter	Year of birth	Native place	Region	Tool for design (type)
1	Nguyen Van	1961	Da Hoi commune, Da Dao district, Ha Bac province	Northern	Thuoc Sam (Ruler A)
2	Le Van The	1964	Ly Duc commune, Ly Nhan district, Ha Nam province	Northern	Thuoc Sam (Ruler A)
3	Nguyen Ngoc Trac	1938	Luong Dien commune, Cam Binh district, Hai Hung province	Northern	Thuoc Sam (Ruler A)
4	Do Dang Tuyen	1931	Dai Dong commune, Tien Son district, Ha Bac province	Northern	Thuoc Sam (Ruler A)
5	Nguyen Tien Dat	1932	Giao Tien commune, Giao Thuy district, Nam Dinh province	Northern	Thuoc Sam (Ruler A)
6	Nguyen Tien Dong	1969	Thanh Ha commune, Thanh Binh district, Hai Duong province	Northern	Thuoc Sam (Ruler A)
7	Le Kim Tan	1940	Thuy Phu village, Huong Thuy district, TT-Hue province	Middle	Thuoc Nach (Ruler B)
8	Chau Van Dien	1926	Thuy An ward, Hue city, TT-Hue province	Middle	Thuoc Nach (Ruler B)
9	Nguyen Re	1947	Huong Van commune, Huong Tra district, TT-Hue province	Middle	Thuoc Nach (Ruler B)
10	Nguyen Lai	1950	Huong Van commune, Huong Tra district, TT-Hue province	Middle	Thuoc Nach (Ruler B)
11	Le Van Dang	1927	Thuy Thanh commune, Huong Thuy district, TT-Hue province	Middle	Thuoc Nach (Ruler B)
12	Phan Ba Linh	1951	Huong Xuan commune, Huong Tra district, TT-Hue province	Middle	Thuoc Nach (Ruler B)
13	Dang Dai Mung	1915	An Thuy commune, Le Thuy district, Quang Binh province	Middle	Thuoc Nach (Ruler B)
14	Nguyen Nghi	1917	Ai Nghia commune, Dai Loc district, Quang Nam province	Middle	Thuoc Dinh (Ruler B)
15	Nguyen Van Dang	1950	Duy Son commune, Duy Xuyen district, Quang Nam province	Middle	Thuoc Ba (Ruler B)
16	Le Viet Tam	1956	Cam Nam ward, Hoi An ancient town, Quang Nam province	Middle	Thuoc Ba (Ruler B)
17	Nai Nha	1921	Phuoc Huu commune, Ninh Phuoc district, Ninh Thuan province	Middle	Thuoc Nac (Ruler C)
18	Dang Ngoc	1938	Phuoc Huu commune, Ninh Phuoc district, Ninh Thuan province	Middle	Thuoc Nac (Ruler C)

d) Inventories

To systematically consolidate the collected data for comprehensive analysis, we conducted extensive fieldwork and site surveys across traditional villages that continue to exist within the designated study area. This investigative process involved meticulous documentation and the creation of detailed inventories for each surveyed architectural object. These inventories were designed to capture critical attributes, including construction chronology, building techniques, material usage, and architectural proportions.

The resulting database serves as an organized repository of empirical evidence, enabling rigorous cross-comparison and longitudinal studies of vernacular architectural forms. Each inventory entry provides a thorough summary of the individual building's characteristics, supported by precise measurements, photographic documentation, and qualitative descriptions. This

methodological approach facilitates the identification of patterns and variations across the corpus of vernacular houses, thereby substantiating the theoretical propositions advanced in this thesis.

Moreover, the inventory system is instrumental in underpinning hypotheses regarding the origins, evolution, and technological underpinnings of traditional construction practices. By anchoring abstract theoretical constructs to tangible material culture, this structured dataset enhances the validity and robustness of the research findings. Ultimately, the database not only contributes to the academic discourse on vernacular architecture but also serves as a practical tool for heritage conservation, restoration planning, and cultural preservation initiatives in the region.

3.2.3 Data analysis

This research encompasses a comprehensive scope, integrating multiple fields and disciplines as outlined above. Accordingly, a multifaceted methodological framework is essential to rigorously support the hypotheses posited in this dissertation. The employed methodologies include the following:

a) Statistical analysis and classification

Drawing upon the systematically collected inventory, a statistical approach will be undertaken to classify vernacular houses based on well-defined architectural criteria. The classification framework comprises: (1) site plans illustrating the overall spatial organization and layout of residential compounds; (2) floor plans detailing the internal spatial configurations and room arrangements; (3) cross-sectional profiles highlighting structural elements and vertical spatial relationships; (4) typologies of wooden frame structures and roofing materials employed; and (5) stylistic forms. Such a classification schema facilitates a structured and nuanced analysis of architectural typologies, spatial proportions, and construction techniques, thereby enabling the identification of recurring patterns and distinct typological variants.

b) Categorization and quantitative analysis

The measured data acquired from field surveys will be digitized using advanced design software such as AutoCAD and SketchUp to generate precise architectural drawings—including site plans, floor plans, sections, and elevations—of each surveyed vernacular structure. Complementing this,

Microsoft Excel will be employed to perform detailed dimensional and proportional analyses. This quantitative approach provides a robust empirical basis for discerning architectural commonalities and divergences across the vernacular housing stock, thereby informing thematic categorization and typological differentiation.

c) Theoretical framework and hypothesis formation

The study will draw upon a rich corpus of theoretical perspectives and prior research by both domestic and international scholars—including Tran Ngoc Them, Nguyen Duc Thiem, Chu Quang Tru, Ngo Huy Quynh, Le Thanh Son, Litana Nguyen, and Kisho Kurokawa—to establish a conceptual foundation for understanding architectural acculturation. Particular emphasis is placed on Furukawa's theoretical model, which delineates acculturation as a sequential process encompassing three critical stages: Exchange, Symbiosis, and Acculturation. This framework underpins the formulation of hypotheses regarding the chronological development and technological evolution of vernacular architectural types extant within the study region. These hypotheses serve as a conceptual lens through which the acculturation processes between the Vietnamese and Cham communities may be examined and articulated.

d) Diagrammatic representation of acculturation processes

To elucidate the dynamic evolution of architectural typologies and construction methodologies across temporal phases, the research will develop transition diagrams that visually map these transformations. Such schematic representations facilitate the identification of key stages of architectural metamorphosis and explicate the underlying metaphysical and cultural significances embedded within vernacular architectural products resulting from acculturation.

e) Synthesis and deductive reasoning

The research methodology entails a critical synthesis of empirical data and theoretical constructs. By systematically identifying convergences (similarities) within the dataset and addressing divergences (differences), the study will employ deductive reasoning to validate or refine the proposed hypotheses. This iterative analytical process culminates in a coherent summarization of research findings and the consequent refinement of the thesis, thereby contributing a rigorously substantiated discourse on the

acculturation phenomena shaping vernacular architecture in the central delta region of Vietnam.

Through the integration of these multidisciplinary methods, the study aims to offer a holistic and nuanced understanding of the complex interactions between cultural exchange, technological transmission, and architectural expression within the vernacular traditions of this historically rich and culturally diverse region.

3.3 Chapter conclusion 3

Utilizing the aforementioned materials and methodological framework, the targeted data collection aims to comprehensively document and analyze the vernacular architecture within its broader socio-cultural and historical context. The essential information to be gathered encompasses the following key dimensions:

Contextual and historical background of the village:

A thorough investigation into the village where the vernacular house is situated is fundamental. This includes examining the village's origins, formation history, demographic evolution, socio-economic development, and cultural heritage. Understanding the village's spatial organization, settlement patterns, and relationship with the natural environment provides critical insights into the factors that shaped the architectural forms and construction practices observed in the local vernacular housing stock. Such contextualization allows for situating the individual house within a living community framework and helps elucidate its role and significance over time.

Chronology of construction and conservation:

Detailed historical information regarding the house's initial construction phase, subsequent restoration or renovation interventions, and its duration of active use by successive owners is imperative. This includes identifying key dates, construction campaigns, and changes in architectural features or materials that reflect evolving functional needs, aesthetic preferences, or responses to environmental and socio-political influences. Archival research, oral histories, and physical investigation may collectively contribute to reconstructing this timeline. Understanding these chronological layers aids in interpreting the building's life cycle and informs strategies for its conservation and adaptive reuse.

Craftsmanship, techniques, and material culture:

An in-depth study of the carpenters, artisans, and builders involved in the house's construction and maintenance is critical for appreciating the technical and intangible heritage embodied in the structure. This includes documenting the traditional construction techniques employed, the tools and implements utilized, and the selection and preparation of building materials. Equally important is the collection and analysis of local terminology and nomenclature related to the house's components and construction processes, which enriches the cultural narrative and preserves linguistic heritage. Such knowledge contributes to safeguarding traditional craftsmanship and supports accurate restoration practices.

Architectural documentation – as-built drawings:

Accurate and comprehensive architectural documentation is indispensable for both academic analysis and practical conservation. This includes producing detailed as-built drawings comprising site plans that illustrate the house in relation to its immediate environment; floor plans that reveal spatial organization and functional zoning; elevations that depict the building's external facades and stylistic elements; and cross-sectional views that provide insights into structural systems and construction details. These drawings serve as a primary reference for understanding the architectural vocabulary, construction logic, and spatial experience of the vernacular house.

Visual documentation – photographic and graphic records:

High-quality visual records are essential to complement written and drawn documentation. This entails capturing images of the house's exterior and interior, its surrounding landscape and village context, architectural details, decorative elements, and sculptural ornamentation. Such imagery facilitates a nuanced appreciation of the aesthetic qualities, craftsmanship, and material conditions of the structure. Additionally, photographic archives support comparative studies, public dissemination, and the creation of heritage interpretation materials.

Collectively, this comprehensive inventory serves as a foundational resource that supports a multi-dimensional understanding of the vernacular architecture under study. By integrating historical context, material culture, technical expertise, architectural representation, and visual documentation, the

methodology ensures a holistic approach that respects both tangible and intangible heritage values. Moreover, the collected data provide critical input for heritage conservation planning, scholarly research, and cultural education, thereby contributing to the sustainable preservation and revitalization of traditional built environments.



Chapter Four

Characteristics of the Vernacular Houses in the Middle Region

This chapter presents a detailed analysis of the architectural characteristics of vernacular houses in Vietnam's Middle (Central) Region. It introduces four representative house types—*Nha Ke-Bay* (Type A), *Nha Roi* (Type B), *Nha Ruong* (Type C), and *Nha La Mai* (Type D)—examining their design concepts, spatial organization, structural systems, and construction techniques. Each house type is analyzed in terms of site layout, building structure, truss formation, and roofing materials to reveal their distinctive regional adaptations. The latter part of the chapter provides a comparative analysis of these types, highlighting their differences and similarities in spatial symbolism, truss structure, and climatic response. Through this comparison, the chapter establishes a foundation for understanding the morphological evolution and cultural acculturation discussed in subsequent chapters.

4.1 An introduction to the Vernacular houses

The vernacular wooden houses of Vietnam's North–Middle and Central coast regions constitute a diverse yet interconnected architectural corpus that reflects centuries of cultural exchange, environmental adaptation, and artisanal ingenuity. These house types—locally identified as *Nha Ke-Bay*, *Nha Roi*, *Nha Ruong*, and *Nha La Mai*—represent not merely variations in building form, but living testimonies to the social, spiritual, and ecological histories of the communities that created and inhabited them. Each typology embodies a distinctive balance between structural innovation, cultural symbolism, and pragmatic response to climate, while also revealing layers of linguistic and historical meaning embedded within regional architectural vocabularies.

Geographically, these four typologies occupy overlapping yet differentiated cultural zones. The *Nha Ke-Bay* is primarily concentrated in the North–Middle transitional region, closely tied to Vietnamese carpentry traditions and Confucian ritual practices. The *Nha Roi*, by contrast, is associated with the Chams settlements and ethnic diversity, reflecting an alternative worldview in which ritual worship occurs outside the domestic sphere. The *Nha Ruong* emerges as the hallmark house form of the Middle region, celebrated for its refined timber craftsmanship, hierarchical spatial order, and symbolic façades. The *Nha La Mai* predominates in the South-

Central coastal provinces, where its distinctive double-layered leaf roof exemplifies ecological resilience and Cham cultural continuity.

Despite their differences, the four house types share a number of underlying architectural principles: the use of timber or bamboo frameworks, reliance on joinery techniques without nails, sensitivity to site orientation and climate, and the integration of spatial hierarchies that align with family structure and belief systems. At the same time, their contrasts—curved beams in the *Nha Ke-Bay*, stilted platforms and minimal interiors in the *Nha Roi*, elaborately carved façades in the *Nha Ruong*, and double-layered leaf roofs in the *Nha La Mai*—underscore the plurality of Vietnam’s vernacular heritage, shaped by the dynamic interplay of indigenous traditions, Cham influences, and Sino-Vietnamese cultural transmissions.

By presenting the concepts, layouts, truss systems, roofing technologies, and façade compositions of the vernacular houses, this chapter situates these houses within a comparative framework that highlights both their commonalities and their unique contributions to Vietnam’s architectural landscape. Collectively, these typologies illuminate how vernacular architecture functions as both a repository of cultural identity and a model of environmental adaptation, offering valuable lessons for heritage conservation and sustainable design today.

4.2 The Nha Ke-Bay (Type A)

4.2.1 Architectural concept

According to the *Investigation Reports on the Vernacular Houses of Nghe An Province* (Hanoi, 2000), conducted by the Faculty of Architecture, Hanoi University of Construction, the earliest recorded vernacular house in Nghe An dates back to 1625. This structure, belonging to Mr. Luu Duc Tan of Hamlet 7, *Hung Dao* Commune, *Hung Nguyen* District, represents one of the oldest surviving examples of traditional residential architecture in the region. Conversely, the latest identified house in *Nghe An* was constructed in 1944, owned by Mr. Le Phung Hong in Hamlet 10, *Xuan Son* Commune, *Do Luong* District. Similarly, investigations in *Thanh Hoa* Province documented by the Hanoi University of Architecture in 2002 reveal a broader temporal spectrum: the earliest house dates to approximately 1559–1569 (Mr. Le Van Hong’s house in *Xom Doai* Village, *Vinh Hung* Commune), while the most recent

examples were built in 1934 (including residences in *Hoang Loc*, *Hoang Trach*, and *Vinh Thinh* Communes).

This substantial temporal range — spanning from the mid-16th century to the early 20th century — underpins the chronological framework of the present study, which focuses primarily on the 16th to 18th centuries, a formative period aligned with the historical Kingdom of Cochin-Chia. This era was marked by significant socio-political transformations, demographic shifts, and the entrenchment of regional cultural identities, all of which are reflected in the material culture of vernacular architecture. The enduring presence and continuity of certain architectural types across centuries attest to a resilient building tradition that adapted to evolving environmental, social, and economic conditions while preserving core cultural values (Nguyen, 2018; Pham, 2014).

Central to this study is the vernacular house typology locally termed *Nha Ke-Bay* (see Figures 30-33) (Tran, 2005). The name encapsulates defining structural characteristics that distinguish this type from other regional houses. The “*Ke*”—a curve-shaped diagonal beam—functions as the primary roof support, while the “*Bay*” refers to a pried or wedged section of this diagonal beam, serving to reinforce and stabilize the structure. These components are meticulously joined using traditional mortise-and-tenon joinery without metal fasteners, a testament to the sophisticated craftsmanship of indigenous carpenters (Tran & Le, 2003). Such joinery techniques not only enhance the structural integrity but also facilitate disassembly and repair, reflecting an understanding of sustainability and material economy in traditional building practices (Nguyen & Bui, 2010).

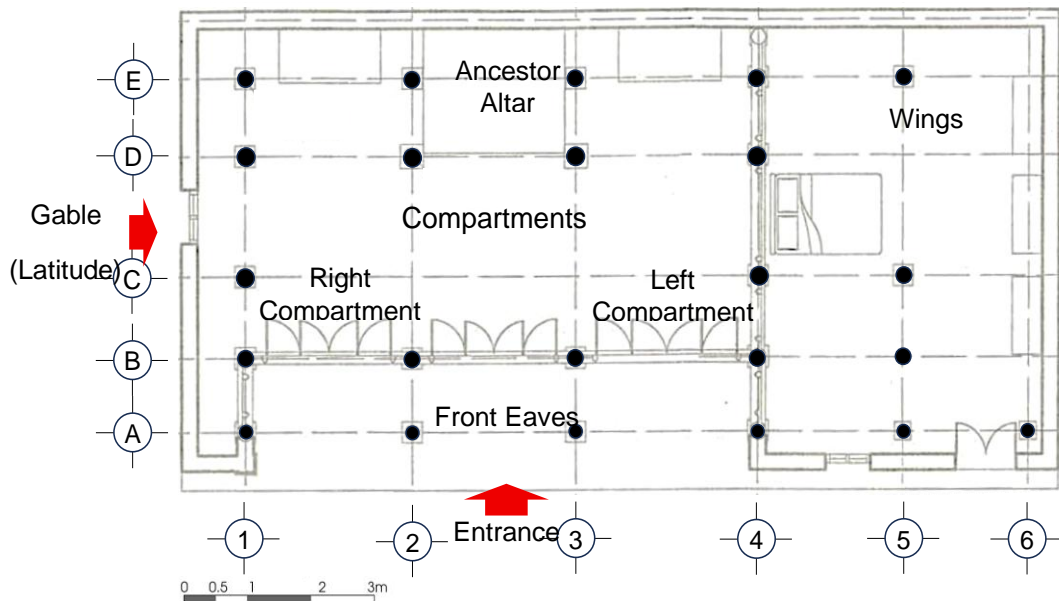


Figure 30: Floor plan of the “Nha Ke-Bay” (Type A).
 (Source: According to the Investigation Report of Hanoi University of Architecture, Vietnam, 2002)

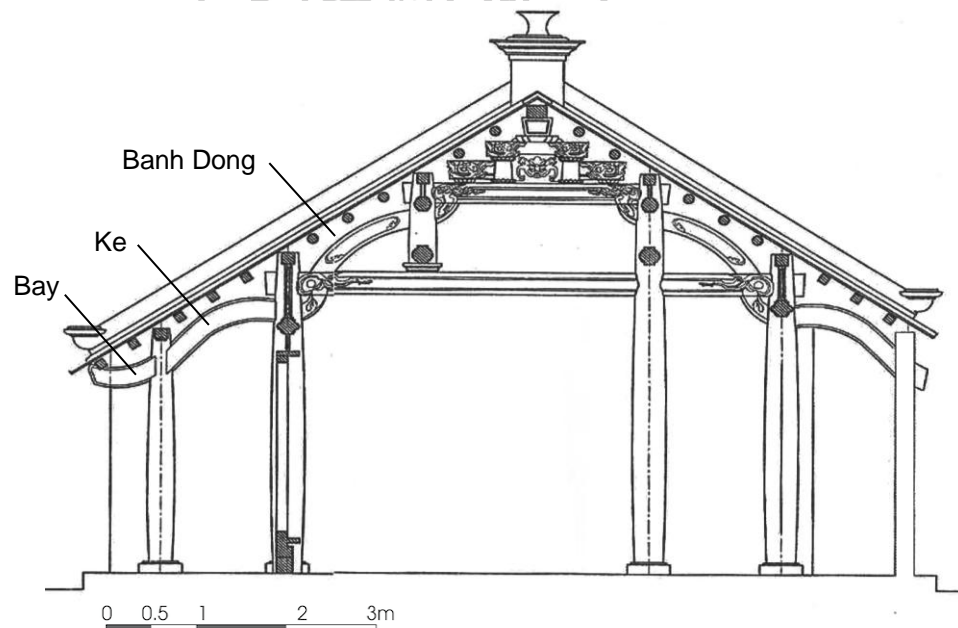


Figure 31: Across section of the “Nha Ke-Bay” (Type A)
 (Source: According to the Investigation Report of Hanoi University of Architecture, Vietnam, 2002)



Figure 32: Elevation of the “Nha Ke-Bay” (Type A), case of Mr. Le Duy Bao’s house, Kim Son village, Hoang Tien commune, Hoang Hoa district, Thanh Hoa province, constructed 1742.
(Source: According to the Investigation Report of Hanoi University of Architecture, Vietnam, 2002)



Figure 33: Feature of a truss of the “Nha Ke-Bay” (Type A).
(Source: According to the Investigation Report of Hanoi University of Architecture, Vietnam, 2002)

An additional distinctive element is the “*Banh Dong*”, a structural intermediary that modulates the roof’s slope. Unlike many vernacular roof forms where the slope corresponds directly to the angle of principal rafters, the *Nha Ke-Bay* employs the “*Banh Dong*” to fill the gap between the curved “*Ke*” beams and the straight rafters, allowing for an independently adjustable

roof pitch (see Figures 31, 33, 34). This design reflects an advanced conceptual separation between structural form and roof geometry, balancing aesthetic aspirations with functional demands such as efficient rainwater runoff and climatic adaptation (Hoang, 2016).

The construction of *Nha Ke-Bay* houses encapsulates broader themes in Vietnamese vernacular architecture, including the integration of locally sourced materials—primarily timber species endemic to the region—and the transmission of carpentry knowledge through oral tradition and apprenticeship (Q. A. Pham, 2017). The prominence of curved beams may be interpreted symbolically, evoking natural forms and cosmological meanings deeply embedded in Vietnamese cultural worldview (Nguyen, 2019). Furthermore, the modularity and joinery methods evident in these houses suggest a pragmatic approach to construction that accommodates repairs, alterations, and relocation, thus ensuring the longevity of the built environment.

In summary, the *Nha Ke-Bay* house is a compelling embodiment of the confluence of material culture, technical innovation, and cultural identity within the vernacular architecture of the intersection zone: North-Middle Region of Vietnam. Its study contributes to a richer understanding of regional building traditions and offers valuable lessons for heritage conservation strategies that seek to maintain authenticity while addressing contemporary challenges (Nguyen & Pham, 2020).

4.2.2 Site plan, layout of the house and orientation

The design of traditional wooden vernacular houses in northern Vietnam is deeply rooted in a confluence of environmental responsiveness, cultural values, and socio-economic factors. This is evident in the deliberate organization of site plans, internal spatial layouts, and the precise orientation of houses, which together create living environments that are both functional and symbolically meaningful.

The site plan of northern Vietnamese vernacular houses typically comprises a compound arrangement that integrates the main residence with ancillary structures such as kitchens, storage houses, wells, and small gardens, often enclosed by a fence or low boundary walls. The compound layout centers around an open courtyard, which serves multiple purposes: promoting cross-ventilation, allowing natural daylight, facilitating social interaction, and

accommodating domestic activities like cooking and craftwork (Nguyen, 2016).

The positioning of the house within the compound and its relationship to natural features—such as rivers, hills, and prevailing winds—is carefully considered in accordance with indigenous environmental knowledge and feng shui principles (Le, 2018). For instance, situating the house on slightly elevated ground prevents flooding during the rainy season, while proximity to water bodies serves both practical needs and auspicious symbolism in local belief systems.

The internal layout of northern Vietnamese wooden houses is characterized by a modular, post-and-beam structural system based on regularly spaced timber columns. The house plan is typically rectangular, subdivided into “*Gian*” compartment (the space between two column rows), with the number of compartments reflecting the household’s economic status (Pham, 2014).

Functionally, the house is arranged along a linear axis with spatial zoning corresponding to social and ritual functions. The central compartment usually contains the ancestral altar, the spiritual heart of the household, reinforcing Confucian values of filial piety and ancestor worship (Tran, 2017). The rear compartments are utilized as living and sleeping areas, while the rear wings commonly house the kitchen and workspaces. The open-plan design, with minimal interior walls, facilitates natural ventilation and flexible use of space, vital for the hot and humid climate of northern Vietnam.

Orientation is a critical design consideration informed by climatic adaptation and cultural cosmology. Houses are predominantly oriented along an east-west axis, with the main façade facing south or southeast. This orientation maximizes solar gain during winter months, providing warmth and light, while reducing exposure to cold northern winds (Hoang & Nguyen, 2015). The roof eaves and window placements further modulate sunlight and ventilation, ensuring thermal comfort throughout the year.

In addition to environmental factors, orientation aligns with Feng-Shui doctrines that prescribe auspicious directional alignments for prosperity, health, and spiritual harmony. Entrances and ancestral altars are positioned to face directions deemed propitious, reflecting the integration of cosmological beliefs into the built environment (Le & Vu, 2019). This multidimensional approach to

orientation underscores the intimate link between the material and spiritual dimensions in northern Vietnamese vernacular architecture.

Together, the site plan, house layout, and orientation illustrate an architectural system where traditional knowledge, environmental adaptation, and cultural symbolism converge. This holistic approach has enabled northern Vietnamese wooden vernacular houses to persist as resilient and meaningful dwellings that continue to embody regional identity and heritage.

4.2.3 Floor plan, spatial arrangement and entrance

The floor plan and spatial organization of northern Vietnamese vernacular houses manifest a carefully calibrated balance between functional efficiency, social hierarchy, and cultural symbolism. These architectural elements are instrumental in shaping the daily life of inhabitants while reinforcing traditional values and community identity.

Northern vernacular houses predominantly adopt a rectangular floor plan divided into several longitudinal compartments, formed by a wooden post-and-beam structural system. Each compartment, defined by pairs of load-bearing timber columns, constitutes a modular unit that determines the scale and proportion of the building (Pham, 2014). The number of compartments often correlates with the family's socioeconomic status: modest houses typically feature three compartments, while wealthier households may have four or more, indicating not only spatial expansiveness but also social prestige (see Figure 30) (Nguyen, 2016).

The modularity inherent in the bay system allows for flexibility in spatial expansion and facilitates the maintenance or replacement of structural elements, reflecting an adaptive and sustainable approach to traditional construction.

Internally, the spatial layout is organized along a central axis extending longitudinally through the building, with spaces allocated according to both practical functions and ritual significance. The foremost compartment at the southern end usually accommodates the ancestral altar, a focal point of family worship and a symbol of filial piety rooted in Confucian ethics (Le & Vu, 2019). This space is considered the spiritual heart of the house and is meticulously maintained to honor ancestors and maintain familial continuity.

The middle bays serve as communal living areas and sleeping quarters, promoting family interaction and cohesion. These spaces are typically open-plan with minimal partitions, facilitating ventilation and allowing multifunctional use according to seasonal and domestic needs.

The rear bay commonly houses the kitchen and ancillary service areas, segregating the domestic workspaces from the more formal and sacred front areas. This spatial separation aligns with traditional concepts of cleanliness and propriety within the household.

The entrance to northern vernacular houses is a carefully designed threshold that mediates between the private domestic realm and the external environment. Typically located on the main façade facing south or southeast, the entrance often features a raised wooden threshold (called *Bac Tam Cap*) designed to prevent the intrusion of evil spirits and to symbolically elevate the household's status (Le, 2018).

Architecturally, the entrance may be modest or elaborately decorated depending on the owner's wealth and social position. The doorway's orientation and placement are also informed by Feng-Shui principles, intended to harness auspicious energy flows and provide favorable conditions for the household.

The entrance leads directly into the main hall or front bay, reinforcing the connection between the exterior world and the sacred interior space of the ancestral altar. This spatial progression reflects a hierarchical ordering of spaces, where visitors are first received in the more public area before deeper access to private family quarters is permitted.

In northern Vietnamese vernacular houses, the spatial configuration consistently adheres to a principle of odd-numbered compartments, a feature that holds both practical and symbolic significance (Le, 2007). The central compartment invariably serves as the locus of the ancestral altar, underscoring the primacy of ancestor worship within the household's cultural and spiritual life. Unlike some vernacular typologies where lateral wings or side compartments may be present to accommodate additional functions, the northern design distinctly omits such wings, maintaining a linear, unbroken sequence of spaces aligned along the central axis. This spatial organization reinforces the hierarchical importance of the altar space as the focal point of familial reverence and social identity.

Architecturally, the entrance is purposefully situated directly opposite the top ridge beam of the roof structure, providing a clear, axial access route that leads directly to the ancestral altar. This deliberate alignment not only facilitates ceremonial processions and ritual activities but also embodies cosmological symbolism, reflecting a harmonious flow between the external environment and the sacred interior domain.

Structurally, northern vernacular houses typically incorporate a greater number of timber elements within the roof truss system compared to their counterparts in the Middle Region of Vietnam. This increased density of timbers enhances the robustness and longevity of the wooden framework, which is essential for withstanding the climatic conditions characteristic of the northern region, including seasonal variations in temperature and wind loads (see Figures 31, 33).

The determination of the roof slope, a critical factor influencing both the aesthetic character and environmental performance of the house, is traditionally governed by the next chapter-mentioned *Thuoc Sam*, a square-shaped carpenter's measuring tool widely employed by northern Vietnamese craftsmen. The *Thuoc Sam* facilitates precise geometric calculations and ensures consistency in the angles and proportions of the roof structure, reflecting the high level of technical knowledge and artisanal skill transmitted through generations. This tool-based design approach allows for the harmonious integration of structural form, functional requirements, and cultural conventions within the vernacular architectural vocabulary.

Together, these elements—the odd-numbered compartment arrangement centered on the ancestral altar, the axial entrance alignment, the intricate timber truss system, and the application of the *Thuoc Sam* measuring instrument—exemplify the synthesis of cultural symbolism, structural ingenuity, and traditional craftsmanship that characterizes northern Vietnamese wooden vernacular houses. Such features not only contribute to the distinctive architectural identity of the region but also offer valuable insights for the conservation and revitalization of vernacular building practices.

4.2.4 Building structure and feature of the truss

The *Nha Ke-Bay* (Type A), a distinctive typology within northern Vietnamese vernacular architecture, is particularly renowned for its

sophisticated timber roof truss system, which constitutes both a structural and symbolic core of the building. The truss not only supports the weight of the roof but also embodies a complex interplay of traditional carpentry techniques, material culture, and aesthetic principles.

The truss of Type A is characterized by an intricate assembly of timber members arranged in a spatial framework that balances load distribution, rigidity, and adaptability. The primary structural components include the curved diagonal beams known as “*Ke*”, which serve as the main support elements transmitting roof loads to the vertical posts. These “*Ke*” beams are typically crafted from locally sourced hardwoods selected for their strength and resilience, reflecting a deep understanding of material properties by traditional carpenters (Tran & Le, 2003).

Interconnected with the “*Ke*” beams is the “*Bay*”—a wedged or pried section of the diagonal beam—that reinforces the truss assembly and stabilizes the curved members. The “*Bay*” functions both as a structural brace and as a connection node, linking the diagonal elements through traditional joinery techniques such as mortise-and-tenon and wooden pegs. This joinery is executed without metal fasteners, relying instead on precision craftsmanship to ensure long-term durability and ease of maintenance (see Figures 31, 34) (Nguyen & Bui, 2010).

A notable feature of Type A truss is the deliberate curvature of the “*Ke*” diagonal beams, which imparts both structural advantages and aesthetic qualities. The curved geometry enhances the truss’s ability to resist bending moments and lateral forces, while simultaneously creating an elegant upward sweep that contributes to the roof’s distinctive silhouette.

The roof slope itself is not directly dictated by the angle of the curved “*Ke*” beams. Instead, an intermediate element called the “*Banh Dong*” fills the gap between the “*Ke*” and the purlins and rafters, allowing for an independent adjustment of the roof’s pitch (see Figure 34). This feature reflects an advanced understanding of structural mechanics and modular design, enabling builders to optimize both form and function in response to climatic conditions and stylistic conventions.

Moreover, the truss system of Type A is more densely composed of timber members compared to vernacular houses in Middle Region of Vietnam, indicating regional variations in construction methods adapted to local

environmental demands. The increased number of timbers enhances load-bearing capacity and structural redundancy, important in northern Vietnam's climate, which experiences significant seasonal temperature fluctuations and wind pressures (Nguyen, 2018).

Beyond its engineering function, the Type A truss embodies cultural symbolism deeply embedded in northern Vietnamese society. The upward curve of the “Ke” beams can be interpreted as an architectural metaphor for ascendance and protection, aligning with indigenous cosmological beliefs and the house's role as a protective sanctuary for the family lineage (Nguyen, 2019). The meticulous craftsmanship and the use of traditional tools, such as the *Thuoc Sam* for precise measurement, further signify the transmission of intangible cultural heritage through carpentry practices.

In summary, the truss structure of Type A exemplifies a sophisticated synthesis of traditional carpentry expertise, structural innovation, and cultural expression. Its technical features not only ensure the building's resilience and functionality but also affirm its identity within the vernacular architectural landscape of northern Vietnam. Studying this truss system offers valuable insights for the conservation of traditional wooden architecture and the revitalization of artisanal building knowledge.

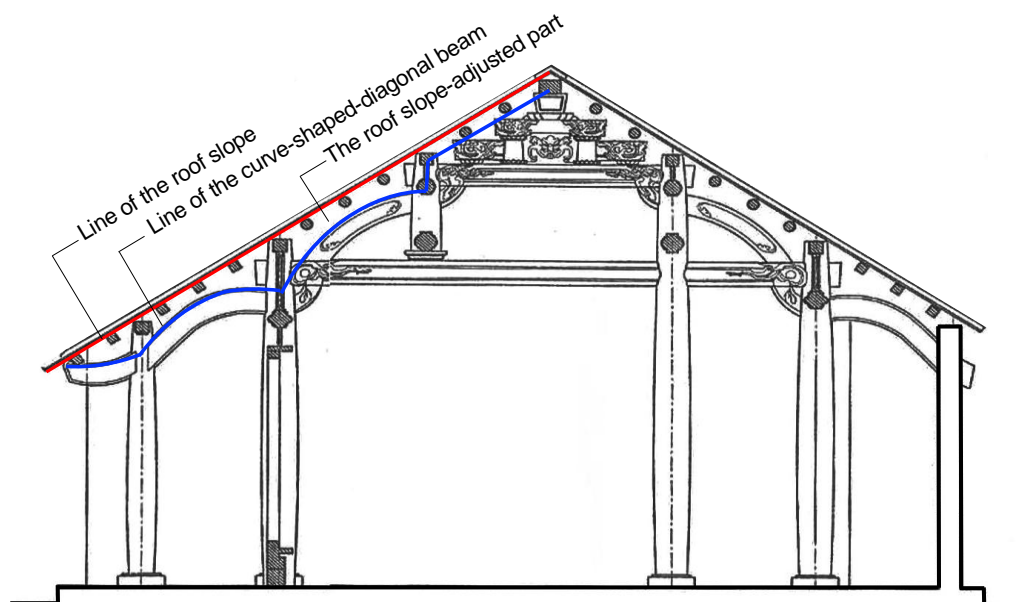


Figure 34: Features of the “Ke-Bay” curve-shaped-diagonal beam and its relationship with the roof slope.
(Source: Author)

4.2.5 Roofing technique and materials

The roofing system of Type A represents a culmination of indigenous carpentry skills, environmental adaptation, and locally available materials, resulting in a durable and climatically responsive shelter characteristic of northern Vietnam.

As the aforementioned, the roofing technique employed in Type A is distinguished by its sophisticated timber framework that supports layered roofing materials to achieve both structural integrity and effective weather protection. The roof's primary support is provided by the “*Ke*” curved diagonal beams, which, together with the “*Bay*” and supplementary purlins, create a robust truss system capable of bearing significant loads, including the roofing covering and environmental forces such as wind and rainfall.

The assembly is traditionally constructed without metal fasteners, relying instead on precise mortise-and-tenon joints and wooden pegs, which confer flexibility and resilience to the structure. This joinery method facilitates slight movements within the timber frame, accommodating the natural expansion and contraction of wood caused by humidity variations, thereby reducing the risk of structural failure over time.

An important element in the roofing technique is the use of the “*Banh Dong*”, which adjusts the angle of the rafters independently from the curvature of the diagonal beams, allowing for an optimized roof pitch that enhances rainwater runoff and ventilation—critical features for the region's humid subtropical climate.

The external roofing material traditionally consists of thatch, wooden shingles, or baked clay tiles, with choices often dictated by local availability, economic factors, and social status. In northern Vietnam, notably the “*Ngoi Vay Ca*” (fish scale) tile and the “*Ngoi Mui Hai*” (shoe tip) tile are predominantly used for Type A roofs due to their durability, fire resistance, and capacity to shed water effectively during heavy monsoons (see Figures 32, and 60).

These tiles are meticulously arranged in overlapping courses that ensure water tightness and facilitate rapid drainage. The roof eaves extend significantly beyond the wall line, providing shade and protection from rain, thereby contributing to the house's thermal comfort and longevity. In some

cases, decorative ridge caps and finials are applied, which serve both aesthetic and symbolic purposes, reflecting the cultural significance of the dwelling.

Additionally, timber battens and laths are employed beneath the roofing tiles or thatch to provide a stable substrate, evenly distributing loads across the truss system. The selection of timber for these elements favors species with natural resistance to insects and decay, such as ironwood or jackfruit wood, further enhancing the roof's durability.

Overall, the roofing technique and materials of Type A exemplify a harmonious integration of skilled craftsmanship, functional requirements, and cultural aesthetics. This roofing system not only protects the interior environment from climatic stresses but also embodies the vernacular knowledge and values passed down through generations of northern Vietnamese carpenters.

4.2.6 An architectural form and façade composition

The vernacular houses of northern Vietnam presents a distinctive architectural form and façade composition that encapsulate both functional considerations and cultural aesthetics, reflecting the harmonious integration of traditional construction techniques with symbolic meanings.

The overall architectural form of Type A is characterized by a longitudinal, rectangular plan oriented along a clear central axis. This linear form emphasizes the hierarchical spatial arrangement typical of northern Vietnamese vernacular houses, where the central compartment serves as the sacred space for the ancestral altar, and other functional areas align symmetrically on either side (Tran, 2017). The house's roof profile is one of its most defining features, marked by gently curved diagonal beams that impart a graceful upward sweep to the roof ridge, lending the building a dynamic silhouette that visually distinguishes it within the rural landscape.

The roof's curvature is not merely aesthetic but serves structural and climatic functions, aiding in rainwater runoff and providing additional height and ventilation in the interior space. This combination of form and function exemplifies the vernacular principle of "form following function" enriched by cultural symbolism.

The façade of Type A is typically simple yet elegant, marked by the expressive display of timber structural elements and limited ornamental

detailing (see Figure 32). Vertical wooden posts and horizontal beams are often left exposed, showcasing the craftsmanship of the timber framework and emphasizing the rhythmic modularity of the bay system. This structural honesty not only conveys a sense of material authenticity but also reinforces the cultural value placed on natural materials and artisanal skill.

The entrance façade is generally oriented south or southeast to optimize sunlight exposure and protect against prevailing northern winds, in accordance with traditional environmental and cosmological considerations. Doors and windows are modest in size but strategically placed to facilitate cross ventilation and daylight penetration, contributing to thermal comfort in the subtropical climate.

Decorative elements on the façade are typically restrained but carry significant symbolic meaning. These may include carved wooden panels, lintels, or ridge decorations featuring motifs derived from local folklore, religious beliefs, or auspicious symbols intended to protect the household and invite prosperity (Nguyen, 2016). The restrained ornamentation reflects the vernacular ethos of balancing utility with meaningful aesthetic expression.

In essence, the façade and architectural form of Type A vernacular house articulate a synthesis of structural logic, environmental adaptation, and cultural symbolism. This architectural language not only fulfills the practical needs of shelter and climate response but also embodies the identity and values of northern Vietnamese rural communities.

4.3 The Nha Roi (Type B)

4.3.1 Architectural concept

The term “*Roi*” presents considerable challenges in interpretation and translation within the Vietnamese linguistic context, primarily due to its obscure etymology and possible origins in ancient Cham language. Unlike many vernacular architectural terms with clear semantic roots in Vietnamese, “*Roi*” lacks a definitive meaning in contemporary usage, suggesting that it may derive from the word *Cham H’roi* as the above mentioned, historically associated with the Cham people—an indigenous ethnic group of Central and Southern Vietnam. Over time, the original meaning of *H’roi* has become obscure or lost, rendering the precise semantic content of “*Roi*” difficult to ascertain in modern Vietnamese scholarship. Consequently, the phrase *Nha Roi*

can be interpreted as “the house of the *Cham H’roi* people,” reflecting an ethno-linguistic legacy embedded within regional vernacular architecture terminology (Nguyen, 2015).

Similarly, the word *Nha* is widely recognized in Vietnamese as meaning “house,” thereby rendering *Nha Ruong* as “house with large beams,” a descriptive term emphasizing the architectural feature of prominent timber framing integral to the building’s structure. This nomenclature reflects a synthesis of native Vietnamese and Sino-Vietnamese elements, demonstrating the layered cultural and linguistic influences that have shaped the architectural vocabulary.

The juxtaposition of *Nha Roi* and *Nha Ruong* thus illustrates a complex interplay of indigenous Cham linguistic heritage and Sino-Vietnamese cultural transmission. While *Nha Roi* embodies an ethno-cultural reference to the Cham people and their architectural identity, *Nha Ruong* reflects the incorporation of Chinese-derived technical terminology into Vietnamese building practices. This duality highlights the multi-ethnic and multi-cultural fabric of Vietnam’s architectural history, where vernacular forms and terminology serve as living testimonies to the country’s diverse historical interactions and exchanges.

Understanding these etymological and cultural nuances enriches the study of Vietnamese vernacular architecture by revealing the layered meanings embedded in architectural terminology, which in turn illuminate broader socio-cultural and historical processes influencing building traditions in the region.

4.3.2 Site plan, layout of the house and orientation

The site plan of the *Nha Roi* (Type B) is typically organized within a rectangular compound, often enclosed by low hedges or bamboo fences, with ancillary structures such as kitchens, granaries, and livestock shelters arranged toward the rear or lateral sides of the plot (Nguyen, 2012). The main house occupies the central position along the longitudinal axis of the site, reinforcing its symbolic and functional primacy. By contrast, the Type B compound often reflects a more flexible arrangement, with auxiliary structures dispersed to accommodate seasonal workspaces, rice barns, or weaving sheds (Po, 2003). While both traditions value axial access, the Cham version tends to integrate open yards for communal activities, reflecting their emphasis on extended kinship gatherings.

In terms of layout, the Vietnamese's Type B commonly adopts a "three compartments with the two-side wings" configuration. The main compartment serves ceremonial and reception functions, flanked by sleeping spaces, with lean-to extensions for cooking or storage (Phan, 2015). This arrangement reflects the principle of integrating ritual and residential functions within a unified structure. In contrast, the Cham's Type B commonly adopts a "one or two compartments with the two-wings" configuration, often elevates the main building on short stilts or a raised platform to protect against seasonal flooding and to enhance ventilation (Le et al., 2011, pp. 59-64). Internally, its plan tends toward a linear sequence, with a central communal and ritual area separated from private sleeping quarters. Cooking spaces are often placed in detached structures, ensuring a clear functional and symbolic separation between sacred and utilitarian zones.

The orientation of both house types is strongly influenced by environmental and cosmological considerations. The Vietnamese's Type B generally oriented toward the south or southeast, following Feng-Shui principles to capture favorable sunlight and breezes while shielding against monsoon rains from the west and cold winds from the north. The Cham's Type B, however, is more frequently oriented toward the east or southeast, aligning with the rising sun, which holds symbolic significance in Cham cosmology, while also maximizing natural light and benefiting from prevailing coastal breezes (Truong, 2023).

Overall, while both house types exhibit sensitivity to climate and environmental conditions, their spatial organization and orientation reveal distinct cultural logics: the Vietnamese's Type B integrates ceremonial and domestic life within a compact plan, while the Cham's Type B maintains a more pronounced separation of sacred and utilitarian spaces, embedded within a looser, multifunctional compound layout.

4.3.3 Floor plan, spatial arrangement, and entrance

Type B represents the fundamental architectural typology predominantly employed by the Cham people as their principal residential form (see Figures 35-43)(Chu, 2003, pp. 153-165). This typology is characterized by a compact footprint, typically manifesting in either a square or rectangular floor plan, which reflects both practical spatial constraints and cultural preferences inherent to Cham domestic architecture.

The structural configuration of Type B houses is determined largely by the number of roof trusses incorporated. When the house employs two trusses, the resulting internal spatial arrangement consists of a single compartment. In contrast, a house with three trusses subdivides the interior into two compartments (see Figure 35), typically delineated by the positioning of the trusses themselves. These compartments often correspond to distinct functional zones within the dwelling, and their spatial organization is further articulated by the presence of two projecting wings located at the front and rear of the structure. This bilateral extension enhances spatial differentiation and provides additional sheltered areas for domestic activities or social interaction.

Importantly, the number of compartments in Type B houses is thus restricted to one or two; configurations exceeding two compartments are uncommon within this typology. This limitation does not appear to arise from prescriptive architectural norms but rather reflects the flexible and adaptive nature of Cham domestic architecture. The configuration is often tailored to the occupants' specific needs and preferences, allowing for adjustments in the number of compartments to optimize comfort, functionality, and social practices within the household (Pham, 2018).

This adaptability underscores the pragmatic and user-centered approach characteristic of Cham vernacular architecture wherein spatial organization is responsive to both environmental conditions and the evolving lifestyles of inhabitants. Consequently, Type B serves as an exemplary model of how vernacular architecture balances structural simplicity with flexible interior arrangements, providing insights into the cultural and practical considerations shaping traditional Cham housing.

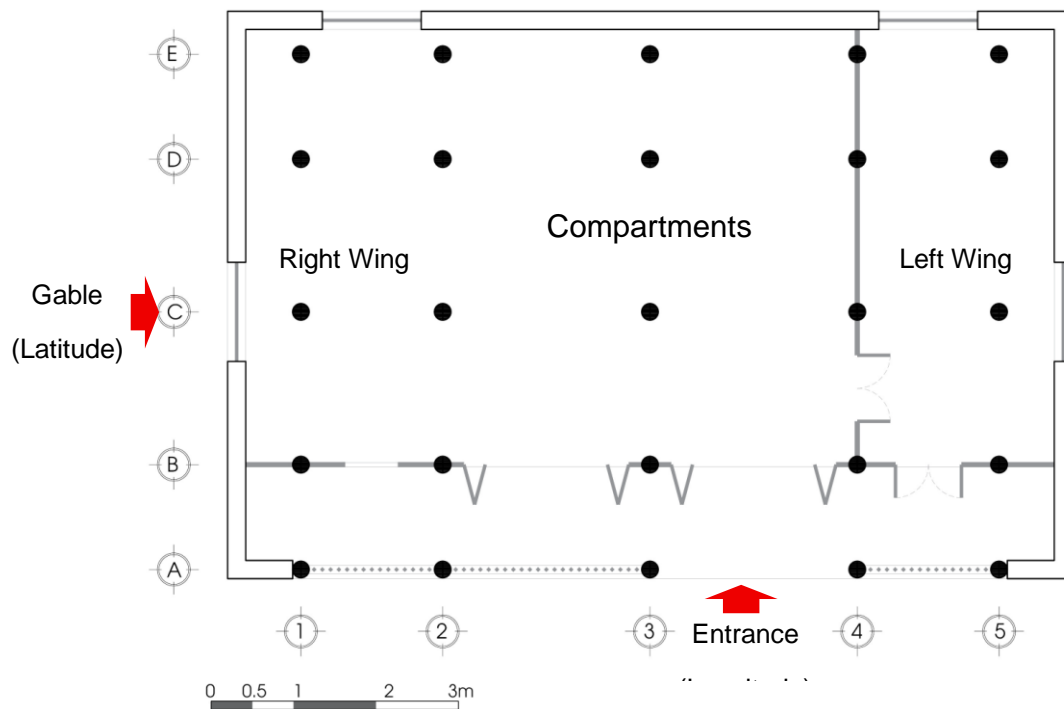


Figure 35: Floor plan of the “Nha Roi” (Later Type B), case of the house of Mr. Nai Nha, Phuoc Huu village, Phuoc Hau commune, Ninh Phuoc district, Ninh Thuan province (see Table 1, no. 59).
(Source: Author)

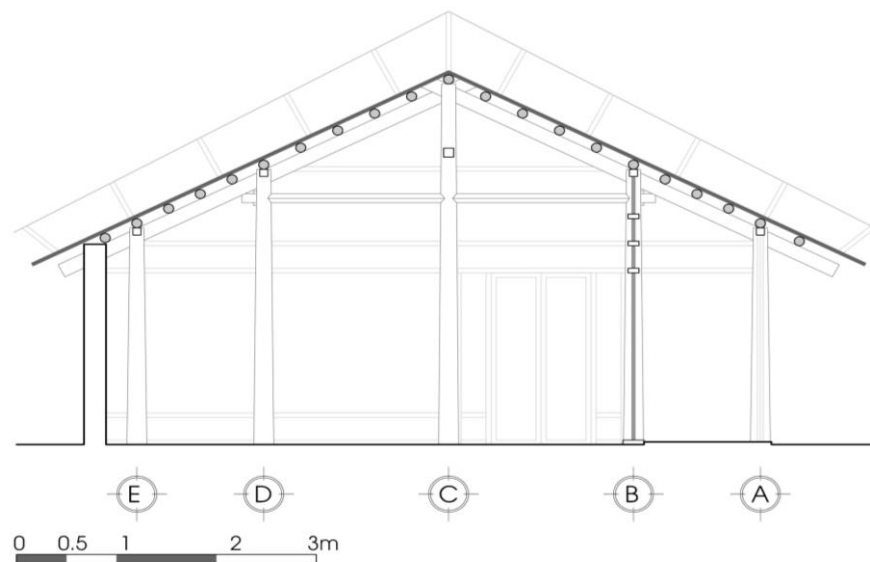


Figure 36: Across section of the “Nha Roi” (Later Type B) with the main column placed at the central of the truss.
(Source: Author)



*Figure 37: Front view of the “Nha Roi” (Early Type B), entrance in the direction of gable, house of Mr. Nai Nha, Phuoc Huu village, Phuoc Hau commune, Ninh Phuoc district, Ninh Thuan province (see Table 1, no. 59).
(Source: Author)*



*Figure 38: The truss of the “Nha Roi” (Early Type B).
(Source: Author)*



Figure 39: The reused-wooden frame of the “Nha Roi” (Early Type B) in Vietnamese’s house
(Source: Author)



Figure 40: Another simple truss of the “Nha Roi” (Early Type B) in Cham’s house
(Source: Author)



*Figure 41: Primary technique using bamboo and tree branch in the “Nha Roi” (Early Type B)
(Source: Author)*



*Figure 42: Front view of the “Nha Roi” (Later Type B), house of Mr. Quang Dai Hoang, Phuoc Dong 1 village, Phuoc Hau commune, Ninh Phuoc district, Ninh Thuan province (see Table 1, no. 62).
(Source: Author)*



Figure 43:: The truss of the “Nha Roi” (Later Type B), entrance in the direction across the top-ridge beam, house of Mr. Quang Dai Hoang (Source: Author)

The entrance of the Type B Cham house is traditionally aligned with the gable end, establishing a clear axial progression from the exterior toward the interior along the vertical axis of the structure (see Figure 37). This deliberate spatial organization underscores the importance of a linear sequence of functional zones that guide movement and activities within the house.

Upon entering, the first spatial zone encountered is the porch, which serves as a transitional semi-open area that mediates between the external environment and the enclosed living spaces. This porch functions as a social interface where informal interactions, receptions, and daily household tasks can take place under partial shelter while maintaining ventilation and connection to the outdoors.

Beyond the porch lies the living room, which acts as the central gathering space for the household. In dwellings comprising a single compartment, the living room doubles as the sleeping area, reflecting an efficient use of limited interior space. However, in houses with two or more compartments, spatial differentiation is more pronounced: the first compartment functions primarily

as the living room, facilitating communal activities, while the subsequent compartment(s) serve as private sleeping quarters for the owner and children, thereby accommodating the need for privacy and familial hierarchy within the domestic environment.

A notable divergence from the vernacular housing traditions of the Vietnamese majority is observed in the absence of an ancestral altar within the interior of Cham houses. Although an entrance aligned with the top ridge beam is present, the Chams do not practice ancestral worship within the domestic setting as is customary among Vietnamese households. Instead, ancestral veneration among the Chams is typically conducted in communal or outdoor spaces, such as village shrines or temples, highlighting a distinctive cultural and religious practice (Nguyen, 2020).

This characteristic signifies a unique cultural adaptation within the architectural typology of Type B houses, illustrating how religious beliefs and social customs directly inform spatial organization. Furthermore, it suggests that this spatial arrangement represents an evolution or later adaptation within the Type B model, wherein traditional Cham social structures and ritual practices continue to shape the built environment distinctly from neighboring ethnic groups.

4.3.4 Building structure and feature of the Truss

The simple frame structure characteristic of Type B vernacular houses is typically constructed using bamboo or a combination of bamboo and timber, materials selected for their availability, flexibility, and structural performance within the local environmental context. Central to this structural system is the presence of a prominent vertical member known locally as the mother column, which occupies the central position within each roof truss and serves as the primary load-bearing element supporting the ridge beam at the apex of the roof (see Figures 36, 38, 39, 43) (Tran, 2017).

Flanking the mother column are two symmetrically positioned intermediate columns, which together with the central column, constitute the defining triadic arrangement of the truss system. This arrangement results in an odd number of columns per truss, a consistent structural principal observable across Type B houses (see Figures 38, 39, 43). Occasionally, additional porch columns are incorporated at the extremities of the structure to extend the spatial

capacity of the porch area, thereby enhancing the functional usability of the house without compromising structural integrity.

Connecting the tops of these columns are elongated diagonal beams known as “Keo”, which are straight rather than curved and extend from the ridge beam down to the intermediate columns. The angle or slope of these diagonal “Keo” beams is critical, as it directly determines the pitch of the roof. This angle is traditionally measured and established using the next chapters mentioned *Thuoc Nac*, a local carpenter’s tool that enables precise geometric calibration of the roof slope, ensuring consistency in form and effective drainage in response to the region’s climatic conditions.

Structurally, the truss is further stabilized by two transverse cross beams that link the tops of the intermediate columns to the central mother column, forming a triangulated framework that enhances lateral rigidity and load distribution. In the longitudinal direction, stability is maintained through the use of latitudinal main beams and tie beams, which connect the columns and prevent deformation under load, thereby preserving the overall coherence of the wooden frame.

The roofing framework also incorporates purlins spaced at regular intervals determined by the size of the thatch materials used for roofing. Notably, the number of purlins is maintained as an odd number—commonly 5, 9, 11, or 13—extending from the ridge beam down to the eaves (see Figures 36, 38, 43). This odd-numbered arrangement not only aligns with broader vernacular architectural traditions favoring odd numbers for their symbolic auspiciousness but also facilitates balanced load distribution and modularity in roofing assembly.

Collectively, this structural system exemplifies the integration of local materials, traditional carpentry tools, and culturally informed design principles. The Type B truss thus reflects a sophisticated understanding of timber architecture that is both environmentally adapted and culturally resonant, enabling the creation of durable, functional, and symbolically meaningful dwellings within the vernacular landscape.

4.3.5 Roofing technique and materials

Originally, the early Type B vernacular houses were distinguished by a distinctive double-roof configuration, reflecting a sophisticated approach to

roofing that combined both functional and climatic considerations. The lower roof layer was traditionally constructed using a rammed clay surface applied over a supporting bamboo wattle framework, providing a durable and thermally effective base. Above this, a secondary upper roof layer was typically composed of thatch or, less commonly, palm leaves, which were fastened securely to the purlins using rattan ropes, a material prized for its flexibility and tensile strength.



*Figure 44:: The double roofed layers of the later Type B, above mentioned house of Mr. Quang Dai Hoang's family.
(Source: Author)*



*Figure 45: The space-gap between the double roofed-layers of the later Type B (above mentioned house of Mr. Quang Dai Hoang's family)
(Source: Author)*

The spatial relationship between these two roofing layers was characterized by an intentional gap ranging from 40 to 60 centimeters in height. This interstitial space functioned as an insulating air cavity, enhancing ventilation and reducing heat transfer, thereby improving the building's thermal comfort in the humid subtropical climate of the region. The double-roof system also facilitated effective rainwater runoff and protection from environmental elements, contributing to the longevity of the structure.

Contemporary interventions, however, have altered this original roofing technique in many extant early Type B houses. Restoration and maintenance efforts have frequently replaced the traditional double-layered roofs with simplified single-layer roofing systems, utilizing modern materials such as corrugated iron sheets or ceramic tiles. These materials, while differing significantly from the original organic coverings, have proven resilient and have contributed to the preservation of these heritage structures over time.

Nonetheless, vestiges of the original construction method remain discernible. The foundational layer of bamboo wattle beneath the roofing remains a consistent feature, confirming continuity with traditional carpentry and roofing practices. This is notably evident in the house of Mr. Quang Dai

Hoang's family, which retains its characteristic double-roof structure (see Figures 44, 45). It is noteworthy that this house's entrance has been reoriented to face the altar direction, diverging from its original spatial orientation—a modification reflecting evolving social or ritual practices.

A comparative analysis of early and later iterations of Type B houses (see Figures 37-45) reveals a sustained reliance on the bamboo wattle and clay rammed roofing technique as a fundamental element of construction. Despite changes in the upper roofing materials and overall roof form, the enduring use of bamboo wattle as a roofing substrate underscores the resilience of indigenous building technologies and their adaptability to both traditional and modern material contexts (see Figures 41, 42).

This evolution from a complex double-roof system to a simplified single-roof system illustrates broader dynamics in vernacular architecture, where traditional craftsmanship intersects with contemporary restoration needs and material availability. It highlights the importance of recognizing and preserving core construction techniques as part of cultural heritage, even as superficial elements adapt to changing times.

4.3.6 An architectural form and façade composition

Type B, a vernacular house typology associated with the Cham ethnic group, exhibits a distinctive architectural form and façade articulation that reflect both functional necessities and the cultural identity of its inhabitants. Its design embodies a synthesis of indigenous craftsmanship, environmental adaptation, and socio-cultural symbolism, setting it apart within the broader spectrum of Southeast Asian vernacular architecture.

Type B typically adopts a compact rectangular or square floor plan, optimizing spatial efficiency while accommodating the domestic and ritual needs of the Cham community. The house structure often rests on stilts or low wooden posts, a feature that elevates the building above the ground to protect against moisture, pests, and flooding—conditions common in the tropical climate of Central and Southern Vietnam where the Cham traditionally reside.

The roof form of Type B is particularly noteworthy. It is usually steeply pitched, facilitating rapid rainwater runoff and enhancing natural ventilation within the interior spaces. The roof is supported by a truss system characterized by simple yet robust timber framing, often incorporating locally sourced

materials such as bamboo and hardwood. The interplay of vertical posts and diagonal bracing generates a rhythmic structural framework that is both functional and visually expressive.

The façade of Type B is generally modest in ornamentation but conveys cultural meaning through its materiality and structural expression (see Figures 37, 42). Vertical wooden slats or planks form the primary exterior wall surfaces, providing privacy while permitting airflow. The surface treatments and joinery techniques reveal the skilled craftsmanship inherent in Cham carpentry traditions.

Entrances are typically positioned on the gable end or along the longitudinal axis (see Figures 37, 39), facilitating an axial spatial sequence from the exterior through transitional semi-open spaces, such as porches or verandas, into the core living areas. The positioning and design of openings are carefully considered to optimize ventilation and daylighting, which are critical in the tropical environment.

While decorative elements are generally restrained, certain symbolic motifs may be carved into doorways, lintels, or structural members, reflecting Cham religious beliefs and cosmology. These motifs serve not only an aesthetic purpose but also function as protective talismans, linking the architectural form with intangible cultural values (see Figures 46-49).



Figure 46: The original decorative motifs on the main doors of the Cham's house (above mentioned house of Mr. Nai Nha's family) (Source: Author)



Figure 47: The original decorative motifs on the windows of the Cham's house (house of Mr. Nai Nha's family) (Source: Author)



Figure 48: The Vietnamized decorative motifs on the main doors of the Cham's house (case of the house of Mrs. Luu Thi Trang's family, see Table 1, no. 60) (Source: Author)



Figure 49: Vietnamized decorative motifs on the windows of the Cham's house (case of the house of Mrs. Luu Thi Trang's family, see Table 1, no. 60) (Source: Author)

In conclusion, the façade and architectural form of Type B encapsulate a vernacular architectural language that balances environmental pragmatism with cultural expression. Its spatial organization, structural clarity, and material choices demonstrate the enduring legacy of Cham architectural heritage and offer valuable insights for the study and conservation of ethnic minority housing traditions in Vietnam.

4.4 The Nha Ruong (Type C)

4.4.1 Architectural concept

The term *Nha Ruong* has long been used to designate a distinctive architectural typology prevalent in Middle Region of Vietnam. Pierre Gourou, a noted French geographer and ethnologist, offers an interpretative explanation of the term *Ruong*, which literally translates as a wooden chest or trunk. According to Gourou, the structural components known as “*Qua giang and Xuyen serve as primary load-bearing elements, ensuring the overall stability and integrity of the timber frame supporting the house. These beams uphold a floor structure called Do Ban, which is enclosed on the entrance side by wooden panels, creating a secure platform on which various household goods and valuables are stored. This arrangement—functionally and visually reminiscent of a chest used for storage—provides the etymological foundation for the name Nha Ruong*” (Gourou, 2001a).

Field research and architectural surveys have corroborated this description, identifying the architectural feature in question as the “*Ram Thuong*” or “*Tra*”—an elevated floor positioned above the main living compartments of the house (see Figures 50, 54). This upper floor serves dual purposes: it functions both as a ceiling for the spaces below and as an upper storage loft. Situated at the highest point within the building envelope, the *Ram Thuong* is traditionally utilized for the safekeeping of precious items and the storage of grain, particularly during seasons of flooding or inclement weather. The physical form and utilitarian role of this upper floor closely parallel that of a chest or trunk, thereby reinforcing the conceptual association suggested by the term *Nha Ruong*.

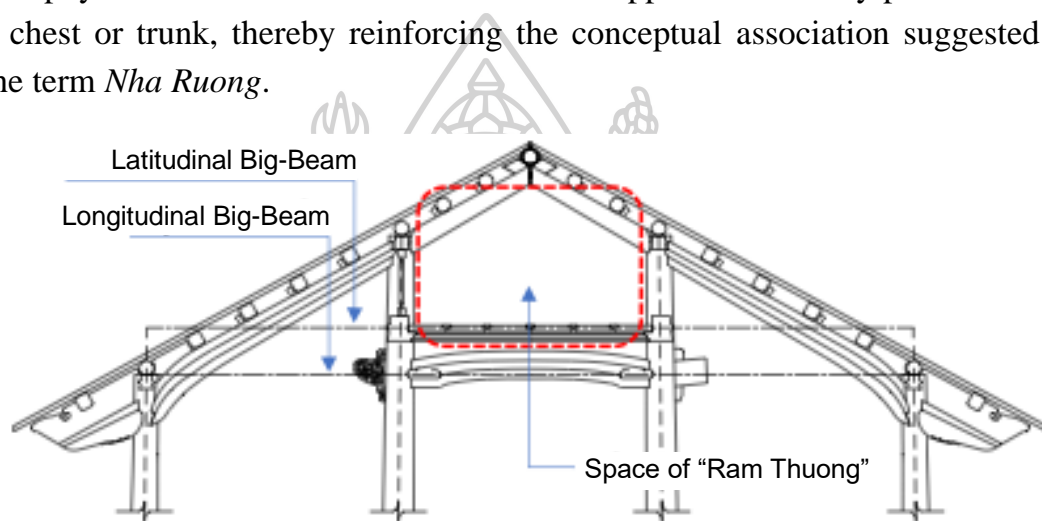


Figure 50: Location of the “*Ram Thuong*” upper floor
 (Source : An, V. L., Son, P. T., Phuc, N. N., Ha N. T. S., Son, N. T., <https://nxbxaydung.com.vn/ky-yeu-hoi-thao-khoa-hoc-quoc-gia-bao-ton-va-phat-huy-cac-gia-tri-nha-truyen-thong-nong-thon-gan-voi-phat-trien-du-lich-khu-vuc-mien-trung-b12296.html>.)

However, it is important to note that Pierre Gourou’s interpretation might have been influenced by dialectal variations and cultural nuances, potentially leading to a certain degree of misinterpretation by foreign researchers unfamiliar with the linguistic particularities of the region. The semantic field surrounding the term “*Ruong*” may thus encompass both material and symbolic dimensions, reflecting the complex interplay of language, culture, and architectural form in Vietnamese vernacular traditions.

The linguistic origin of “*Ruong*” can be traced back to the Sino-Vietnamese character 梁 (*Luong*), which literally means beam or rafter and holds significant connotations within traditional building practice (Dao, 1957, p. 530; Ly & Waters, 1997, pp. 418, 1169; Vu, 1999, p. 1187). This character is

also embedded within the historical phrase “*Luong Dong Trieu Dinh*”, which metaphorically refers to the beams and columns of the Nation, symbolizing individuals entrusted with the highest responsibilities in governance and society. This metaphor underscores the cultural significance attributed to the structural elements of traditional Vietnamese architecture, where the physical framework of the house is imbued with social and symbolic meaning.

Over centuries, the term *Nha Ruong* has evolved to denote a specific architectural style that is regionally concentrated. This style is predominantly found in the geographical corridor extending from south of the Gianh River in Quang Binh Province down to Quang Ngai Province. Historically, this area was recognized as the “*Ngu Quang Dinh*” during the Nguyen Dynasty, comprising the five provinces of *Quang Binh*, *Quang Tri*, *Quang Duc*, *Quang Nam*, and *Quang Ngai* (The National Department of History of Nguyen Dynasty, 1960). The *Nha Ruong* thus represents not merely a building Type But also a cultural marker that embodies the regional identity, craftsmanship traditions, and socio-historical context of Middle Region of Vietnam.

Architecturally, the *Nha Ruong* is renowned for its elegant timber frame construction, intricate joinery, and harmonious proportions. The structural system is often composed of massive wooden columns and beams joined without nails, relying instead on complex mortise-and-tenon techniques that exemplify the high level of carpentry skill passed down through generations. The interplay between functional necessity and aesthetic refinement in the *Nha Ruong* embodies core principles of Vietnamese vernacular architecture, where the building is conceived as both a shelter and a cultural artifact.

Moreover, the *Nha Ruong* has played an integral role in the social fabric of the communities in which it appears. It often serves as the locus of family life, ancestral worship, and community gatherings, reflecting the intertwined nature of architecture and social practice. Preservation efforts today emphasize the importance of maintaining these structures not only as architectural heritage but also as living symbols of cultural continuity.

In summary, the term *Nha Ruong* encompasses a rich confluence of linguistic, architectural, and cultural meanings. From its etymological roots linked to both indigenous and Sino-Vietnamese influences, to its manifestation as a distinctive timber house form concentrated in Middle Region of Vietnam,

the *Nha Ruong* stands as a testament to the enduring legacy of traditional Vietnamese architecture and the complex histories it embodies.

4.4.2 Site plan, layout of the house and orientation

The *Nha Ruong* (Type C), a traditional timber house typology prevalent in Middle Region of Vietnam, is notable for its deliberate and culturally significant site planning, spatial organization, and orientation. These aspects collectively reflect an intricate balance between environmental adaptation, socio-cultural practices, and architectural traditions.

Typically, Type C is situated within a residential compound that integrates both built and natural elements, such as courtyards, gardens, and boundary walls. The compound layout often adheres to principles derived from traditional feng-shui, which guides the positioning of the house relative to topography, water sources, prevailing winds, and solar orientation. This ensures optimal climatic comfort, protection from natural hazards, and auspicious spiritual alignment.

The house is usually positioned on a raised platform or stilts to mitigate dampness and facilitate ventilation, a common adaptation in Vietnam's humid tropical climate. The surrounding space is designed to allow airflow and sunlight penetration, contributing to a healthy and comfortable living environment.

The internal layout of Type C is highly structured and hierarchical, reflecting both functional requirements and Confucian family values. The plan is typically rectangular, divided longitudinally into a series of interconnected compartments framed by sturdy timber columns and beams. These compartments are arranged symmetrically along a central axis, which serves as the primary circulation route through the house (L. V. Pham, 2017).

The spatial hierarchy is evident in the arrangement of rooms: the central bay often serves as the main living area or reception hall, accommodating social and ceremonial functions, including ancestral worship. Flanking bays are designated for private activities such as sleeping quarters or storage.

This organization facilitates clear distinctions between public and private spaces, reinforcing family hierarchy and social customs.

Orientation plays a crucial role in the design of Type C, guided by traditional beliefs and environmental considerations. The house is typically

aligned along a north-south or east-west axis, depending on local geomantic advice, with the entrance facing a direction deemed auspicious for the household's prosperity and well-being.

This orientation maximizes exposure to prevailing breezes for natural cooling and minimizes exposure to harsh weather elements. The gable ends of the house are often oriented to capture scenic views or to respect neighboring structures and natural features, reinforcing a harmonious relationship between the built environment and its context.

Furthermore, the positioning of doors, windows, and ventilation openings is carefully planned to enhance cross-ventilation, daylighting, and privacy, contributing to the overall environmental performance and comfort of the house.

In conclusion, the site plan, layout, and orientation of Type C reveal a sophisticated integration of cultural values, environmental adaptation, and architectural principles. This synthesis not only ensures the house's functional efficacy and comfort but also embeds it deeply within the cultural and spiritual landscape of Middle Region of Vietnam.

4.4.3 Floor plan, spatial arrangement and entrance

Type C vernacular houses represent the most prevalent architectural form among the populations of northern and Middle Region of Vietnam's middle regions. (Chu, 2003, pp. 153-165) Renowned for their aesthetic refinement and robust structural resilience—particularly their ability to withstand typhoons—these houses embody a harmonious balance between functional design and cultural symbolism.

Typically, Type C houses are organized around a rectangular floor plan that strictly adheres to traditional spatial regulations, resulting in an odd number of compartments (see Figure 51). This numerical arrangement is not arbitrary but is deeply rooted in indigenous cultural beliefs and architectural conventions that prioritize symmetry, balance, and auspiciousness in domestic design.

The main entrance is customarily oriented toward the principal façade, aligned with the front ridge of the roof, thus establishing a direct axial progression leading inward to the ancestral altar. This orientation reinforces the

centrality of ancestor worship within the household, a core tenet of Vietnamese familial and spiritual life.

In terms of spatial configuration, the floor plan exhibits flexibility to accommodate different household scales. For smaller dwellings, a plan with one central compartment, while medium to larger houses often feature three primary compartments accompanied by two side wings (see Figures 51, 53). This gradation reflects variations in household size, social status, and functional needs.

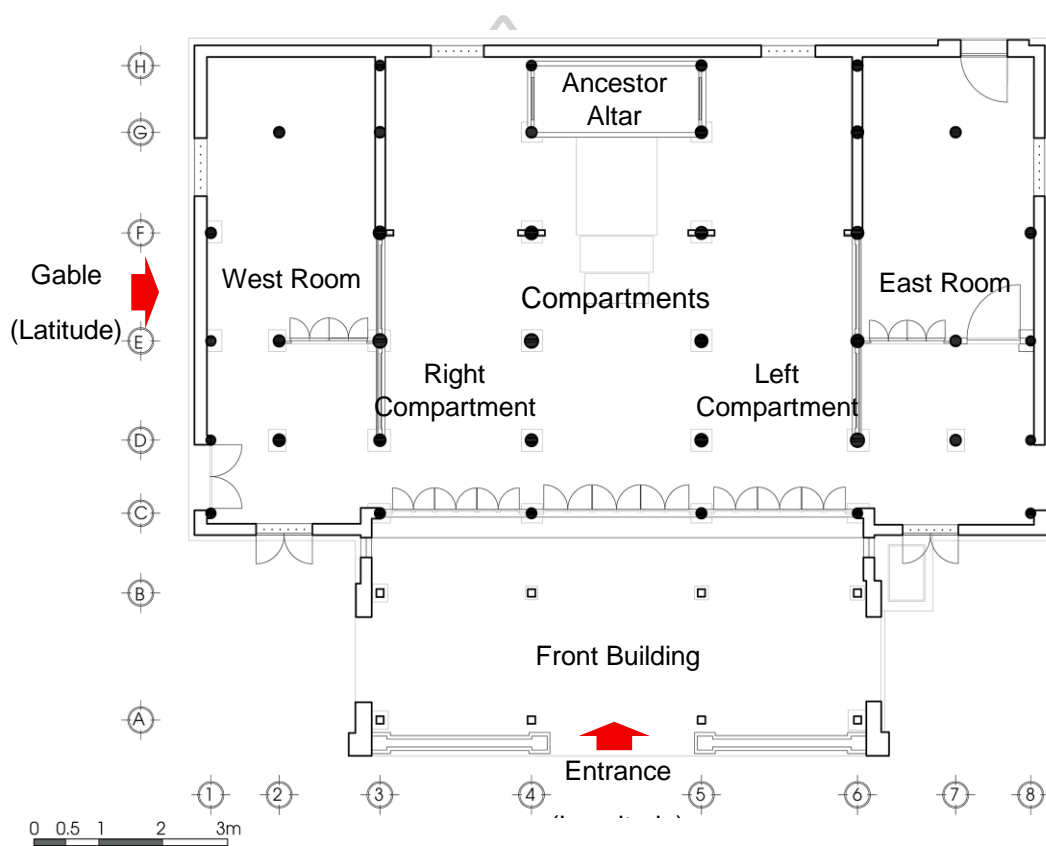


Figure 51: Floor plan of “Nha Ruong” (Later Type C), case of Mr. Le Hoi’s house, Kim Long village, Hue City, Thua Thien Hue province (see Table 1, no. 17)
(Source: An Khang company)

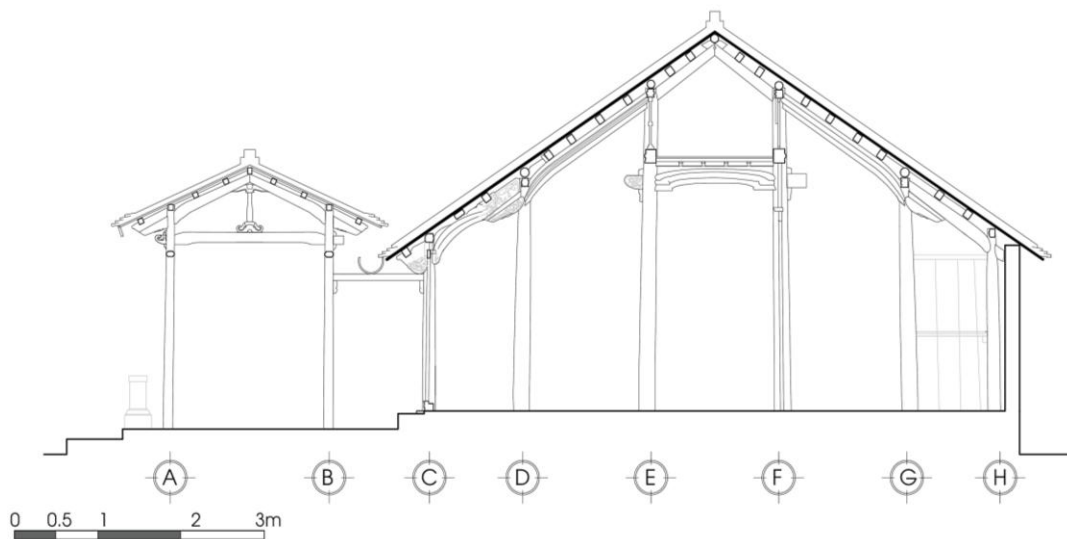


Figure 52: Cross section of “Nha Ruong” (Later Type C), case of Mr. Le Hoi’s house, Kim Long village, Hue City, Thua Thien Hue province (see Table 1, no. 17). (Source: An Khang company)



Figure 53: Front view of “Nha Ruong” (Later Type C), case of Mr. Le Hoi’s house, Kim Long village, Hue City, Thua Thien Hue province (see Table 1, no. 17). (Source: An Khang company)



Figure 54: Wooden structure of the “Nha Ruong” (Later Type C), case of Mr. Le Hoi’s house, Hue City, Thua Thien Hue province (see Table 1, no. 17). (Source: An Khang company)



Figure 55: Cross section of the “Nha Ruong” (Early Type C), case of the “An Hien” Garden House, 58 Nguyen Phuc Nguyen Street, Huong Long Ward, Hue City (2014) (Source: An Khang company)



Figure 56: Front façade of the “Nha Ruong” (Early Type C), case of the “An Hien” Garden House, 58 Nguyen Phuc Nguyen Street, Huong Long Ward, Hue City (2014) (Source: An Khang company)



Figure 57: Wooden structure of the “Nha Ruong” (Early Type C), case of the “An

Hien” Garden House, 58 Nguyen Phuc Nguyen Street, Huong Long Ward, Hue City (2014)
(Soucre: An Khang company)

When the layout consists of a single central compartment and two wings, the central space is predominantly dedicated to ancestor worship, serving as the spiritual and ceremonial heart of the home. The adjacent wings are distinctly gendered: the eastern wing, known locally as the “*Dong Phong*” (East Room), functions as the women’s quarters, while the western wing, or “*Tay Phong*” (West Room), serves as the men’s bedroom. This spatial gender division not only facilitates privacy but also reflects the Confucian-influenced domestic order prevalent in Vietnamese society (see Figures 51-57).

In houses with three compartments, the central compartment retains its ritual function as the locus of ancestor worship and religious practices. The flanking compartments on the left and right sides are more multifunctional, commonly serving as living rooms or guest reception areas, thus accommodating both familial interaction and social hospitality. The adjacent wings maintain their gender-specific roles, with the “*Dong Phong*” dedicated to the wife or female members of the household, and the “*Tay Phong*” allocated to the husband or male occupants.

This architectural arrangement underscores a deeply embedded social structure, where spatial delineation codifies family roles and gender relations, while simultaneously providing practical solutions for domestic life. The careful orchestration of compartmentalization and wing allocation within Type C houses illustrates how vernacular architecture in Vietnam integrates cultural values, social norms, and environmental considerations into a cohesive built environment.

Among the surviving examples of Type C vernacular houses, two principal variants can be identified: the early Type C (see Figure 55-57) and the later Type C (see Figures 51-54). These variants reflect an evolutionary trajectory within this architectural typology, driven by changing social needs and functional demands over time.

The early Type C represents the more traditional and foundational model, characterized by its original spatial arrangement and structural simplicity. This version embodies the essential design principles and cultural conventions that

define Type C houses, including the strict compartmentalization and axial organization aligned with ritual practices and family hierarchies.

In contrast, the later Type C is widely regarded as a developmental refinement of the early form, introduced to address the growing spatial requirements of expanding households or evolving domestic functions. This adaptation is most notably expressed through the addition of a sub-structure that extends the front lobby area of the house. By elongating the entrance zone, the later Type C not only increases the usable interior space but also enhances the transitional experience between the exterior environment and the sacred inner spaces dedicated to ancestor worship.

This architectural modification can be interpreted as a response to socio-economic changes, such as increasing family sizes, heightened social interactions, and possibly shifts in ceremonial practices that demanded more accommodating spatial configurations. The extension of the front lobby in the later Type C serves both practical and symbolic purposes: practically, it provides additional communal or reception areas; symbolically, it reinforces the importance of hospitality and social status within the household.

Furthermore, this evolution demonstrates the inherent flexibility of vernacular architectural forms, which, while rooted in tradition, exhibit adaptability to accommodate the dynamic needs of their inhabitants. The morphological changes from early to later Type C houses highlight the dialectic between preservation and innovation within Vietnam's vernacular-built environment.

In sum, the distinction between early and later Type C variants underscores the complex interplay of cultural continuity and adaptive transformation, reflecting broader patterns of social change and architectural development in northern and Middle Region of Vietnamese rural communities.

4.4.4 Building structure and feature of the Truss

In the structural design of Type C vernacular houses, including early and later Type C (see Figures 52, 55), a defining characteristic lies in the arrangement and number of columns per truss along the building's longitudinal axis. The number of columns is consistently designed as an even number, typically ranging between six and eight rows of columns per truss, not

including the porch columns. This regularity reflects a deliberate structural and symbolic logic embedded within traditional Vietnamese carpentry.

The columns are traditionally anchored directly onto stone basement footings, a foundation technique that elevates the wooden frame above ground moisture and provides durability against environmental degradation. Within each truss, the column arrangement follows a hierarchical size gradation: two large primary columns occupy the central positions, flanked symmetrically by two intermediate-sized middle columns, and finally two smaller columns are placed at the outermost edges. This graduated column sizing not only serves aesthetic balance but also reflects functional load distribution principles, with the largest columns supporting the greatest structural weight.

The longitudinal main beam spans between the two large central columns, forming a robust backbone for each truss. Perpendicular to this, latitudinal main beams connect individual trusses, thereby generating the essential three-dimensional wooden frame that constitutes the structural core of the house. This framework exemplifies traditional Vietnamese joinery techniques, which emphasize precision, interlocking connections, and the use of mortise-and-tenon joints without metal fasteners.

Atop each column, diagonal beams known locally as “*Keo*” are installed. These are straight diagonal members extending from the top-ridge beam down to the upper surfaces of the large or middle columns, playing a crucial role in stabilizing the roof structure. The slope of the “*Keo*” beams determines the pitch of the roof (see Figure 58), which is calculated using the next chapters-mentioned *Thuoc Nach* measuring method—an indigenous design technique involving the use of square-shaped wooden rulers that provide precise control over roof geometry.

To ensure overall structural stability, the tops of all columns—both longitudinally and latitudinally—are connected by head-tie beams, which act as horizontal ties preventing lateral displacement and reinforcing the rigidity of the timber frame. This integrated beam system exemplifies the Vietnamese carpentry principle of creating a cohesive structural network that distributes loads effectively while allowing for flexibility during environmental stresses such as seismic activity or strong winds.

The roofing system further reflects traditional design conventions, particularly in the arrangement of purlins. Similar to Type B houses, the

number of purlins is always an odd number—commonly 5, 9, or 13—extending from the top-ridge beam over the middle columns and continuing toward the edge of the roof (see Figures 52, 55). The flexibility in the exact number of purlins allows carpenters to adjust the roof span and support in accordance with local climatic conditions and the size of the structure. This odd-numbered purlin arrangement not only contributes to structural integrity but may also carry symbolic meaning related to balance and harmony within Vietnamese cultural cosmology.

Overall, the column and beam configuration of Type C houses demonstrates a sophisticated synthesis of functional engineering, cultural symbolism, and artisanal mastery. This structural system has enabled these vernacular houses to endure for centuries, resisting environmental challenges while maintaining architectural elegance and cultural significance.

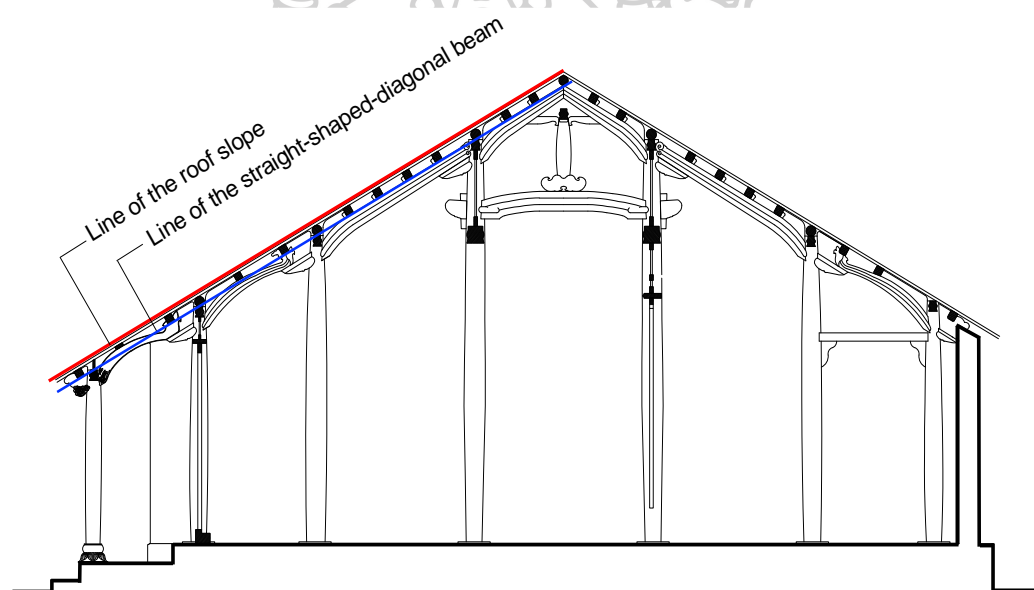


Figure 58: Feature of the “Keo” straight-shaped-diagonal beam and its relation to the roof slope (Early Type C)
(Source: Author)

4.4.5 Roofing technique and materials

Type C houses traditionally feature either single-layer or multi-layer roofing systems, each reflecting distinct construction techniques and material choices adapted to regional climatic and cultural requirements. The roofing strategy not only serves functional purposes but also embodies vernacular

architectural knowledge that balances durability, thermal comfort, and aesthetic considerations (Le & Nguyen, 2019).

In earlier stages, bamboo was employed for the roof-structure and thatch covering (see Figure 59); in subsequent phases, the bamboo roof-structure was substituted with timber to accommodate tiled roofs (see Figure 60).



Figure 59: Using bamboo as a roof-structure for thatched roofing (Early Type C)
(Source: Author)



Figure 60: Using wood as a roof-structure for tiled roofing (Later Type C)
(Source: Author)

In the single-layer roof configuration, ceramic tube tiles locally referred to as “*Ngoi Am-Duong*” are directly affixed onto the rafters (see Figure 78). These interlocking concave and convex tiles provide effective water shedding and weather protection, and their characteristic alternating pattern creates a distinctive visual rhythm on the roof surface. This tile type is emblematic of northern and Middle Region of Vietnamese vernacular architecture and represents a synthesis of indigenous craftsmanship and influences from historical ceramic technologies.

Conversely, the multi-layered roofing system incorporates an additional intermediate layer, typically composed of ramming clay, placed between the upper and lower roof layers. This composite structure enhances multiple performance attributes: the dense clay layer increases the roof’s load-bearing capacity, offers superior waterproofing by sealing potential gaps, provides fire resistance through its inert material properties, and contributes to thermal regulation by acting as a natural insulator that mitigates heat transfer into the interior spaces. The presence of this clay layer exemplifies the vernacular

adaptation to the region's humid subtropical climate, where heavy seasonal rains and high temperatures necessitate robust and thermally efficient roofing solutions (see Figures 80).

Notably, most Type C roofs employing the multi-layer technique are topped with slab tiles known locally as "*Ngoi Liet*" (see Figure 79). These flat, rectangular tiles are laid without gaps, forming a continuous, impermeable surface that enhances rainwater runoff and durability. The use of "*Ngoi Liet*" is prevalent in both northern and central regions of Vietnam, reflecting a shared material culture and construction methodology that prioritizes weather resistance and longevity (Le, 2022).

In certain cases, the uppermost roofing layer may consist of traditional thatching materials, which are secured onto the ramming clay layer via rattan rope bindings attached to the purlins. This practice reflects an enduring vernacular technique where organic materials are employed to supplement or replace ceramic tiles, offering advantages in terms of local availability, cost-effectiveness, and insulation. The integration of thatching with a clay base illustrates a sophisticated layering approach that combines the strengths of both organic and inorganic materials, achieving enhanced environmental performance while maintaining cultural continuity.

In summary, the roofing systems of Type C houses demonstrate a rich interplay of material science, traditional craftsmanship, and environmental adaptation. Whether through single-layer "*Ngoi Am-Duong*" tiles or complex multi-layer constructions incorporating ramming clay and "*Ngoi Liet*" slabs, these roofs exemplify the vernacular wisdom that has enabled these structures to endure Vietnam's challenging climatic conditions for centuries.

4.4.6 An architectural form and façade composition

Type C is a quintessential example of Middle Region of Vietnamese vernacular architecture, renowned not only for its refined craftsmanship but also for its distinctive façade and architectural form, which collectively embody cultural identity, aesthetic principles, and climatic adaptation.

The façade of Type C is typically characterized by a harmonious composition of timber framing, intricately carved wooden panels, and balanced spatial rhythm. The visible wooden framework, often painted or polished to reveal the natural grain, conveys a sense of structural honesty and artisanal

mastery. The external walls frequently incorporate openwork panels or lattices, which serve both decorative and functional purposes by facilitating natural ventilation and diffusing sunlight into the interior spaces.

Central to the façade is the prominent main entrance, which often features elaborately carved doors and lintels adorned with motifs derived from indigenous symbolism and Confucian iconography. These motifs may include floral patterns, auspicious animals, or ancestral emblems, reflecting the household's social status and spiritual beliefs. The entrance is usually flanked by symmetrical arrangements of columns and windows, creating a balanced and inviting frontal aspect.

The roofline of Type C façade is another significant visual element, often displaying elegantly curved eaves and upturned corners that are reminiscent of classical East Asian architectural traditions yet adapted to local stylistic expressions. This form not only enhances aesthetic appeal but also facilitates efficient rainwater runoff and shade provision, underscoring the integration of form and function.

Architecturally, Type C is conceived as a rectilinear timber-framed structure with a modular grid defined by rows of columns and beams. This grid system establishes a clear spatial order, within which interior compartments are arranged symmetrically along a central axis. The central compartment typically houses the ancestral altar, serving as the spiritual and ceremonial nucleus of the house, while side compartments function as living, sleeping, or reception areas.

The architectural form of Type C exemplifies the principle of unity and hierarchy, where the spatial configuration reflects both practical considerations and cultural values. The rhythmic repetition of structural bays creates a sense of order and stability, while variations in compartment size and ornamentation denote the relative importance of different spaces within the household.

Materially, the use of high-quality hardwoods such as teak or ironwood, combined with sophisticated joinery techniques, imparts both durability and elegance to the structure. The integration of wooden carvings and decorative elements within the structural framework blurs the boundary between architecture and art, making Type C a living repository of local craftsmanship and aesthetic traditions.

Beyond its physical attributes, the façade and architectural form of Type C are deeply imbued with symbolic meanings. The orientation, proportions, and decorative motifs all resonate with Confucian and ancestral worship principles, reinforcing familial hierarchy, social harmony, and continuity with the past. The façade thus functions as a cultural interface, communicating the household's identity, values, and social status to the community and visitors.

In summary, Type C façade and architectural form are distinguished by their refined timber craftsmanship, balanced compositional aesthetics, and rich cultural symbolism. This vernacular architecture exemplifies a harmonious synthesis of environmental adaptation, social structure, and artistic expression, making it a vital component of Vietnam's architectural heritage.

4.5 The Nha La Mai (Type D)

4.5.1 Architectural concept

The *Nha La Mai* (Gourou, 2001a, 2001b), constitutes a prevalent vernacular house typology distributed across the central and south-central coastal regions of Vietnam, specifically from Quảng Nam to Phú Yên provinces. The nomenclature *Nha La Mai* literally translates to “house with a leaf roof,” a term that encapsulates its defining architectural feature: a roofing system constructed primarily from natural foliage materials, such as palm or other broad leaves endemic to the region (see Figures 61-64).

This typology is distinguished by its characteristic double-layered roof configuration, which not only serves as an effective response to the local climatic conditions—particularly the high humidity, intense solar radiation, and seasonal heavy rainfall—but also reflects the adaptation of indigenous building traditions to available natural resources (Nguyen & Le, 2021). The double-roof system, consisting of an upper thatched layer and a secondary inner layer, functions to optimize thermal insulation, enhance waterproofing, and facilitate ventilation, thereby maintaining interior comfort in a tropical environment.

The construction techniques, material selections, and spatial organization of the *Nha La Mai* typology exemplify the intimate relationship between vernacular architecture and its ecological context, demonstrating sustainable practices that have been refined through generations. The cultural significance of this house type is equally noteworthy, as it embodies the local communities' identity and traditional knowledge systems.

Further detailed examination of the *Nha La Mai*, including its structural components, roofing technology, and socio-cultural implications, will be addressed in subsequent chapters to provide a comprehensive understanding of its architectural and anthropological dimensions.

4.5.2 Site plan, layout of the house and orientation

The *Nha La Mai* (hereafter refers to as “Type D”) is a traditional vernacular house form widely found in the central and south-central coastal regions of Vietnam. Its architectural characteristics—including site planning, spatial layout, and orientation—reflect both ecological adaptation and cultural practices specific to these tropical environments.

Type D is typically situated within a compound that integrates the natural landscape with human habitation. Given the tropical monsoon climate of the region, the site selection emphasizes elevation and natural drainage to mitigate flooding risks during the rainy season. The house is often positioned on slightly raised ground or supported by stilts, which facilitates air circulation beneath the structure and protects the timber elements from moisture-related deterioration.

Surrounding the house, the site plan frequently includes auxiliary spaces such as gardens, vegetable plots, and water features that contribute to the household’s subsistence and microclimatic regulation. These outdoor areas also act as transitional zones, softening the boundary between interior living spaces and the natural environment.

The internal spatial organization of Type D is typically straightforward and functional, responding to the daily needs of the occupants and the climatic context. The floor plan is generally rectangular and compact, facilitating efficient use of space and structural stability. Internally, the house is often divided into a few primary compartments that accommodate essential functions such as living, cooking, and sleeping.

The central area is commonly allocated for communal activities and family gatherings, while peripheral spaces serve as private or utility areas. Due to the relatively small scale of many Type D structures, multifunctionality within compartments is common, with furnishings and partitions adapted for flexible usage.

Orientation is a critical design aspect of Type D, carefully considered to optimize natural ventilation, daylighting, and protection from prevailing winds

and solar heat gain. The house is generally aligned along an east-west axis, with the longer façades facing north and south to minimize direct exposure to the low-angle morning and afternoon sun.

Openings such as doors and windows are strategically placed to facilitate cross-ventilation, harnessing prevailing sea breezes for passive cooling. Roof overhangs and the double-layered thatched roofing system further mitigate solar radiation and channel rainwater away from the structure, enhancing occupant comfort and building durability.

Moreover, the house's entrance is often oriented according to local geomantic principles, which consider auspicious directions linked to spiritual beliefs and social customs. This alignment reinforces the household's connection to ancestral traditions and local identity.

In summary, Type D exemplifies a vernacular architectural response finely tuned to its environmental and cultural context. Its site plan, spatial layout, and orientation collectively contribute to a sustainable and resilient dwelling form that has endured in the tropical coastal regions of Vietnam.

4.5.3 Floor plan, spatial arrangement and entrance

Type D represents a prominent vernacular house typology prevalent throughout the central and south-central coastal regions of Vietnam (Gourou, 2001a, 2001b). This architectural style is also often identified as the traditional Cham vernacular house without Altar, particularly within Ninh Thuận Province, where it embodies a distinctive cultural and environmental adaptation. Type D is especially noted for its characteristic roof design, which combines functional resilience with aesthetic distinction, offering enhanced protection against the region's frequent typhoons and fire hazards (see Figures 47, 49).

Structurally and spatially, Type D house shares several salient features with the Type C houses, particularly in terms of its entrance orientation and truss construction techniques. The entryways are carefully aligned along the building's longitudinal axis, facilitating efficient circulation and symbolic access that often corresponds with local customs and cosmological beliefs. The truss system, similarly, reflects advanced traditional carpentry, employing timber frameworks that optimize both load distribution and flexibility, essential qualities for withstanding the region's challenging climatic forces.

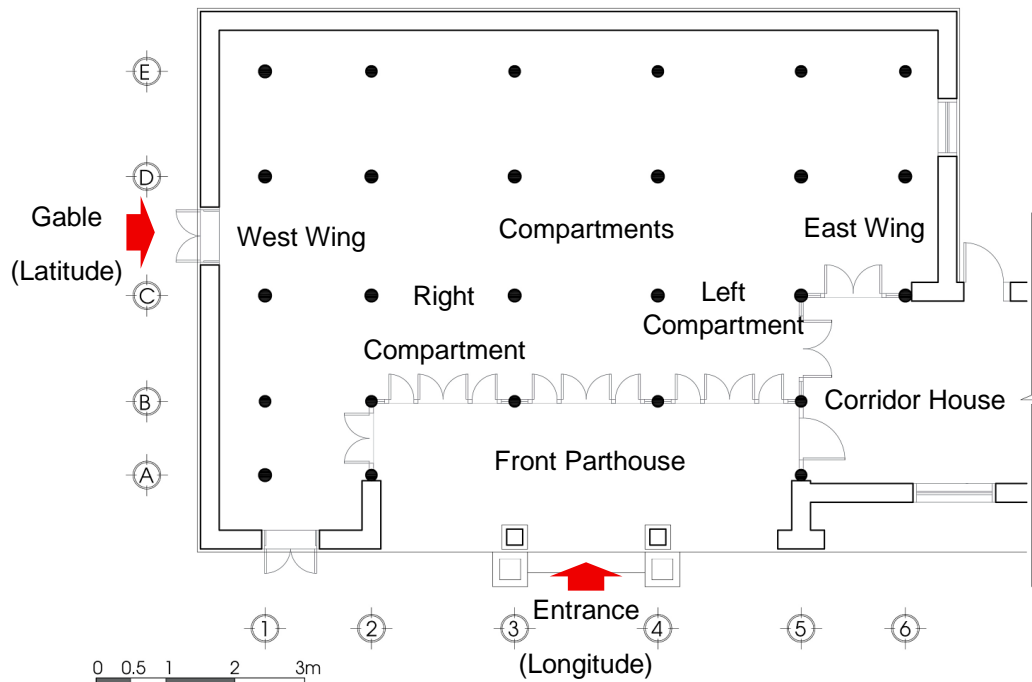


Figure 61:: Floor plan of the “Nha La Mai” (Type D), case of Mrs. Le Thi Tam house, Dong Xuan district, Phu Yen province (see Table 1, no. 58).

(Source: Author)



Figure 62: Cross section of the “Nha La Mai” (Type D), case of Mrs. Le Thi Tam house, Dong Xuan district, Phu Yen province (see Table 1, no. 58).

(Source: Author)



Figure 63: Double roofed layers of the “Nha La Mai” (Type D), case of the House collected from Ninh Phuoc district, Ninh Thuan province, displaying at the Ethnology Museum of Vietnam.

(Source: Le, V.A)



Figure 64: Fundamental-based roof layer of the “Nha La Mai” (Type D) made of bamboo mixed clay, collected house from Ninh Phuoc district, Ninh Thuan province, displaying at the Ethnology Museum of Vietnam.

(Source: Le, V.A)

In terms of internal spatial organization, the number of compartments within Type D houses varies, often aligning with the modular arrangements

observed in either Type B house or Type C house's vernacular forms. This variability allows Type D structures to accommodate different family sizes and functional requirements, from smaller single-compartment dwellings to larger multi-compartment layouts with clearly defined living, sleeping, and ceremonial spaces. Such adaptability highlights the vernacular responsiveness of Type D architecture to social and environmental contexts.

Moreover, the roof architecture of Type D house is particularly noteworthy. Its design typically incorporates steeply pitched, often double-layered roofing systems that enhance rainwater runoff and ventilation, while the use of durable, fire-resistant materials contributes to the structure's longevity in a typhoon-prone coastal environment. This roof form not only reflects functional imperatives but also serves as a cultural marker, reinforcing the Cham community's identity and their longstanding architectural heritage within Vietnam's diverse ethnographic landscape.

4.5.4 Building structure and feature of the Truss

The structural system of Type D vernacular house, particularly its roof truss design, reflects an ingenious synthesis of locally available materials, traditional carpentry techniques, and climatic adaptation. The truss not only functions as the primary load-bearing framework supporting the distinctive double-layered thatched roof but also exemplifies the ecological sensibility and artisanal skill embedded within this architectural tradition (see Figures 62, 64).

Type D typically employs a lightweight timber frame constructed from readily accessible hardwoods or bamboo, chosen for their favorable strength-to-weight ratios and flexibility. The truss system is generally composed of a series of triangular frameworks, which efficiently transfer roof loads to the vertical supports or columns, thereby ensuring stability while minimizing material use.

Each truss is formed by principal members including the top ridge beam, diagonal rafters, and horizontal tie beams. The top ridge beam acts as the apex of the roof structure, anchoring the diagonal rafters that slope downward to connect with the supporting columns or walls. These diagonal rafters not only define the roof's distinctive steep pitch but also contribute to the effective shedding of rainwater and enhanced ventilation beneath the roofing layers.

One of the hallmark features of Type D truss is its adaptability to the double-roofed configuration. The truss accommodates two separate roofing layers—the lower thatched layer and the upper protective layer—through an extended framework that creates an intervening air cavity. This air gap is critical for thermal regulation, preventing heat accumulation and facilitating airflow, thereby maintaining indoor comfort in the hot, humid climate.

Traditional joinery techniques are employed throughout the truss construction, often relying on interlocking wooden joints, lashings, and pegs rather than metal fasteners. This not only allows for structural flexibility to absorb dynamic loads such as wind and seismic forces but also facilitates easier repair and replacement of individual components. Rattan ropes are commonly used to bind connections, providing tensile strength while accommodating slight movements without compromising the truss's integrity.

The choice of lightweight materials and the open truss design contribute to the house's resilience against heavy monsoon rains and strong coastal winds. Moreover, the visible timber framework within the interior space often holds aesthetic and symbolic significance, with exposed beams sometimes adorned with carvings or painted motifs that reflect local cultural narratives and ancestral reverence.

It can be considered that the truss system of Type D exemplifies a harmonious integration of structural efficiency, material economy, and cultural expression. Its design and construction demonstrate how vernacular architecture in Vietnam effectively responds to environmental challenges while preserving artisanal traditions.

In summary, Type D vernacular houses exemplify a sophisticated integration of cultural expression, environmental adaptation, and structural ingenuity. Their shared traits with other vernacular types underscore common regional building traditions, while distinctive elements—particularly in roofing and spatial organization—underscore the unique heritage of the Cham people and their architectural responses to the central-south Vietnamese coastal milieu.

4.5.5 Roofing technique and material

Type D vernacular houses are distinguished by their characteristic double-layered roofing system, a feature they share with both the early and later

iterations of *Nha Roi* houses (see Figures 63, 64, 76, 77). The lower roof layer typically consists of a composite material made from rammed clay mixed with straw, providing a dense, insulating base that enhances thermal regulation and water resistance. This clay-straw layer serves as a solid foundation, protecting the structure against humidity and temperature fluctuations common in the region's tropical climate.

Above this, the upper roof layer is constructed from traditional roofing materials such as ceramic tiles or thatch. The use of tiles offers durability and fire resistance, while thatch provides excellent ventilation and a natural aesthetic that harmonizes with the surrounding environment. A substantial air gap—measuring between 60 cm and 140 cm—separates the two roof layers. This vertical clearance facilitates enhanced airflow and thermal dissipation, preventing heat buildup beneath the roof and reducing interior temperatures during hot seasons.

The presence of this double-roof configuration results in a markedly tall roof profile, imparting a distinctive proportional elevation that contributes to the house's visual identity and architectural presence within its setting. The significant roof height not only addresses climatic concerns but also expresses social and symbolic values, as elevated roofs are often associated with status and prestige in vernacular architectural traditions.

Further examination of the double-roofed system, as depicted in Figures 49, 50, 62, and 63, reveals that the fundamental roof construction techniques of Type D house align closely with those employed in both the early and later Type B houses. This includes the use of bamboo wattle combined with a layer of rammed clay to form a robust, weather-resistant base layer. Such technical congruence suggests a shared architectural lineage or mutual influence between Type B and Type D, emphasizing a regional vernacular approach to roofing that prioritizes environmental adaptation and material efficiency.

Notably, this double-layer roofing system is entirely absent in Type C houses, which typically feature single-layered roofs constructed with slab or tube tiles. The absence of a double roof in Type C house underscores divergent architectural responses to local environmental conditions, resource availability, and cultural practices across Vietnamese vernacular house types.

In conclusion, the double-roofed layering of Type D houses represents a sophisticated architectural strategy that enhances climatic resilience while

reinforcing cultural identity. Its technical and formal parallels with *Nha Roi* roofing systems suggest interconnected vernacular traditions that have evolved to address similar environmental challenges, distinguishing these types from other regional variants such as *Nha Ruong* house.

4.5.6 An architectural form and façade composition

Type D represents a distinctive vernacular architectural typology in the central and south-central coastal regions of Vietnam, whose façade and overall architectural form reveal a nuanced integration of environmental adaptation, cultural identity, and material pragmatism.

The façade of Type D is characterized by its simplicity and functionality, reflecting the pragmatic use of locally available natural materials. Typically, the external walls are constructed with lightweight, permeable materials such as woven bamboo panels or wooden planks, allowing for ventilation while providing sufficient enclosure. This permeability aligns with the region's tropical climate, facilitating airflow that aids in thermal comfort and humidity control. (Le & Nguyen, 2022).

Visually, the façade exhibits a rhythmic pattern of structural posts and infill panels, often left in their natural state or minimally treated, underscoring an aesthetic grounded in organic textures and earthy tones. The absence of heavy ornamentation differentiates the Type D from more elaborately decorated vernacular houses in northern and Middle Region of Vietnam, signaling both socio-economic factors and cultural preferences intrinsic to the local communities, including the Cham ethnic group.

The main entrance typically occupies a central position on the façade, marked by a modest doorway that opens directly into the primary living space. The entrance is often sheltered by an extended eave or veranda, which functions as a transitional space protecting inhabitants from sun and rain while serving as a social interface between the private interior and the communal exterior environment.

Architecturally, Type D house adopts a rectilinear floor plan, generally modest in scale, optimized for ease of construction and maintenance using indigenous materials. Its structural system relies on timber or bamboo frames, which support the signature double-layered roof characterized by steep slopes

that enhance rainwater runoff—a critical feature in a region subject to intense monsoon rainfall.

The architectural form is typically elevated on low stilts or a raised platform, which not only protects the dwelling from ground moisture and occasional flooding but also promotes underfloor ventilation, further contributing to indoor thermal comfort. This elevation integrates seamlessly with the open façade treatment to create a breathable, lightweight structure well-suited to its coastal tropical environment.

The distinctive double-roofed profile, with a substantial air gap between layers, imparts a visually striking vertical dimension to the house, lending it an elegant silhouette despite its overall simplicity. The gently curving eaves and pronounced roof overhangs extend beyond the façade, shading the walls and openings, and reinforcing the house's harmonious relationship with its natural surroundings.

The architectural form and façade of Type D embody the vernacular's deep connection to ecological sustainability and cultural expression. Its use of renewable local materials and passive climate-control strategies exemplifies an environmentally responsive design ethos. The restrained aesthetic and functional layout reflect the socio-cultural values and lifestyle of local communities, particularly the Cham people, for whom this house type holds cultural significance. Overall, Type D represents a vernacular paradigm where simplicity, environmental sensitivity, and cultural identity converge, demonstrating an elegant response to climate and tradition that ensures its lasting relevance in the coastal landscapes of central and southern Vietnam.

4.6 Comparative analysis of Vernacular houses

To elucidate the architectural affinities and divergences among the principal types of vernacular houses discussed in this study, this section presents a comparative analysis focusing on key morphological and structural attributes: entrance orientation, compartmental organization, column arrangement per truss, truss typology, and roofing methods (see Table 3). This comparative framework facilitates a nuanced understanding of how vernacular forms have adapted to varying cultural, environmental, and functional demands across regions.

Table 3 Comparative observation among the vernacular houses

Stt	Name	Type	Direction of the Entrance		Number of Compartment		Number of Column/Truss		Type of Truss		Roofing Technique		
			Latitude (Gable)	Longitude (Altar)	Odd	Even	Odd	Even	Ke Bay	Keo	Double	Single	Multi
1	Nha Ke-Bay	A		X	X			X	X			X	
2	Nha Roi	B	X	X		X	X		X	X			
3	Nha Ruong	C		X	X			X	X		X	X	X
4	Nha La Mai	D		X	X	X		X	X	X	X		

4.6.1 Entrance orientation and spatial symbolism

A salient commonality among Types A, C, and Type D of Vietnamese lies in their entrance orientation, which is predominantly aligned to provide direct access to the ancestral altar. This axial alignment underscores the centrality of ancestor worship and spiritual practice within the domestic sphere, reflecting deeply embedded cultural values that prioritize filial piety and ritual continuity. The entrance's positioning not only serves a functional role in guiding circulation but also delineates sacred spatial hierarchies within the household, thereby embedding cosmological symbolism into architectural form.

4.6.2 Number of compartments and spatial organization

The number of compartments within these vernacular house types reveals both practical and symbolic considerations. Types A, C, and D typically exhibit an odd number of compartments, a pattern resonant with indigenous beliefs that associate odd numbers with auspiciousness and cosmic harmony. In contrast, Types B and D demonstrate flexibility in this regard, accommodating both odd and even numbers of compartments. This variability likely responds to evolving household sizes and functional requirements, reflecting vernacular adaptability. The compartmental layout thus becomes a tangible expression of social organization, family structure, and cultural mores within these built environments.

4.6.3 Column arrangement per Truss

The structural rhythm established by columns plays a critical role in defining spatial proportions and load distribution. Types A, C, and D consistently feature an even number of columns per truss, a design choice that ensures structural stability and facilitates modular construction. This even-

column configuration corresponds with the architectural language of balance and symmetry, enhancing both the building's mechanical performance and its aesthetic coherence.

4.6.4 Truss typology and structural expression

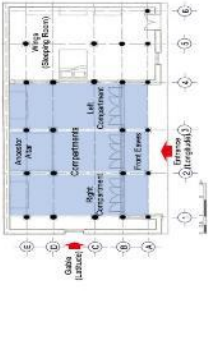
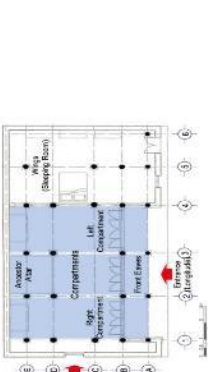
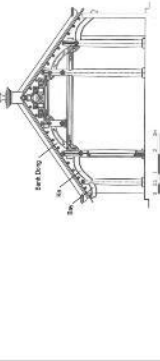
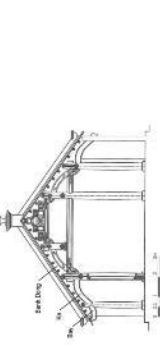

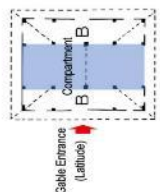
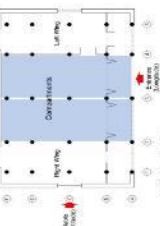
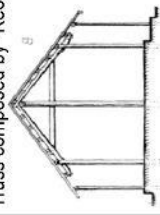
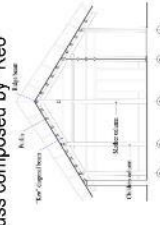

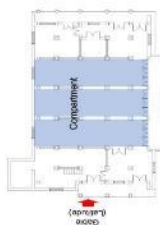
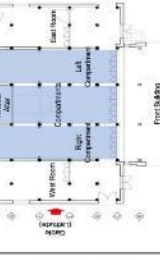

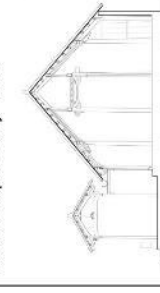

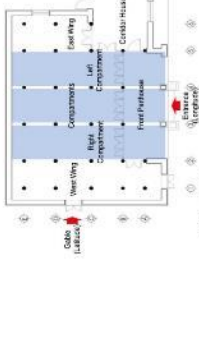

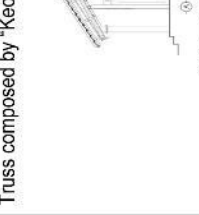
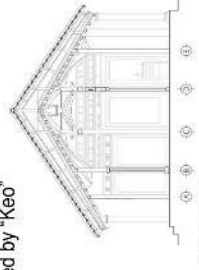

The truss systems reveal distinctive regional and typological traits. Types B, C, and D share a common structural vocabulary characterized by the use of the “Keo”—a straight-shaped diagonal beam that efficiently transfers roof loads to the vertical supports. This straight diagonal member facilitates a relatively straightforward construction process and contributes to the structural robustness of the roof frame. Conversely, Type A diverges through its utilization of the Ke-Bay, a uniquely curved diagonal beam that introduces both visual dynamism and complex craftsmanship into the truss assembly. The curved Ke-Bay not only reflects localized carpentry traditions but also indicates an architectural response to climatic or aesthetic priorities inherent to its geographic context.

4.6.5 Roofing techniques and climatic adaptation

Roofing strategies further delineate typological affinities. Types B and D notably employ a double-layered roofing technique, wherein an insulating lower layer—typically composed of clay mixed with straw—is surmounted by an outer protective layer of tiles or thatch. This double-roof configuration enhances thermal comfort, waterproofing, and fire resistance, exemplifying an advanced vernacular response to the region's tropical monsoon climate. The presence of a substantial air gap between the layers facilitates ventilation and reduces heat transfer, thereby improving indoor environmental quality. In contrast, Types A and C generally feature single-layer roofs, often constructed with locally sourced materials suited to their respective environmental conditions and resource availabilities.

In synthesis, this comparative analysis reveals a complex interplay of cultural symbolism, structural pragmatism, and environmental responsiveness underlying the architectural typologies. While shared features among the types point to common regional traditions and construction knowledge, variations highlight adaptive strategies tailored to distinct socio-cultural identities and ecological contexts. Understanding these similarities and differences deepens our appreciation of the richness and diversity inherent in Vietnamese vernacular architecture (see Table 4).

Table 4: Synthesize information about the similarities and differences among the Type A, Type B, Type C, and Type D.

Type	Name of Houses	Ethnic/Area	Plan		Section		Roofs	Picture
			Early type	Later type	Early type	Later		
A	Nha Ke-Bay	Vietnamese (Northern region)					Single Roof (Nghi Mui Hai)	
B	Nha Roi	Chams (South-Middle region)					Double Roofs (Thatch + Clay) Single Roof (Iron sheet)	
C	Nha Ruong	Vietnamese (North-Middle region)					Multi Roofs (Tiles + Clay) Single Roofs (Ying-Yan Tiles)	
D	Nha La Mai	Vietnamese & Chams (South-Middle region)					Double Roofs (Thatch + Clay) Double Roofs (Tiles + Clay)	

4.7 Chapter conclusion 4

Within the transitional zone between Tonkin (the former northern polity) and Cochinchina (the former southern polity), as well as across the broader Middle Region of Vietnam, four principal typologies of vernacular houses have been documented: the *Nha Ke-Bay* (Type A), the *Nha Roi* (Type B), the *Nha Ruong* (Type C), and the *Nha La Mai* (Type D). Each of these house types embodies distinctive morphological, structural, and functional characteristics shaped by the interplay of regional traditions, environmental conditions, and socio-cultural practices.

Among these, the *Nha Ke-Bay* (Type A) stands out for its pronounced departure from the formal and structural conventions observed in the other three typologies. Its most distinctive features include a unique truss system employing the *Ke-Bay*—a curved diagonal beam that requires advanced carpentry skills—along with specific spatial and symbolic arrangements that closely reflect the cultural ethos of the communities in which it developed. These differences suggest not only a localized architectural identity but also a nuanced response to environmental challenges, material availability, and ritual traditions.

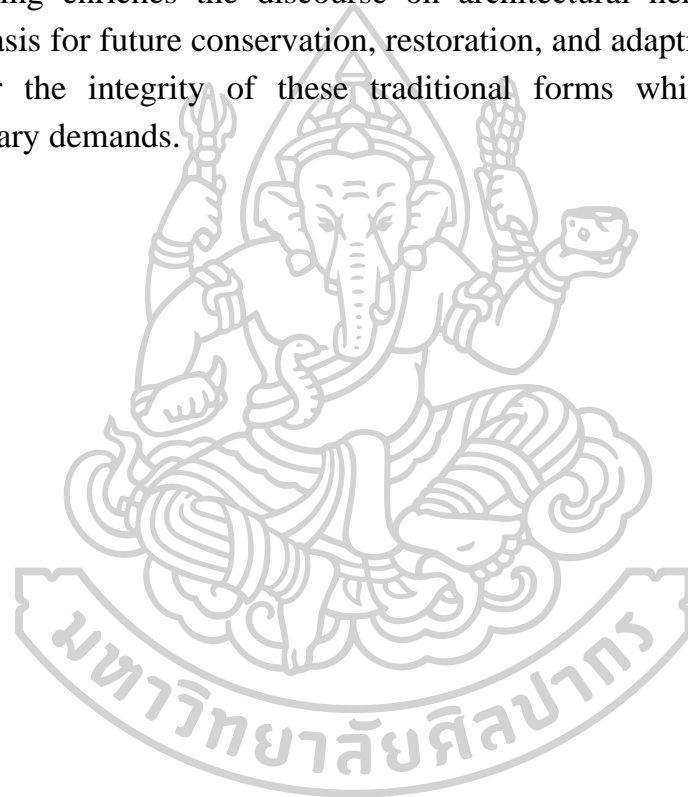
The classification and comparative study of these four house types provide critical insights into the diversity and adaptability of Vietnamese vernacular architecture, highlighting the complex interweaving of continuity and variation that has allowed these forms to endure and evolve over centuries.

Specifically, this comparative examination of entrance orientation, compartmental organization, column arrangement, truss typology, and roofing techniques demonstrates that Vietnamese vernacular house forms embody a sophisticated synthesis of cultural tradition, structural logic, and environmental adaptation. The recurrence of axial alignments towards ancestral altars and the preference for auspicious odd-numbered compartments underscore the enduring influence of spiritual beliefs and social values in shaping domestic space. Concurrently, consistent structural features—such as the even-numbered column configurations—reflect a shared technical vocabulary grounded in balance, symmetry, and stability.

Nevertheless, the typological divergences, from the distinctive curvature of the *Ke-Bay* truss in Type A to the advanced thermal performance of the double-layered roofs in Types B and D, reveal the capacity of vernacular

builders to innovate within a framework of tradition. These variations are not merely stylistic but represent deliberate, context-specific adaptations to regional climates, available materials, and evolving household needs.

By illuminating both the convergences and distinctions across house types, this analysis affirms that Vietnamese vernacular architecture is neither static nor monolithic. Instead, it emerges as a dynamic and resilient cultural product—anchored in shared heritage yet continually reinterpreted to address shifting environmental conditions and socio-cultural imperatives. This understanding enriches the discourse on architectural heritage, providing a nuanced basis for future conservation, restoration, and adaptive reuse initiatives that honor the integrity of these traditional forms while accommodating contemporary demands.



Chapter Five

Tradition in the Construction of Vernacular Houses

This chapter examines the traditional practices shaping the construction of vernacular houses in Vietnam's Central Region. It first discusses the influence of migration, cultural exchange, and craft traditions on local building knowledge. The chapter then outlines key construction ceremonies and explores materials, roofing techniques, and carpenters' design methods across regions. A comparative section highlights their technical origins and regional adaptations. Overall, the chapter emphasizes how vernacular construction embodies both technical skill and cultural belief, reflecting the harmony between craftsmanship, tradition, and identity.

5.1 Migration, cultural exchange, and craft tradition

To fully comprehend the origins and evolution of vernacular architecture in Vietnam, it is essential to trace its roots back to significant historical periods marked by social transformation and cultural interchanges. One pivotal starting point is the mid-16th century, specifically around 1558, when Lord Nguyen Hoang began his governance over the Thuan Hoa Prefectures. However, the architectural heritage predates even this era, emerging from centuries of human settlement, migration, and cultural synthesis.

During this period, Vietnam experienced substantial migratory movements, especially from the northern and central intersection zones toward the southern regions. These migration waves were driven by the search for arable land and economic opportunity, resulting in diverse ethnic groups settling in close proximity. This demographic confluence fostered dynamic cultural interactions, wherein communities exchanged agricultural knowledge, production techniques, and craftsmanship, including traditional building methods. The shared experience of confronting environmental challenges such as typhoons, floods, and mountainous terrain necessitated cooperative efforts, particularly in constructing resilient dwellings suited to local conditions.

The historical record, preserved in various administrative documents, chronicles this era of multi-ethnic coexistence and cultural amalgamation. These accounts highlight the integral role of architecture not only as a utilitarian practice but also as a cultural expression reflective of identity, social

organization, and environmental adaptation. Construction activities were central to community life, symbolizing both the physical and social fabric of settlements.

The governance of the Lords Nguyen (1558–1777) significantly influenced architectural production, as they consolidated control over southern territories and initiated systematic development. To erect public and private structures, these feudal rulers employed skilled artisans proficient in standardized construction techniques. While dynastic power shifted over the centuries, the essential expertise of carpenters, masons, and craftsmen persisted, transmitted through generations via apprenticeship, familial lineages, and guild systems (Nguyen & Le, 2022).

Craftspeople organized themselves in various social frameworks, including family-based workshops, professional guilds, and even military labor contingents, which facilitated the coordinated production of architectural elements and large-scale construction projects. These organizational forms ensured the continuity and refinement of traditional building knowledge, enabling vernacular architecture to evolve while retaining core structural principles and aesthetic values.

In summary, the vernacular architecture of Vietnam is rooted in a complex historical matrix shaped by migratory flows, cultural exchanges, and institutional patronage. The enduring legacy of skilled artisans and their adaptive craftsmanship forms the backbone of this architectural heritage, revealing a narrative of resilience and cultural synthesis that continues to inform contemporary building practices.

5.2 Traditional ceremonies in Construction works of the Regions

5.2.1 “Le Phat Moc”: Wood-cutting ceremony (Vietnamese)

The *Le Phat Moc* (Nguyen et al., 2010, p. 122), literally translated as the "wood-cutting ceremony"—is a deeply significant ritual performed by carpenters at the inception of traditional Vietnamese house construction. This ceremony is conducted on-site prior to the commencement of any physical building activities and is carefully timed to coincide with an auspicious day and hour, selected according to traditional lunar calendars and local geomantic principles (Phong Thủy). The ritual serves multiple purposes: to seek spiritual protection, ensure the smooth progress of construction, and honor ancestral legacies within the craft.

At the heart of the ceremony, the householder prepares an altar adorned with offerings such as fruits, incense, rice, and other symbolic gifts. This altar acts as the focal point for making a solemn vow to initiate the house-building process, thereby invoking blessings for safety, prosperity, and the harmonious completion of the project. The carpenter, as the skilled craftsman and custodian of building knowledge, performs a series of ritualized acts to consecrate the work ahead.

One of the central acts involves the symbolic striking of an axe-head on a carefully selected piece of timber—usually a tree trunk earmarked to become the principal ridge beam (*xà gò*) of the house. This act is more than a mere practical initiation; it is imbued with spiritual significance, representing the invocation of strength, precision, and good fortune into the wood and the structure as a whole.

Following this, the carpenter splits a bamboo stalk longitudinally to fashion a traditional measuring instrument known as the *Con Can* ruler. This handcrafted bamboo ruler embodies both practical and symbolic functions. Practically, it serves as a standard measure during the construction process, ensuring dimensional accuracy according to time-honored proportions. Symbolically, the *Con Can* becomes a talisman of continuity and preservation; it is meticulously preserved by the householder and later used for any future renovation or repair work, thereby linking the life of the building across generations.

Alongside the *Con Can*, other essential carpentry tools such as the triangular ruler (*thước tam giác*), axe, and ink string are arranged on the altar as part of the offering. These tools represent the material culture of the craft and its intrinsic relationship to ritual practice, symbolizing the unity of skill, tradition, and spiritual respect embedded in Vietnamese vernacular construction.

Upon the conclusion of the ceremonial rites, it is customary for the householder to host a communal meal, honoring the carpenter and inviting them to partake in the feast as a gesture of goodwill and respect. Additionally, symbolic gifts—including money and portions of rice or raspberries from the altar offerings—are presented to the elder carpenter, who often holds a position of authority and custodianship within the craft community. This act reinforces

social bonds and acknowledges the elder's role in safeguarding the collective knowledge and ethical standards of traditional building practices.

In sum, the *Le Phat Moc* ceremony is a multifaceted ritual that transcends its immediate practical function, embodying cultural values of reverence, craftsmanship, and intergenerational continuity. It exemplifies how traditional Vietnamese construction is not merely a technical endeavor but a holistic practice deeply enmeshed in spiritual, social, and cultural dimensions.

5.2.2 “Le Dong Tho”: Foundation ceremony (Vietnamese and Chams)

Concurrently with the *Le Phat Moc* wood-cutting ceremony, the foundation ceremony—performed primarily by masons—constitutes a critical ritual in the traditional Vietnamese house-building process. This ceremony is conducted directly at the designated site for the house's foundation, symbolizing the formal commencement of construction and the establishment of the building's physical and spiritual grounding (Nguyen et al., 2010, p. 123).

The ritual begins with the homeowner and the master mason jointly performing respectful bows before an altar dedicated to the “Tho Cong” (Earth-God), a revered deity associated with land, fertility, and protection. This act of reverence reflects a profound cultural recognition of the land's sacredness and the necessity of securing divine favor to ensure the project's prosperity and structural integrity. The invocation to the Earth-God is fundamental, as the foundation literally represents the house's base and its connection to the earth, linking the built environment with cosmological and terrestrial forces (Nguyen & Le, 2018).

Central to the ceremony is the symbolic act conducted by the master mason, who wields a hoe to break the surface of the foundation ground. This action transcends mere physical labor, embodying a ritual gesture that signifies the transition from potentiality to materialization—the moment when the invisible site is transformed into the physical footprint of the future home. Following the initial excavation, the mason lifts a clod of earth as an offering, symbolically acknowledging the earth's generative power and expressing gratitude for its support. This earth sample may also serve as a talisman, reinforcing the bond between the dwelling and the site throughout the building's lifespan.

The conclusion of the foundation ceremony is marked by a communal meal shared between the homeowner and the construction workers. This feast not only celebrates the auspicious beginning of the building process but also reinforces social cohesion, mutual respect, and collective participation among all parties involved. It epitomizes the integration of ritual, labor, and community within Vietnamese vernacular construction culture.

Overall, the foundation ceremony exemplifies the inseparability of spiritual practice and material craftsmanship in traditional Vietnamese architecture. It articulates an understanding that the successful realization of a house is contingent not only upon technical skill but also upon the harmonious alignment of human endeavor with spiritual and environmental forces.

5.2.3 “Le Dat Da Tang”: Basement stone placement ceremony (Vietnamese and Chams)

Following the reinforcement of the foundation, the ceremonial commencement of placing the basement stones marks a critical phase in traditional Vietnamese house construction. (Nguyen & Le, 2001, p. 126) This ritual, primarily overseen by the carpenters, underscores the symbolic and structural importance of the basement stones as the literal and metaphorical cornerstone of the dwelling.

The ceremony is conducted on the site prepared for the house’s foundation, where an altar is carefully arranged at the geometric center of the plot. This altar serves as the focal point for ritual observances, reinforcing the sanctity of the building site and the interconnectedness of the material and spiritual realms.

In the opening act of the ceremony, both the homeowner and the master mason perform a formal bow toward the altar dedicated to the Earth-God, thereby invoking divine permission and blessings for the placement of the basement stones. This act reflects the culturally embedded reverence for the Earth-God, who is believed to govern the land’s fertility, stability, and protective qualities. By seeking the Earth-God's approval, the participants acknowledge their dependence on these natural and spiritual forces to ensure the durability and auspiciousness of the forthcoming structure.

The master mason then ceremonially positions the first basement stone at the base of the main structural column, carefully placing it in its predetermined

location according to the architectural plan. This stone is often regarded as a keystone element, providing foundational support to the entire timber framework and symbolizing the inception of the house's structural integrity.

Upon completing the placement, the master mason bows again before the altar, expressing gratitude and reinforcing the ritual's sanctity. This gesture symbolizes respect for both the craft and the spiritual realm, signifying the harmonious collaboration between human agency and divine will in the building process.

This basement stone placement ceremony encapsulates the intersection of practical construction activities and ritualized cultural expressions within Vietnamese vernacular architecture. It exemplifies how foundational structural elements are not only engineered for physical stability but are also imbued with layered meanings that contribute to the dwelling's social and spiritual dimensions.

5.2.4 The “Le Thuong Tru”: Wooden frame erection ceremony (Vietnamese and Chams)

The ceremony marking the commencement of wooden frame erection constitutes one of the most momentous and communal events in the traditional Vietnamese house-building process. (Nguyen & Le, 2001, p. 126) Often attracting the largest gathering of family members, neighbors, and craftsmen, this ritual underscores not only the technical progression of construction but also the social and spiritual dimensions embedded within vernacular architectural practices.

Prior to the ceremony, all essential components of the wooden frame—including principal columns, beams, and cross members—are meticulously prepared and pre-assembled where possible. The homeowner, in consultation with traditional astrologers or based on indigenous calendrical systems, selects an auspicious date and time to conduct the ceremony, ensuring alignment with favorable cosmic and terrestrial conditions.

The ritual begins with prayers offered to both the Earth-God, protector of the land, and the *Cuu Tien Huyen Nu* Lady-God, a revered deity associated with protection, fertility, and household prosperity. The dual invocation highlights the integration of earthbound and celestial forces believed to govern the welfare and stability of the new dwelling.

Following these invocations, the homeowner and the master carpenter perform formal bows before the altars dedicated to these deities, signifying reverence and the solicitation of divine blessings for the safety and success of the construction endeavor. Subsequently, the assembled community collaboratively engages in the physical raising of the initial timber elements.

The manual erection of the wooden frame requires concerted effort, relying heavily on the strength and coordination of multiple participants. Traditional tools such as ropes are employed to pull the heavy timbers into upright positions, while supporting poles brace the structure from opposing sides to stabilize the framework during the gradual raising process. This labor-intensive activity is emblematic of the collective spirit and mutual cooperation central to vernacular building culture.

Typically, only the essential primary timbers—such as the main columns and their associated cross beams—are erected during this initial phase, forming the skeletal framework that defines the spatial volume of the house. These components are carefully interconnected using traditional joinery techniques, often eschewing nails or metal fasteners in favor of mortise-and-tenon joints secured by wooden pegs.

In instances where the auspicious date is imminent but the full complement of frame components is not yet available, the ceremony may still proceed with a symbolic erection of simpler timber elements. This practice reflects the primacy of ritual timing in Vietnamese cultural traditions, underscoring that the ceremonial inauguration of construction holds intrinsic significance beyond the immediate physical assembly of materials.

In sum, the wooden frame erection ceremony encapsulates the interweaving of craftsmanship, ritual, and community engagement, illustrating how vernacular architecture serves as a living repository of cultural identity and collective memory.

5.2.5 The “Le Thuong Luong”: The Main ridge beam raising ceremony

(Vietnamese and Chams)

The ceremony dedicated to raising the main ridge beam represents a pivotal milestone within the traditional Vietnamese house-building sequence.(Nguyen & Le, 2001, p. 126). While it may occasionally coincide with the earlier column erection ceremony when auspicious timing permits, this

ritual most commonly inaugurates the next distinct phase following the completion of the primary wooden frame assembly (see Figure 64). Its significance lies not only in the physical act of placing the ridge beam but also in its profound symbolic role as the crowning element that unites and stabilizes the entire structural framework.



Figure 65: “Le Thuong Luong” main ridge-beam raising ceremony of the Chieu Kinh Dien Temple (Thai Mieu area - Hue Imperial City), 2013 (Source: Le, V.A)

Careful selection of an auspicious date and time, guided by traditional lunar calendars and geomantic principles, is essential to maximize spiritual harmony and favorable outcomes. The homeowner and the master carpenter commence the ceremony by performing solemn bows toward ancestral altars dedicated to the lineage of carpenters. This act reflects an invocation for ancestral blessings, seeking permission and protection as the craftsmen proceed with this crucial stage. It also embodies a deep reverence for the continuity of the craft, acknowledging the transmission of carpentry knowledge through successive generations.

Following the ancestral invocation, prayers are offered for the smooth and safe completion of the house, alongside wishes for the health, prosperity, and well-being of its future occupants. This interweaving of spiritual supplication and material construction encapsulates the holistic worldview underpinning

Vietnamese vernacular architecture, where human dwellings are viewed as living entities embedded within cosmological and social networks.

The master carpenter then ceremonially positions the main ridge beam at the apex of the wooden frame. This beam serves as the spine of the roof structure, linking opposing roof trusses and conferring overall stability and integrity to the house. To imbue this structural element with protective and auspicious qualities, a red cloth amulet festooned with charms designed to ward off malevolent spirits is affixed to the beam. The color red, emblematic of vitality and good fortune in Vietnamese culture, enhances the talismanic efficacy of the adornments.

Complementing the amulet, a sprig used in traditional fortune-telling practices and several roofing tiles are also placed upon the ridge beam. These items symbolize the convergence of craftsmanship, ritual, and future-oriented aspirations embedded within the act of building.

Upon completion of the ritual, the homeowner extends hospitality by inviting all participating carpenters to partake in the ceremonial offerings, fostering communal solidarity and gratitude. Notably, a distinct tray containing rice and monetary gifts is reserved exclusively for the master carpenter, acknowledging their pivotal role as the chief craftsman and custodian of traditional construction knowledge.

In essence, the main ridge beam raising ceremony embodies the fusion of technical expertise, ritual observance, and social cohesion, illustrating the multifaceted cultural dimensions that animate vernacular architectural practice in Vietnam.

5.2.6 The “Le Gai Noc”: Roofing commencement ceremony (Vietnamese and Chams)

The ceremony marking the commencement of the roofing phase is a critical ritual in the sequence of traditional Vietnamese house construction (Nguyen & Le, 2001, p. 126). Typically presided over by the homeowner and the master mason, this ceremony is performed on a day and time carefully chosen based on auspicious calendrical calculations to ensure harmony between human activities and cosmic rhythms.

The ritual setting involves the preparation of an altar positioned prominently in front of the newly erected house. The altar is adorned with

offerings closely paralleling those utilized during the preceding ridge-beam raising ceremony, including incense, fruits, symbolic food items, and other customary votive objects. These offerings function as a tangible interface between the physical world and the spiritual realm, inviting blessings and protective influences over the roofing process.

Central to the ritual is the master mason's act of making a solemn vow and prayer directed to their ancestors and spiritual protectors. This invocation seeks permission and divine sanction to begin the critical task of laying the roof tiles, underscoring the belief that successful construction hinges upon both skilled labor and ancestral favor. By honoring their lineage in this manner, the master mason reinforces the continuity of traditional craftsmanship and the ethical responsibilities incumbent upon the trade.

Following the completion of the prayers and vows, the roofing workers commence the physical task of placing tiles on the roof structure. This labor-intensive activity is not merely a technical milestone but also a communal effort imbued with cultural significance, symbolizing the gradual enclosure and protection of the domestic space.

Upon the conclusion of the ritual activities, the offerings are shared between the homeowner and the construction workers in an act that strengthens social bonds and expresses mutual gratitude. Notably, a dedicated tray containing rice and monetary gifts is reserved exclusively for the master mason, recognizing their leadership role and custodianship of specialized knowledge within the building process.

This roofing commencement ceremony exemplifies the inseparability of ritual observance and labor in Vietnamese vernacular architecture, illustrating how construction practices are embedded within a framework of cultural meaning, ancestral reverence, and community cohesion.

5.5.2 The technical origins of the design methods

Building on the preceding analysis of measurement tools and their associated design methodologies, it is possible to trace distinct technical lineages in the carpentry traditions of Vietnam's northern region, middle region, and the Cham communities of the south-central coastal area.

The design method of Vietnamese carpenters in the northern region appears closely aligned with ancient Chinese practices. This similarity is most

evident in the geometric principles, proportional systems, and standardized measuring tools employed—particularly the use of square-based rulers and auxiliary devices for leveling and vertical alignment. These elements reflect a legacy of formalized design knowledge, potentially introduced through historical Sino–Vietnamese cultural exchange and subsequently reinforced through the conservatism characteristic of hereditary carpenter guilds.

In contrast, the design method of Vietnamese carpenters in the Middle Region represents a distinct adaptation. While it retains certain conceptual elements that may have been influenced by ancient Chinese construction principles, the middle region’s method diverges sharply in both form and application. The use of Ruler B, an equilateral triangle–based measuring device, departs from the square–geometry tradition of the north. This shift suggests a process of regional innovation, likely influenced by cross-cultural contact with the indigenous Cham communities inhabiting the same geographical zone.

The design method of the Cham carpenters—as inferred from surviving architectural remains and ethnographic surveys—appears to be fundamentally different from either northern or middle Vietnamese traditions. It is primarily anthropometric, relying on the dimensions of the human body as a base unit of measurement. This approach, arguably the most ancient of the three, reflects a pragmatic and intuitive method of design, oriented toward small-scale, functional vernacular structures rather than monumental or highly codified architecture. The absence of written manuals or strongly codified measurement standards in Cham practice further underscores its empirical, craft-based nature.

Despite their differences, Ruler B (used by Vietnamese carpenters in the middle region) and Ruler C (used by the Chams in Ninh Thuan Province) share notable similarities in both form and operational logic. This correspondence suggests a direct technical relationship between the two traditions, with Ruler B likely representing an evolved form of Ruler C. The adaptation of the Cham-derived tool into Ruler B may have involved standardizing its measurement scale, adjusting its proportions, and integrating it into the more structured design mindset inherited from the northern Vietnamese tradition.

This process reflects a broader phenomenon of acculturation in architectural techniques, in which carpenters of the Middle Region selectively

adopted Cham innovations while preserving core elements of their own inherited design philosophy. The outcome was the emergence of a new vernacular house type unique to the middle region—a hybrid architectural form embodying both indigenous Cham influences and Vietnamese construction traditions.

The coexistence of three distinct measuring devices—Ruler A, Ruler B, and Ruler C—within the same historical period strongly indicates that these design methods did not share a single origin. Instead, their presence points to a complex regional landscape of technical diversity, shaped by overlapping spheres of influence and localized innovation. The persistence of each method across generations also reflects a deep-seated technical conservatism among traditional carpenters, for whom inherited tools and procedures carry both practical and cultural significance.

When compared directly, the Cham design process emerges as simpler, more flexible, and less constrained by rigid proportional rules than its Vietnamese counterparts. While this simplicity might be interpreted as a sign of technical primitivism, it can also be viewed as an expression of adaptation to local materials, skills, and construction needs. By contrast, both the northern and middle Vietnamese traditions—though differing in tool geometry—share a greater emphasis on precision, standardization, and proportional harmony, reflecting a more formalized conception of architectural design.

In conclusion, the comparative study of these three traditions reveals not only differing technical origins but also the dynamic interplay between continuity and change in Vietnam's carpentry heritage. The northern method demonstrates continuity with the Chinese architectural canon; the middle region's method exemplifies cross-cultural synthesis; and the Cham method preserves an older, anthropometric approach that predates the others. Together, they illustrate how vernacular architecture evolves through both the preservation of tradition and the strategic integration of foreign or indigenous innovations.

5.2.7 The “Le Nhap Trach”: Housewarming ceremony (Vietnamese)

Upon completion of the construction of a new house, the homeowner traditionally conducts a housewarming ceremony to mark the formal transition into the newly built dwelling. (Nguyen & Le, 2001, p. 126) This significant ritual is invariably scheduled on an auspicious date and time, carefully

determined through traditional astrological and geomantic systems to harmonize human activity with cosmic and terrestrial forces.

The ceremonial preparations encompass a comprehensive array of offerings, many of which echo those utilized in prior construction rituals, thereby maintaining continuity and reinforcing sacred symbolism throughout the building process. However, the housewarming ceremony is distinguished by additional ritual components specifically oriented toward invoking prosperity, health, and familial well-being in the new domestic environment.

Key among these offerings is a water container—often a vessel deliberately filled below capacity, symbolizing the continuous flow and renewal of life energy within the household. Alongside this, containers filled with rice and salt are presented, embodying sustenance and preservation, foundational elements for the family's survival and stability. Kitchen utensils and dishes are also included, arranged in even numbers to ward off loneliness and invite harmony and balance into domestic life. A continuously burning fire, maintained red and warm throughout the day, signifies vitality, protection, and the hearth's central role as a source of life and familial unity.

Central to the ritual is the formal communication with the Earth-God, to whom the homeowner reports the relocation into the new house. This act represents a solemn petition for continued peace, health, and prosperity under the Earth God's guardianship, affirming the reciprocal relationship between the family and the spiritual forces governing the land. This invocation reflects the deep-seated Vietnamese belief in the land's sacrality and the necessity of spiritual endorsement for the household's enduring well-being.

Simultaneously, the ceremony encompasses a ritual to welcome the grandparents back into the home, symbolizing the restoration of ancestral presence and familial continuity. This gesture reinforces filial piety and the intergenerational transmission of cultural values, situating the new house not merely as a physical shelter but as a living vessel of family heritage and social identity.

Together, these ritual acts during the housewarming ceremony illustrate the integrative nature of Vietnamese vernacular architecture, where construction and habitation are inseparably intertwined with spiritual practice, social cohesion, and cultural expression.

5.2.8 The “Le An Vi”: Ancestor welcoming ceremony (Vietnamese)

The ceremony is often held to welcome the ancestors of the family (Nguyen & Le, 2001, p. 127). The house owner places the ancestor altar in the correct position and arranges self-made objects such as incense bowls, incense burners, lamp stands, and ancestral tablets to invite their ancestors to settle in their new house. For Buddhist families, there is a Buddha worshipping ceremony, often involving monks in the celebration.

Integral to the housewarming rituals in Vietnamese vernacular culture is the ceremony dedicated to welcoming the family’s ancestors into the newly constructed residence. This ritual serves as a vital link between past and present generations, reinforcing the enduring presence and guidance of ancestral spirits within the domestic sphere.

The ceremony commences with the careful placement of the ancestral altar in a position that adheres to traditional spatial and geomantic principles, ensuring optimal auspiciousness and spiritual efficacy. The altar itself is adorned with a collection of ritual paraphernalia—often crafted by the household members—such as incense bowls, incense burners, lamp stands, and intricately inscribed ancestral tablets. These objects function as both symbolic and functional mediators, facilitating communication between the living family and their forebears.

The act of inviting the ancestors to settle in the new house involves a sequence of offerings and ritualized gestures, including the lighting of incense and the recitation of prayers or invocations. This process signifies not only the physical relocation of the family but also the metaphysical re-establishment of ancestral presence, which is believed to confer protection, prosperity, and harmony upon the household.

For Buddhist families, the ancestor welcoming ceremony is often complemented by a Buddha worshipping ritual. This component may involve the participation of Buddhist monks who conduct chanting, blessings, and other liturgical acts that integrate Buddhist cosmology with indigenous ancestral veneration practices. The inclusion of Buddhist rites reflects the syncretic nature of Vietnamese spirituality, where Confucian filial piety, indigenous animism, and Mahayana Buddhism coexist and mutually enrich domestic ritual life.

Collectively, these ceremonies articulate a profound cultural ethos that situates the home as a sacred space—a locus where spiritual continuity, familial identity, and architectural form converge. The ancestor welcoming ritual not only sanctifies the physical environment but also reaffirms social cohesion and intergenerational responsibility within the Vietnamese vernacular tradition.

5.2.9 The “Le Tong Moc”: Ceremony of expelling evil spirits (Vietnamese)

Within the spectrum of traditional Vietnamese house-building and habitation rituals, the ceremony dedicated to expelling evil spirits occupies a critical and complex role. Rooted in indigenous beliefs about the animistic presence within natural elements, particularly large trees, this ritual seeks to purify the wooden components of the house and protect the household from malevolent influences (Nguyen & Le, 2001, p. 127).

According to local cosmologies, certain spirits are thought to inhabit venerable trees, which often provide timber for house construction. If these spirits are not properly appeased or expelled during the building process, they are believed to exert negative effects on the occupants, manifesting as destructive phenomena such as fires, sudden illnesses, or nocturnal disturbances. One culturally specific affliction is known as “wood pressed”, characterized by sensations of immobility or paralysis during sleep, interpreted as spiritual oppression caused by unsettled entities residing within the wooden structure.

To counter these adverse influences, a specialized ceremony—often referred to as the wooden tidying or spirit expulsion ritual—is performed. This ceremony serves as a metaphysical cleansing of the timber, aimed at driving out any residual spirits and restoring spiritual equilibrium to the dwelling. The ritual is typically conducted either concomitantly with the housewarming ceremony, once the family has moved in and animated the new home with life and presence, or at other significant junctures in the building’s lifecycle.

The practitioners of this ceremony may be shamans, who possess specialized knowledge and skills in spirit communication and exorcism, or Buddhist monks, whose involvement reflects the syncretism between indigenous animistic traditions and organized religious practices. The choice of officiant often depends on regional customs, religious affiliations of the household, and the specific spiritual needs of the community.

During the ceremony, ritual actions may include offerings, chants, symbolic gestures, and the use of protective talismans or amulets, all designed to confront and dispel negative entities. The process not only safeguards the physical and spiritual integrity of the house but also reassures the occupants, fostering a sense of security and well-being.

This spirit expulsion ritual highlights the intimate connection between Vietnamese vernacular architecture and the metaphysical world, revealing how the built environment is conceived not merely as a material shelter but as a living, spiritual space requiring continual care and ritual maintenance.

5.2.10 The “Le Tan Gia”: New house completion celebration (Vietnamese and Chams)

Following the sequence of foundational rituals—including the relocation into the new house, the careful veneration of ancestors, (Nguyen & Le, 2001, p. 127) and the expulsion of malevolent spirits—the house owner traditionally hosts a comprehensive celebration to mark the formal completion and inhabitation of the dwelling. This festivity functions as both a ritual affirmation of the house as a sanctified and harmonious space and as a vital social occasion reinforcing communal bonds.

Central to the celebration is the offering ritual directed towards a pantheon of deities intimately associated with domestic life and prosperity. Foremost among these are the Earth-God, guardian of the land on which the house stands; the “Ong Tao” Kitchen-God, protector of the household hearth and daily sustenance; the “Than Tai” (God of Wealth), invoked to ensure material abundance; and the “Thanh Mau” (Mother Goddess), who oversees fertility, protection, and spiritual welfare. The altar, carefully prepared with offerings such as fruits, incense, and symbolic foods, serves as the focal point for these acts of devotion.

The ritual proceedings commence with the burning of incense and ceremonial bows, through which the house owner formally notifies the deities of the successful completion and occupation of the residence. This act embodies a petition for continued blessings—peace, health, security, and prosperity—to grace the family in their new home. The prayers encapsulate collective hopes and aspirations, intertwining spiritual concerns with the practical realities of domestic life.

Subsequent to the formal ritual, the house owner extends hospitality by inviting relatives, friends, and master craftsmen who participated in the building process to partake in a communal feast. This gathering serves multiple functions: it expresses gratitude toward those who contributed labor and expertise, fosters social cohesion, and publicly celebrates the culmination of a significant life event. The inclusion of master craftsmen acknowledges the cultural importance of their skill and the transmission of traditional knowledge, underscoring the interdependence between craftsmanship and community.

This celebratory event exemplifies how Vietnamese vernacular architecture is embedded within a broader cultural matrix where ritual observance, social relations, and spatial practices coalesce. The house is thereby consecrated not merely as a physical structure but as a living locus of family continuity, spiritual protection, and communal identity.

In summary, in the aforementioned traditional rituals, both the Vietnamese and the Cham perform essential and obligatory ceremonies directly related to construction, such as the foundation ceremony, basement stone placement ceremony, wooden frame erection ceremony, main ridge beam raising ceremony, roofing commencement ceremony, and new house completion celebration. However, rituals associated with ancestral lineage or geomantic beliefs are carried out solemnly only by the Vietnamese. This demonstrates that the religion and belief systems of each ethnic group have directly influenced the form and content of these traditional rituals.

5.3 Used materials and roofing techniques

5.3.1 Used material evolution

Within the broader context of Southeast Asia's indigenous technical traditions, vernacular houses in the Middle Region of Vietnam exhibit a strong reliance on locally available construction materials, derived from primitive natural resources. This architectural form is closely associated with a socio-economic environment in which human settlement was primarily concentrated along coastal plains, accreted by the alluvial deposits of major rivers. These fertile lowlands supported predominantly agricultural production supplemented by handicraft industries, shaping the material culture, and building practices of the region.

The selection of building materials reflected both the environmental context and the cultural-technical knowledge embedded within the community.

Structural framing was traditionally composed of bamboo or wood; wall systems often utilized a combination of bamboo wattles plastered with clay; and roofing materials ranged from thatch made of palm leaves to fired clay tiles. Such materials were not only abundant in the immediate surroundings but also compatible with local climatic conditions, allowing for rapid procurement, processing, and assembly using tools and techniques passed down through generations.

From a construction technology perspective, the durability of vernacular houses in this region was constrained by the nature of the materials employed. Bamboo, rattan, straw, and unbaked clay—though abundant and easy to work—were inherently susceptible to rapid degradation under the harsh tropical monsoon climate of Middle Region of Vietnam, which is characterized by high humidity, intense rainfall, and seasonal typhoons. In this environmental setting, the longevity of an architectural work often depended less on the raw material itself and more on the refinement of the construction techniques applied. Consequently, traditional building practices in the region tended toward conservatism, seeking to optimize the resilience of existing techniques rather than pursuing radical innovations that might compromise structural stability.

This relationship between technological maturity and product longevity can be summarized in the observation that “the age of technology precedes the age of the products it creates.” In other words, once an effective building method was developed, it could be applied repeatedly over generations, outlasting the individual buildings themselves. This principle contributed to the persistence of certain material-technical systems long after the introduction of alternative materials, particularly in rural contexts where replacement and repair were a regular part of community life. Preservation of vernacular houses, therefore, was less about maintaining a singular historic artifact and more about sustaining the embodied knowledge of construction as a cultural practice.

A similar principle applied to monumental and elite architecture, where the symbolic value of materials reinforced political authority and social hierarchy. For example, the imperial palaces of the Nguyễn lords in the kingdom of Cochinchina, and later the Nguyễn Dynasty (1802–1945), were constructed from higher-grade and more durable materials—such as precious hardwoods, fired clay tiles, and brick masonry—to signify status and ensure

longevity. Furthermore, the Nguyen Dynasty promulgated formal regulations regarding the permitted materials, scale, and typology of buildings, thereby codifying architectural expression as a visual manifestation of social order.

From the standpoint of architectural chronology, the historical use of construction materials in the Middle Region can be organized into five principal stages, representing a gradual progression in technical sophistication (see Figures 66-73).

Stage 1: Bamboo frame – Thatch roof – Bamboo wattle walls

Stage 2: Bamboo and Wooden frame – Thatch/clay roof – Bamboo wattle walls

Stage 3: Wooden frame – Thatch/clay roof – Bamboo wattle/Wooden plank walls

Stage 4: Wooden frame – Tile roof – Clay walls – Wooden plank walls

Stage 5: Wooden frame – Tile roof – Brick walls.

This sequence outlines a clear technological development trajectory, from lightweight, short-lived organic materials toward more durable and fire-resistant systems. However, the progression was neither uniform nor strictly linear. Transitional phases frequently emerged, during which older material systems coexisted with newer ones. The adoption of advanced materials was often contingent upon their accessibility, cost, and perceived necessity. In many rural and semi-rural areas, traditional soft materials such as bamboo, rattan, straw, and clay remained prevalent due to their ready availability near settlements, their ease of use without specialized tools, and the familiarity of their construction techniques. These factors fostered intergenerational transmission of building knowledge, reinforcing the resilience and continuity of the vernacular building tradition even in the face of gradual technological change.





Figure 67: Truss of Bamboo-wooden (Stage 2)
 (Source: Le, V.A)



Figure 68: Interior of Wooden house 01 (Stage 3), case of Mr. Nguyen Sinh Sac's house in Kim Lien Village, Nam Dan District, Nghe An Province
 (Source: [https://www.vntrip.vn/cam-nang/lang-sen-que-bac-diem-den-khong-the-bo-qua-khi-du-lich-nghe-an-28962,](https://www.vntrip.vn/cam-nang/lang-sen-que-bac-diem-den-khong-the-bo-qua-khi-du-lich-nghe-an-28962))



*Figure 69: Interior of Wooden house 02 (Stage 2 & 3), case of Mr. Nguyen Sinh Sac's house in Kim Lien Village, Nam Dan District, Nghe An Province
(Source: <https://www.vntrip.vn/cam-nang/lang-sen-que-bac-diem-den-khong-the-bo-qua-khi-du-lich-nghe-an-28962>,)*



*Figure 70: Wooden house and brick walls (Stage 5), case of Mrs. Nguyen Thi Tuy's house, Phu Mong Village, Kim Long Ward, Hue City, Thua Thien Hue Province.
(Source: An Khang company)*



Figure 71: Truss of Wooden house (Stage 5), case of Mrs. Nguyen Thi Tuy's house, Phu Mong Village, Kim Long Ward, Hue City, Thua Thien Hue Province. (Source: An Khang company)

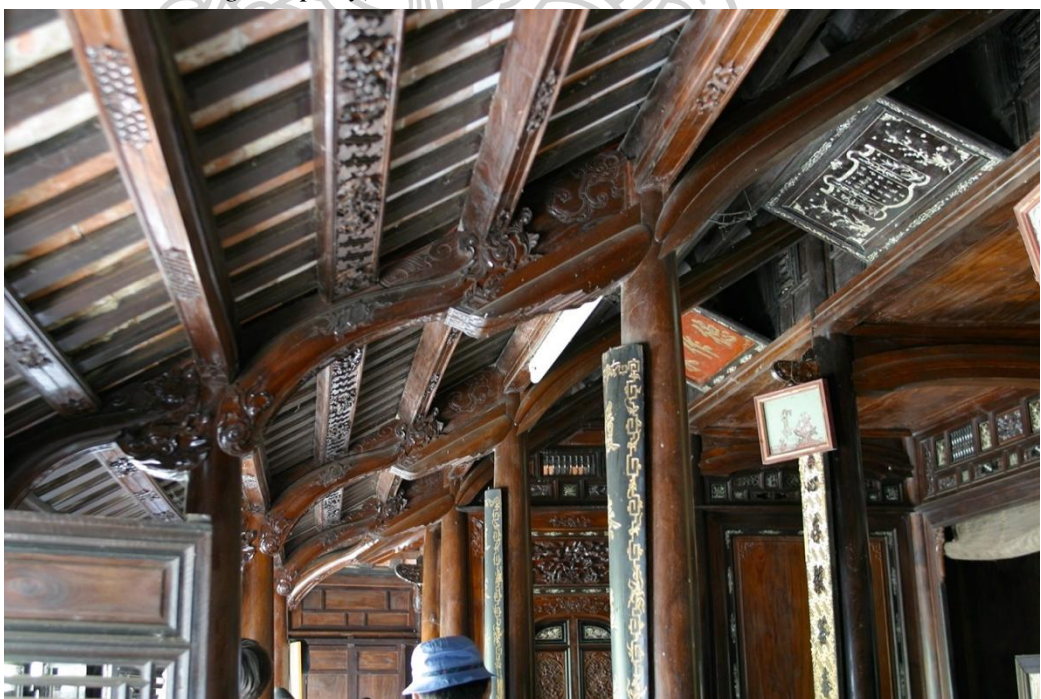


Figure 72: Interior of Wooden house (Stage 5), case of Mrs. Ngo Thi Chau's house in Thuy Phu Commune, Huong Thuy District, Thua Thien Hue Province (2014) (Source: An Khang company)



Figure 73: Ancestor Altar of the Wooden house (Stage 5), case of Mrs. Ngo Thi Chau's house in Thuy Phu Commune, Huong Thuy District, Thua Thien Hue Province (2014).

(Source: An Khang company)

5.3.2 Comparative roofing techniques

The vernacular houses of northern Vietnam are distinguished by a characteristic single-layer roofing system, typically composed of either thatch or heavy clay tiles laid directly upon the rafters. This technique reflects adaptation to the subregional climatic conditions, in which seasonal temperature variation is relatively moderate compared to the more extreme conditions of Middle Region of Vietnam. Consequently, the primary objectives of roofing design in the northern vernacular tradition emphasize efficient rainwater drainage and resistance to typhoon damage, rather than the heat insulation and fireproofing measures that are of greater importance in the central region.



Figure 74: Technique of single-roofed layers of Nha Ke-Bay (Type A)
(Source: Le, V.A)



Figure 75: The tiles putted direct on the rafters of Nha Ke-Bay (Type A).
(Source: Le, V.A)



*Figure 76: Technique of double-roofed layers of Nha La Mai (Type D).
(Source : Le, V.A)*



*Figure 77: Distance between the Two-roof layers of Nha La Mai (Type D)
(Source: Author)*

To enhance water-shedding capacity, northern Vietnamese builders have long employed specialized roof tiles, notably the “Vay Ca” (fish scale) tile and the “Mui Hai” (shoe tip) tile. The former derives its name from its rounded, overlapping form, which evokes the layered scales of a fish; the latter recalls

the upturned tips of aristocratic footwear in the feudal period. Both types are installed directly on the rafters without an intermediary underlayment, with the raised front edge of each tile designed to accelerate the runoff of rainwater from the roof surface toward the eaves (see Figures 74, 75). This configuration minimizes the risk of water penetration during intense rainfall events, a common occurrence during the northern monsoon season.

In contrast, the vernacular architecture of Middle Region of Vietnam developed under markedly harsher climatic pressures. The region experiences significant temperature fluctuations between the dry and rainy seasons, prolonged periods of hot, desiccating winds, and frequent high-intensity typhoons capable of dislodging or destroying roof structures. These challenges necessitated roofing strategies that addressed not only rapid water drainage and wind resistance but also heat mitigation and fire prevention during the arid months.

The diffusion of this double-roof technique (see Figures 76, 77) from Cham settlements into Vietnamese building traditions in the Middle Region illustrates a broader pattern of cultural and technical exchange. It also reflects a pragmatic approach to environmental adaptation: rather than relying solely on more durable materials, builders incorporated redundancy into the roof system itself, ensuring that even if the outer covering failed during a storm, the underlying layer could still provide partial shelter until repairs could be made (see Figures 78, 79, 80).



Figure 78: An unusual single-roofed layers of vernacular house in the Middle Regions (Case of the town house in Hoi An ancient city, Quang Nam Province, Vietnam)
 (Source: Author)



Figure 79: Technique of multi-roofed layers of Nha Ruong (Type C).
 (Source: Author)



Figure 80: Consolidated layer of clay for multi-roofed layers of Nha Ruong (Type C). (Source: Author)

Thus, while both northern and Middle Region of Vietnamese vernacular roofing practices are grounded in environmental responsiveness, their material choices, construction methods, and structural configurations diverge according to the distinct climatic and hazard profiles of their respective regions. The result is a regionally differentiated but technically coherent architectural heritage that embodies the interplay between environmental constraints, cultural knowledge, and interregional exchange.

5.4 The ways of traditional Carpenters in design

This section is primarily based on the study report concerning the tools and methods of traditional Vietnamese vernacular architectural design. The article, titled *Study on Vietnamese Design Methods of Traditional Vernacular Architecture and Discussion on Their Technical Origins* of Vinh An Le and Dinh Son Cao, was published in the *International Journal of Architectural Heritage*, Volume 18, Issue 4, 2024, by Taylor & Francis (Le & Cao, 2023).

5.4.1 Design method of the Vietnamese carpenter in the northern region

a) The “*Thuoc Sam*” Right-Angle Ruler and its proportional geometry

The *Thuoc Sam* right-angle ruler (hereafter referred to as Ruler A) constitutes an indispensable measuring and layout instrument in the toolkit of traditional carpenters in northern Vietnam (see Figures 81, 82, and 83). Serving

both as a standardized unit of measurement and as a geometric reference tool, Ruler A is integral to the manufacture and assembly of wooden architectural structures, particularly in vernacular and temple construction.

Structurally, Ruler A comprises two perpendicular arms, forming a right angle. Along the edges of each arm are engraved symbolic markers that correspond to specific spatial dimensions in construction:

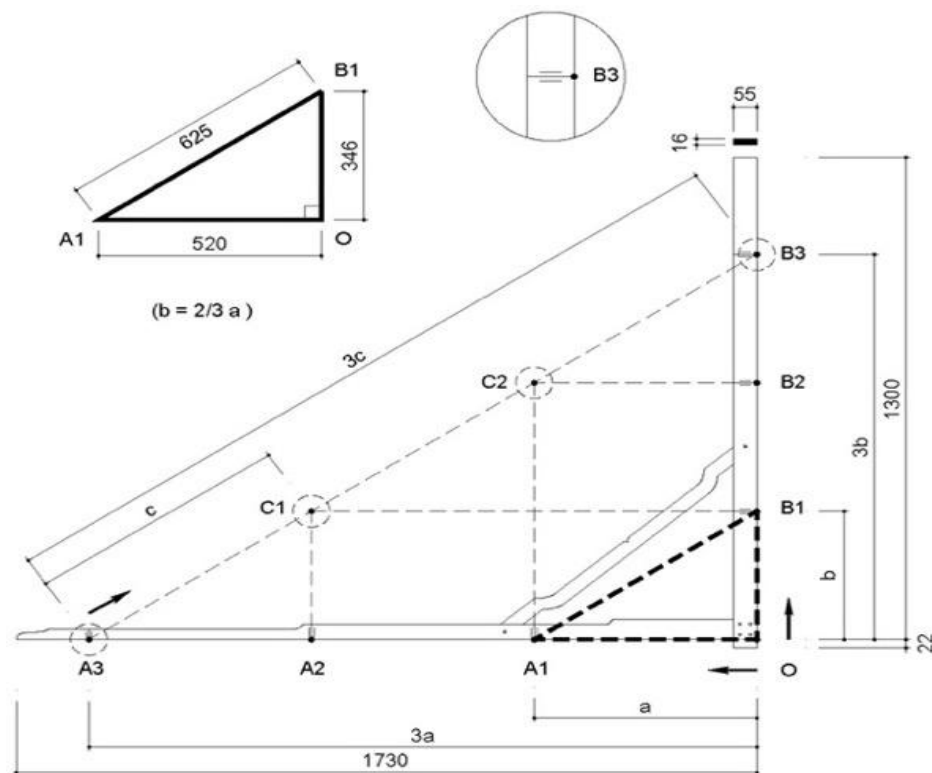


Figure 81: Feature of the “Thuoc Sam” (Ruler A)
(Source : An, L.V. & Son, D. C., (2023), p.8.)



Figure 82: The use of Ruler A
 (Source: An, L.V. & Son, D. C., (2023), p.8.)



Figure 83: Relevant tools used for design
 (Source: An, L.V. & Son, D. C., (2023), p.8.)

- *Khoang Ngang* (horizontal dimension), denoting the longitudinal or leveling measure of a building's base.

- *Khoang Dung* (vertical dimension), representing the upright height of structural elements, in alignment with gravitational direction.
- *Khoang Chay* (diagonal dimension), defined by the hypotenuse formed between the *Khoang Ngang* and *Khoang Dung*, also known as the roof slope dimension.

The proportional relationship between these dimensions is codified in a fixed ratio of $b/a \approx 2/3$, where a is the *Khoang Ngang* and b is the *Khoang Dung*. This ratio is deeply embedded in northern Vietnamese carpentry practice, reflecting a long-standing empirical understanding of structural stability, visual harmony, and climatic adaptation. The *Khoang Chay* (c) is derived from the Pythagorean relationship between a and b , thus defining the diagonal span of the purlins and determining the roof pitch (Le & Cao, 2023, p. 8).

The practical application of this proportional system is highly adaptive. The absolute length of the “triangle unit” determined by Ruler A varies according to the scale of the building, the intended use, and the roofing material employed. For example:

In smaller dwellings or buildings with thatched roofing, the triangle unit is often shorter, yielding a steeper roof pitch for rapid rainwater runoff.

In larger timber-framed structures with heavy clay tiles, the triangle unit is extended to achieve a gentler slope, balancing water drainage needs with the structural capacity of the frame.

In practice, the *Khoang Ngang* (a) (see Figures 81, 84, 85) represents the standardized base unit for determining the longitudinal length of the house, typically ranging between 1.0 and 1.5 units depending on site and material considerations. The *Khoang Dung* (b), fixed at approximately two-thirds of a , governs the elevation of the building and is critical for ensuring adequate headroom and proportional balance. The *Khoang Chay* (c), as the diagonal, is not merely a byproduct of geometry but an essential control dimension, informing the exact length and angle of rafters, the placement of purlins, and the alignment of the roof plane.

Beyond its geometric function, Ruler A encapsulates a system of encoded building knowledge, functioning as both a practical tool and a mnemonic device for the transmission of technical skills. The engravings on its surfaces

allow carpenters to work without reliance on written plans, aligning with an oral-apprenticeship tradition in which spatial relationships are conveyed through demonstration and replication. Its proportional rules ensure structural integrity, aesthetic coherence, and construction efficiency—qualities that have contributed to the continuity of wooden architecture in northern Vietnam for centuries.

b) Design method

In the traditional carpentry practices of northern Vietnam, the dimensional framework of a timber building is determined through a proportional system that integrates site conditions, material considerations, and symbolic-cultural requirements. The scale and layout of a structure are first defined in relation to the available plot of land, with two principal directional measurements: the “*Long Nha*” longitudinal axis, representing the building’s length, and the “*Long Gian*” latitudinal axis, representing its width. Both axes are traditionally dimensioned in accordance with the offerings and specifications provided by the house owner, reflecting the close relationship between architectural design and socio-cultural patronage (see Figures 84, 85).

- (1) Longitudinal Measurement System (*Long Nha*): The longitudinal span (L)—the distance between the outermost front and back small columns—is subdivided into 18 proportional units ($18a$). This subdivision governs the spatial hierarchy of the column bays:
- *Khoang Thuong* ($L1$) – $8a$: the distance between two primary or “big” columns, forming the central, most significant structural bay.
 - *Khoang Trung* ($L2$) – $5a$: the interval between a primary column and an intermediate “middle” column.
 - *Khoảng Thuan* ($L3$) – $3a$: the distance between a middle column and a small perimeter column.

This graduated spacing reflects both structural logic—distributing loads according to the relative strength of column types—and spatial symbolism, with the central bays allocated greater width as a mark of status and function.

(2) Latitudinal Measurement System (*Long Gian*)

The latitudinal span is organized into a sequence of the “*Gian*” compartments and the “*Chai*” wings. Compartments, which are always arranged in odd numbers, define the main structural modules, while wings,

arranged in even numbers, form lateral extensions of the building. Traditionally, a single compartment measures between 7–9 units in length, while the length of a wing is proportional to its adjacent compartment, generally two-thirds of its size. This proportional limitation ensures visual harmony, structural balance, and adherence to customary building codes.

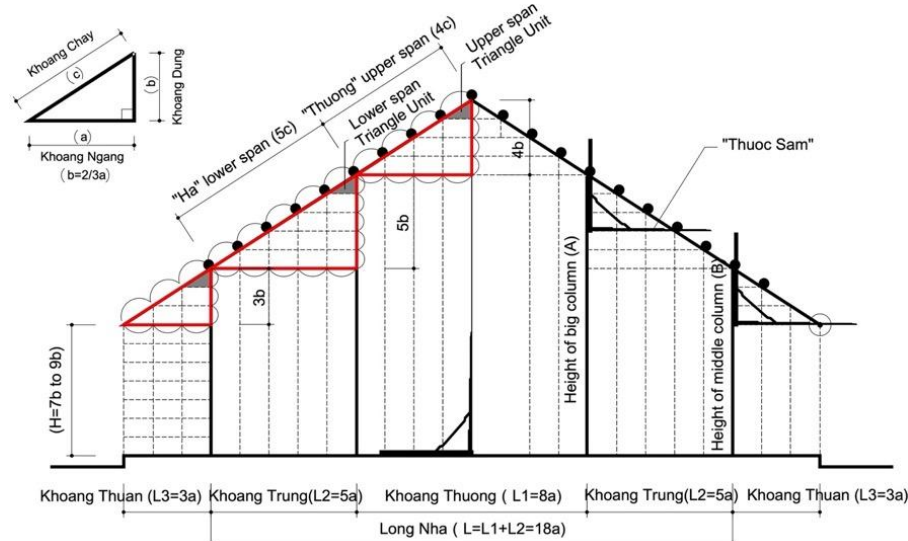


Figure 84: Design method of northern region's vernacular architecture (according to the carpenters in the northern region) (Source: An, L.V. & Son, D. C., (2023), p.9.)

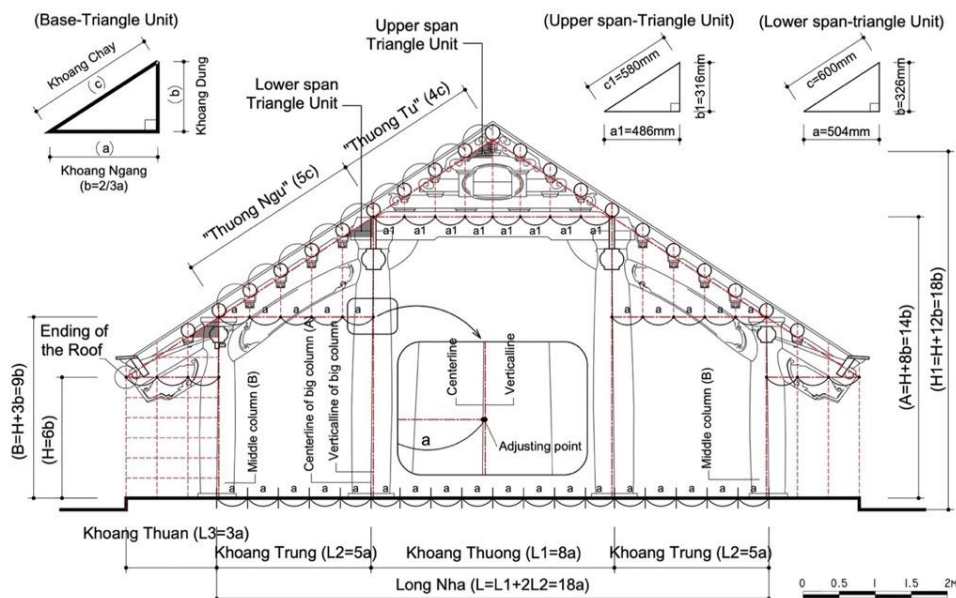


Figure 85: Analysis of the cross-section of the typical northern region's vernacular architecture (Ly Nhan District, Ha Nam Province) (Source: An, L.V. & Son, D. C., (2023), p.11.)

(3) Column heights and Vertical proportions

The height of the small column (H)—which defines the clearance beneath the roof eaves—is designed between 7b–9b to ensure comfortable headroom. Based on this height, the other vertical members are calculated:

- Big column (A) = $H + 8b$
- Middle column (B) = $H + 3b$

Once L (longitudinal span) and H (small column height) are established, the total height, longitudinal proportions, and roof slope of the building are fixed. Roofing material directly influences the b/a ratio (vertical-to-horizontal proportion of the basic measurement unit):

- Thatched or palm-leaf roof: $b/a = 65\%–70\%$ (steeper slope for faster water runoff)
- Tile roof: $b/a = 55\%–60\%$ (gentler slope, heavier load-bearing requirement)

(4) Purlin Spacing and Truss Configuration

The *Khoang Chay* (c)—distance between two purlins—is calculated in direct relation to the number of *Khoảng Ngang* (a). For example, in the case of the *Dinh Van Xa* communal hall, the truss type “*Thuong Tu – Ha Ngu*” (upper diagonal span divided into $4c$, lower span divided into $5c$) is applied symmetrically to each side of the roof. This classification reflects both structural logic and regional carpentry conventions.

(5) Column Diameter and Timber Sectioning

The diameter of the columns is proportioned to the latitudinal span, providing not only adequate structural strength but also contributing to the visual balance of the building’s elevation. Correspondingly, the cross-sectional dimensions of all primary timbers—longitudinal beams, latitudinal beams, and diagonal braces—are calibrated to match the column diameter, ensuring consistent load distribution and cohesive visual rhythm.

Within the scope of this study, the analysis will focus on the three principal dimensional axes— X (length), Y (width), and Z (height)—as the primary framework for understanding proportional design in traditional northern Vietnamese timber architecture.

5.4.2 Design method of the Vietnamese carpenter in the middle region

a) *The “Thuoc Nach” Equilateral -Triangle Ruler and its functional significance*

In the traditional carpentry practices of the Middle Region of Vietnam, craftsmen frequently employ a specialized measuring and drawing instrument known as the *Thuoc Nach* (hereafter referred to as Ruler B). This tool is understood through two principal functions: firstly, as a precision instrument for drafting and layout, and secondly, as a standardized unit of measurement (see Figures 86-89).

Structurally, Ruler B is characterized by the geometry of an equilateral triangle, with each side measuring exactly one unit in length—typically ranging from approximately 400 mm to 426 mm. This standardization allows for consistent scaling in the design and construction of traditional timber architecture, while also enabling adaptation to specific building dimensions (Le & Cao, 2023, p. 8)

Ruler B fulfills a wide range of critical functions in the construction of vernacular wooden houses. It is indispensable for:

- Plan Layout and Symmetry Control – Establishing the central longitudinal axis of the building plan and precisely aligning the centerlines of column rows. This ensures structural balance and architectural harmony, which are culturally valued in Vietnamese architecture.
- Structural Framework Design – Facilitating the proportional design of timber trusses and the core load-bearing wooden frame, which typically consists of four main elements: vertical columns, diagonal bracing beams, latitudinal tie beams, and longitudinal beams.
- Roof Geometry Determination – Enabling accurate calculation of roof slopes, which are closely linked to regional climatic adaptations and the choice of roofing materials.
- Timber Assembly Coordination – Guiding the positioning and fitting of structural members during the assembly process, thereby ensuring dimensional accuracy and stability.

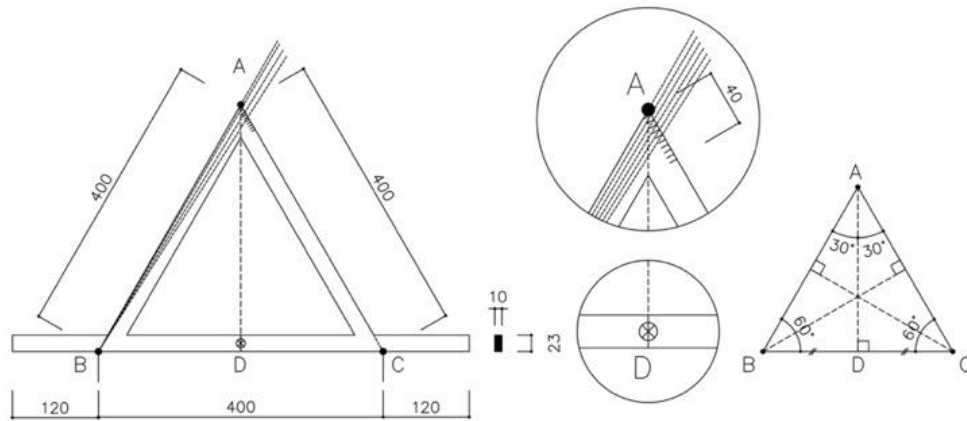


Figure 86: Feature of the “Thuoc Nach” (Ruler B)
 (Source: An, L.V. & Son, D. C., (2023), p.15)

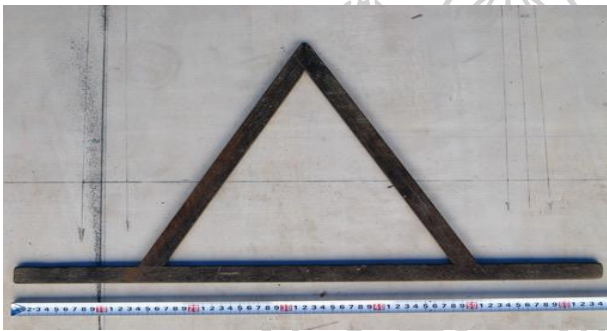


Figure 87: The remaining Ruler B of the carpenter
 (Source: An, L.V. & Son, D. C., (2023), p.16)

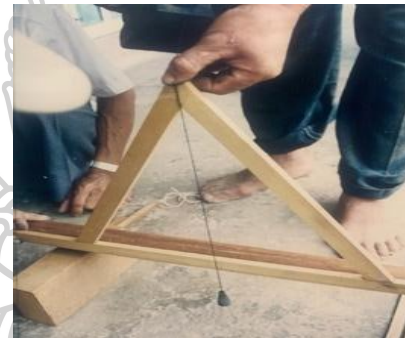


Figure 88: The use of Ruler B with Plumbline
 (Source: An, L.V. & Son, D. C., (2023), p.15)



Figure 89: The use of Ruler B to fix the roof slope
 (Source: An, L.V. & Son, D. C., (2023), p.16)

Additionally, when used in conjunction with a plumb line, Ruler B assists in setting precise horizontal and vertical references during construction. This combined use enhances the accuracy of both the vertical alignment of columns and the leveling of beams—an essential factor for the long-term structural performance of timber buildings.

The multifunctional nature of Ruler B reflects the ingenuity of traditional Vietnamese carpentry, where a single, portable, and geometrically simple tool integrates measurement, proportioning, and construction alignment. Beyond its technical role, Ruler B also represents a material embodiment of craft knowledge transmitted through generations, contributing to the enduring stability, aesthetic balance, and environmental responsiveness of Middle Region of Vietnam's vernacular wooden architecture.

b) Design methods

In the vernacular architecture of Middle Region of Vietnam, carpenters traditionally determined the scale and proportions of a building based on the dimensions of the allocated land plot and the intended function of the structure. The number of longitudinal spans and latitudinal spans was not arbitrarily chosen but depended largely on the offerings and resources of the house owner. In customary practice, the number of latitudinal spans seldom exceeded three compartments with two flanking wings (see Figures 90, 91).

Prior to the construction process, several key design parameters were established, including:

- Functional purpose — whether the building would serve residential or worship functions.
- Length of the longitudinal and latitudinal beams — determining the primary frame dimensions.

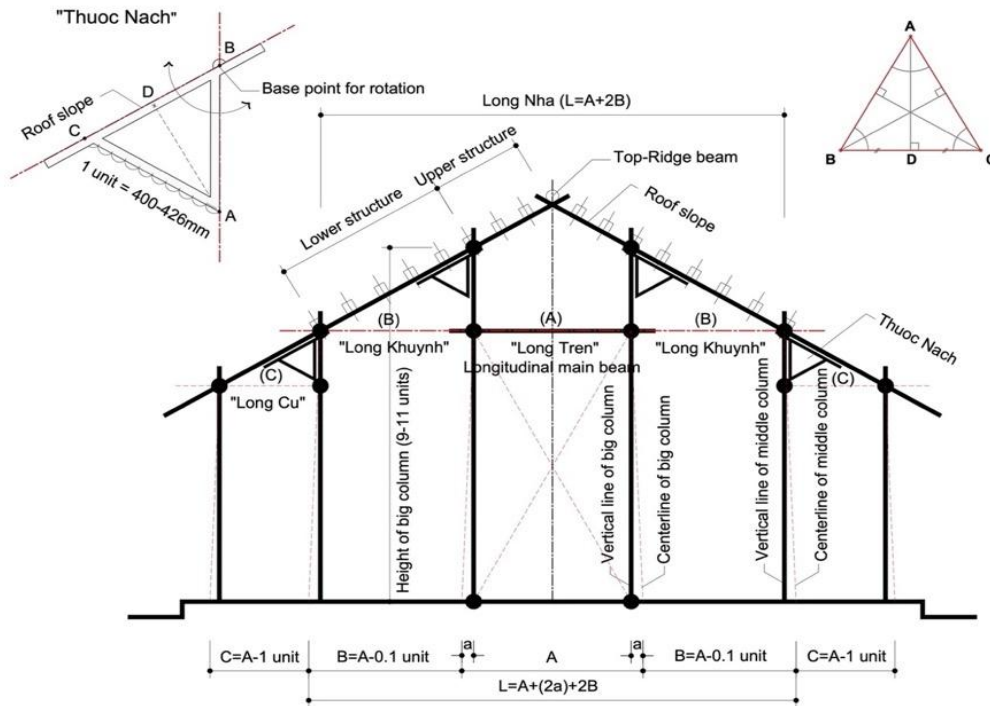


Figure 90: Design method of the middle region's vernacular architecture (according to the carpenters in middle region) (Source: An, L.V. & Son, D. C., (2023), p.17)

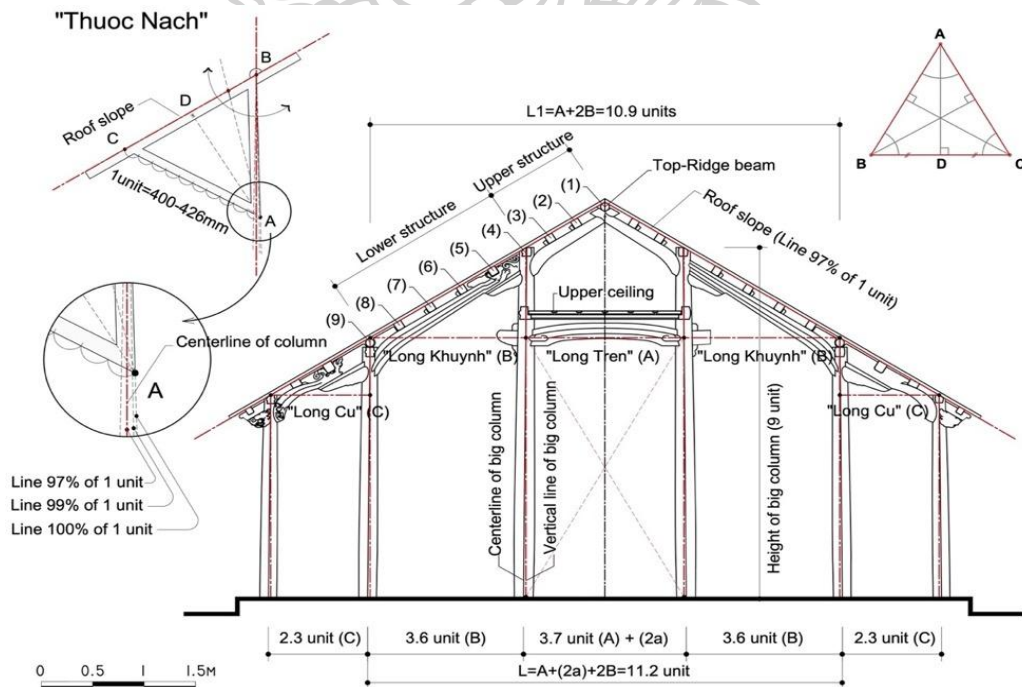


Figure 91: Analysis of the cross-section of the typical middle region's vernacular architecture (Phu Vang District, Thua Thien Hue Province) (Source: An, L.V. & Son, D. C., (2023), p.19)

- Number of column rows — influencing both the interior division and structural stability.
- Height of the main columns (*Cot Cai*) — calculated in relation to beam lengths to achieve proportional harmony.
- Number of compartments and wings — defining the overall layout.

Roofing material — directly affecting roof slope design and drainage performance.

From the longitudinal span perspective, the most critical measurement was the *centerline-to-centerline* distance between the main columns, calculated at the top ends of the columns. This dimension largely dictated the overall scale of the structure.

From the latitudinal span perspective, the building's total length was determined by the sum of compartments (always designed in odd numbers) and wings (designed in even numbers). Each compartment length, measured centerline-to-centerline between columns, directly corresponded to the length of the longitudinal beam. Traditional practice limited compartment length to approximately 5.5 to 6.5 *Thuoc Sam* units to maintain optimal proportions and material efficiency.

The height of the main column was measured from ground level (or the column base) to the top and was proportionally related to both longitudinal and latitudinal beam lengths. This height, together with the beam dimensions, established the fundamental structural identity of Middle Region of Vietnamese vernacular houses — defined by the positional relationship between the longitudinal beams, latitudinal beams, and the vertical columns.

Roof slope design was determined by the diagonal alignment between the upper edge of the “*Keo*” diagonal beam and the centerline of the main column, intersecting precisely at the column's top-centerline. The slope was traditionally calculated using the “Ruler B” system described earlier. To ensure efficient rainwater runoff while maintaining structural stability, roof slopes were typically fixed between 50% and 65%, with exact values adjusted according to roofing material.

Purlin arrangement in the longitudinal section was determined by counting from the top ridge beam down to the top of the “*Cot Quan*” secondary columns. Carpenters consistently preferred auspicious odd numbers

— such as 5, 9, or 13 purlins — reflecting the cultural belief in the good fortune associated with odd numerals.

Proportional relationships between key dimensions were also codified through practice. In many documented examples, the beam length ratio $B = A - 0.1$ unit (where A is the longitudinal span) was common. The ratio between A and C (height of main column) was more variable, with C ranging from $A - 1$ unit to $A - 1.5$ units, except in exceptional cases. Empirical evidence further indicates a direct proportional relationship between longitudinal span length (A), column height (C), and roof slope — forming the essential triad of proportional harmony in Middle Region of Vietnamese timber architecture. (Le & Cao, 2023, pp. 15-24).

5.4.3 Design method of the Cham's carpenter in the south-middle region

a) *The “Thuoc Nac” Equilateral -Triangle Ruler and its functional significance*

Among the Cham community residing in Ninh Thuận Province, a group of highly skilled master carpenters—locally referred to as *Ong Hang*—are renowned for their combined technical precision and artistic craftsmanship. One of their distinctive design tools is the *Thuoc Nac* (hereafter referred to as Ruler C) (see Figure 92), a small ruler in the form of an equilateral triangle. The term *Nac* in the Cham vernacular is a verb denoting the act of mating between a male and a female, an analogy to the jointing of a “Cot” vertical column with a “Keo” diagonal roof beam.

Although Ruler C consistently takes the geometric form of an equilateral triangle (Fig. 38), the length of its sides is not standardized according to a fixed measurement unit. Instead, its dimensions are personalized, determined by the length of the carpenter's own hand-span, locally known as *lengkat*. This anthropometric approach aligns with long-standing Southeast Asian craft traditions in which body-based measurements ensure proportional harmony between the artisan's tools and the final built form.



*Figure 92: Feature of “Thuoc Nac” (Ruler C)
(Source: An, L.V. & Son, D. C., (2023), p.23)*

Two documented case studies illustrate this relationship between body dimensions and Ruler C sizing:

- Mr. Nai Nha (Tab. 2, no. 17; see Figure 93) — with a stature of 1.60 m and a lengkat of 22 cm, resulting in each side of his Ruler C measuring 22 cm.
- Mr. Dang Ngoc (Tab. 2, no. 18; see Figure 94) — with a stature of 1.76 m and a lengkat of 26 cm, resulting in each side of his Ruler C measuring 26 cm.



Figure 93: Carpenter Nai Nha
(Source : An, L.V. & Son, D. C., (2023), p.23)



Figure 94: Carpenter Dang Ngoc
(Source : An, L.V. & Son, D. C., (2023), p.23)

In formal terms, the proportionality principle embedded in Ruler C reflects an *artisan-to-tool calibration*, whereby the ruler becomes an extension of the craftsman's body, allowing for an intuitive translation of measurements into timber joinery and roof geometry.

From a functional perspective, Ruler C shares a geometric resemblance to Ruler B, used by Vietnamese carpenters in the central region. However, there are two notable distinctions:

Ornamentation and Engraving — Ruler C is characteristically plain, with minimal engraved markings, in contrast to the more elaborately inscribed Ruler B.

Functional Scope — Owing to its simpler engravings, Ruler C serves a more limited but focused set of applications. Both Ruler C and Ruler B are employed primarily to determine roof slopes and to coordinate the alignment of columns with both “*Xa Doc*” longitudinal beam and “*Xa Ngang*” latitudinal beam. The main divergence lies in their scale: the side length of Ruler C varies according to the carpenter’s *lengkat*, whereas Ruler B is typically produced in fixed standardized dimensions.

This anthropometric calibration not only personalizes the building process but also encodes a cultural dimension into the architectural form, making the final structure a direct extension of both the human body and the inherited craft tradition.

b) Design method of the Chams

According to accounts from Cham carpenters, the vernacular dwellings they typically constructed were wooden or bamboo structures with thatched roofs. The most common form was the *Nha Roi* type, characterized by a distinctive truss system composed of three vertical posts: one “*Cot Cai*” large central column flanked symmetrically by two “*Cot Quan*” smaller side columns. This arrangement ensured structural balance while reflecting a proportional order that was both functional and aesthetically consistent with Cham building traditions.

The spatial dimensions of these houses were determined according to anthropometric measurements, a method rooted in indigenous knowledge systems. Specifically, the distance between the central column and each side column was defined as the span of an open pair of arms (approximately 6 feet plus the length of a *lengkat*, a traditional Cham unit of measure). Consequently, the total width of the house—measured as the combined length of two truss bays—would equal double the arm span (around 12 feet plus two *lengkats*),

providing adequate internal space while avoiding the constriction of movement (see Figure 95).

The vertical dimension followed a similarly human-centered logic. The height of the *Nha Roi*, measured from the ground to the “Xa Noc” top ridge beam, was generally set at twice the open-arm span plus the height of a person’s head. This ensured sufficient clearance under the eaves to prevent head contact, thus improving comfort and safety.

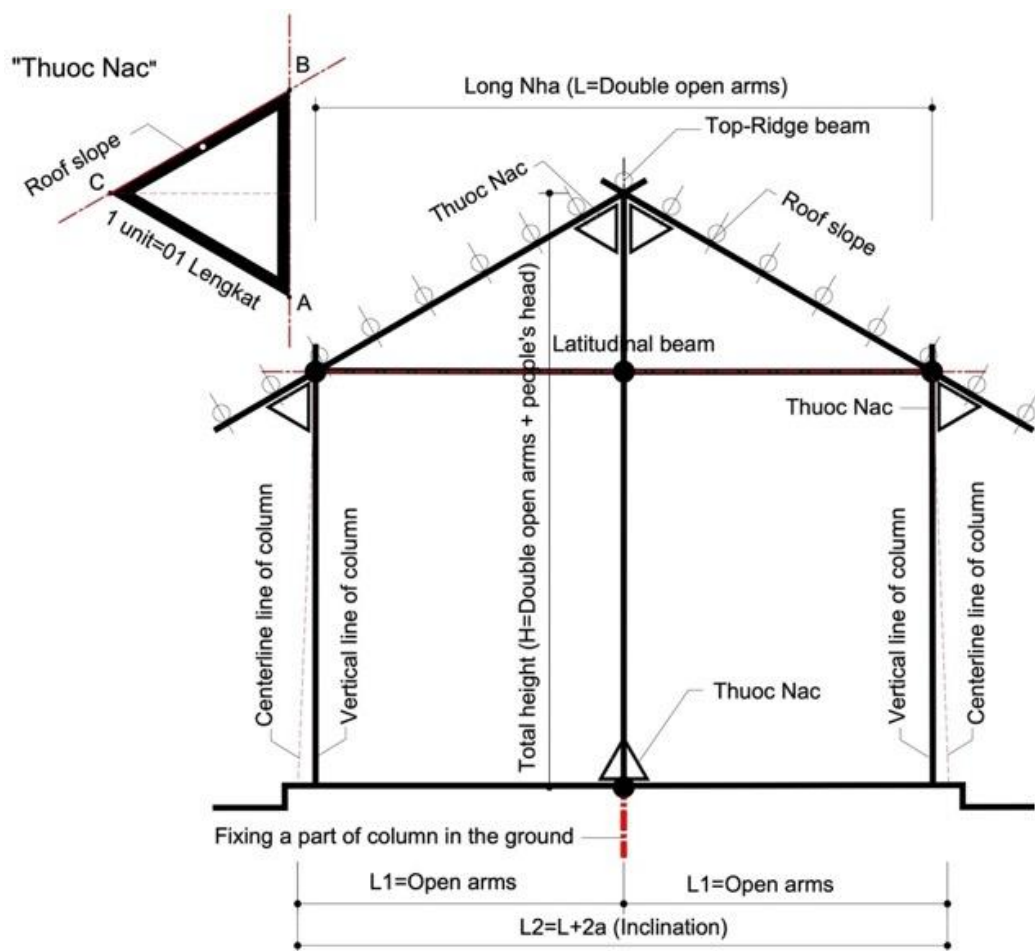


Figure 95: Design method of the Cham’s vernacular house in Ninh Thuan Province (Source: An, L.V. & Son, D. C., (2023), p.24)

Roof pitch was determined using a traditional carpentry tool known as Ruler C. This device incorporated an equilateral triangle, with each internal angle measuring 60 degrees. The carpenters would align one side of the triangle with the centerline of the central column, while another side defined the slope of the roof. This approach was both simple and effective, producing a roof pitch equivalent to approximately 60–65%, an optimal range for

facilitating rapid rainwater drainage while reducing the risk of roof damage during storms.(Le & Cao, 2023, pp. 23-24).

Although by the time of our 2008 survey only a few Cham vernacular houses remained intact, field documentation of surviving carpentry tools and interviews with experienced Cham artisans provided valuable insights into their design philosophy. The evidence suggests that Cham builders prioritized three fundamental parameters:

- Plan dimensions – governed by the human body’s arm span.
- Roof slope – determined using the equilateral-triangle method with Ruler C.
- Column height – based on twice the arm span plus head clearance.

These principles closely parallel those found in the work of Vietnamese carpenters in the central region, indicating a shared architectural logic rooted in human-scaled measurement systems and climate-responsive design.

5.5 Comparison and discussion of their technical origins

5.5.1 Regarding carpentry designing tools

Historical sources on ancient Chinese construction practices reveal the systematic use of four principal measuring instruments: the *Lu Ban Xich* ruler, employed to determine spiritually auspicious dimensions (see Figure 96); the *Khuc Xich* ruler(Naikaku Bunko, pp. 115-116; Sicheng, 1996b, pp. 292-293), applied in geometrical calculations (see Figure 97); the *Truc Xich* ruler, used for establishing vertical alignment (see Figure 98); and the *Thuy Binh* tool,(Sicheng, 1996a, pp. 3-4), designed for achieving horizontal leveling (see Figure 99). These tools not only supported the precise determination of proportions and alignments but also ensured the structural integrity and symbolic harmony of traditional Chinese wooden architecture.

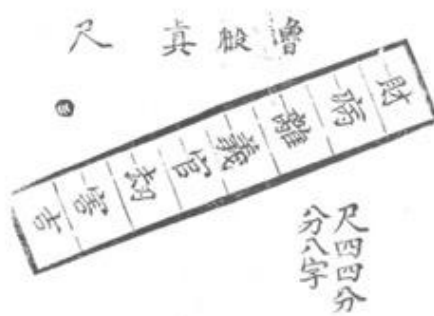


Figure 96: “Lu Ban Xich” Rule
(Source: An, L.V. & Son, D. C., (2023), p.25)

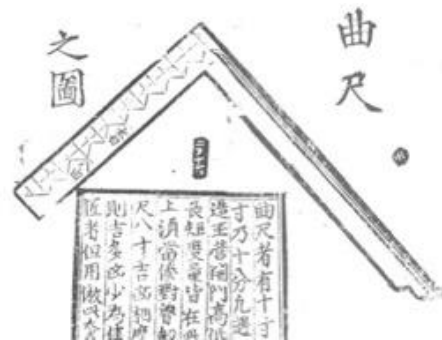


Figure 97: “Khuc Xich” Ruler
(Source: An, L.V. & Son, D. C., (2023), p.26)

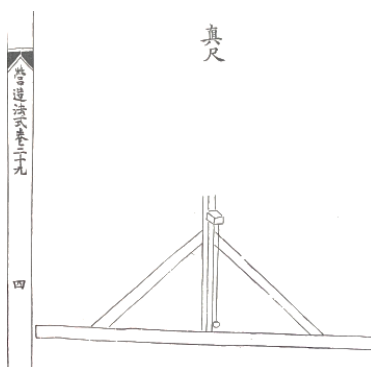


Figure 98: “Truc Xich” Ruler
(Source: An, L.V. & Son, D. C., (2023), p.26)

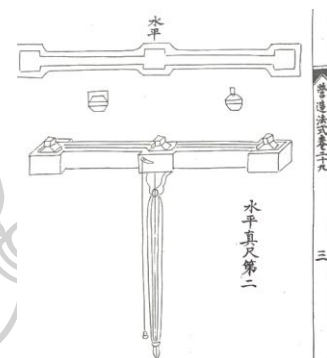


Figure 99: “Thuy Binh” Tool
(Source: An, L.V. & Son, D. C., (2023), p.26)

Within this framework, Ruler A in the Vietnamese tradition demonstrates a close parallel to the *Khuc Xich* and *Lu Ban Xich* rulers. Like its Chinese counterparts, Ruler A served to divide triangular units to determine architectural scale, establish proportional relationships, and fix roof slopes. Its application, however, necessitated the concurrent use of a leveling tool (horizontal reference) and a plumb line (vertical reference)—functions corresponding to the Chinese *Thuy Binh* and *Truc Xich* tools. This combination reflects an approach grounded in the same principles of dimensional accuracy, neat assembly, and structural stability as found in Chinese carpentry.

In contrast, Rulers B and C present a markedly different design logic. Both are based on an equilateral triangle geometry and incorporate fixed measurement units along each edge. The integration of a plumb line with these tools allowed them to replicate all the core functions of the four aforementioned Chinese tools within a single compact device. This represents a conceptual leap in tool efficiency—condensing multiple measuring operations

into one implement, thereby streamlining the design process and reducing the number of separate tools required on site.

The origins of these triangular tools—particularly Rulers B and C—do not align with known ancient Chinese construction traditions. Historical documentation offers no evidence that such equilateral triangle-based instruments were part of the Chinese carpentry toolkit. Their presence in the Vietnamese Middle Region and potential linkage to Cham traditions suggests a different lineage of technical development.

The case of the Cham is particularly intriguing. The Champa Kingdom, which once occupied much of present-day Middle Region of Vietnam, was destroyed in the 17th century, leaving few records of its carpentry practices. What remains are the Cham brick towers, such as the Po Klong Garai Tower, constructed during the reign of King Jaya Simhavarman III (late 13th to 14th century) in present-day Phan Rang–Thap Cham City (Ninh Thuan Province). Architectural analysis of this structure reveals geometric features that could plausibly relate to equilateral triangle design principles, hinting at a distinct indigenous or cross-cultural technological origin for such tools (see Figures 100, and 101) (Pugnaroni & Carlorosi, 2013, pp. 195-197).

From this perspective, the evidence supports the conclusion that the design tools used by carpenters of the Vietnamese Middle Region and the Cham were not derived from ancient Chinese methods. Instead, the equilateral triangle-based design represents a more integrated and functionally optimal approach compared to the square-based tools of the Chinese system. Furthermore, it is plausible to suggest that Ruler B evolved from Ruler C through a refinement in measurement standards—replacing the traditional *lengkat* unit with a scaled measurement system better suited to modular construction.

In summary, the comparative study of these tools underscores not only technical divergence between regions but also the creative adaptation and optimization of design methods in response to local cultural, material, and environmental contexts. The equilateral triangle-based measurement approach exemplifies an indigenous innovation that prioritized multifunctionality, efficiency, and precision—qualities that, while distinct from Chinese precedents, reflect a sophisticated understanding of architectural geometry and craftsmanship.



Figure 100: Poklong Garai Tower (13th century) in Phan Rang City, Ninh Thuan Province, Vietnam
 (Source : An, L.V. & Son, D. C., (2023), p.27)

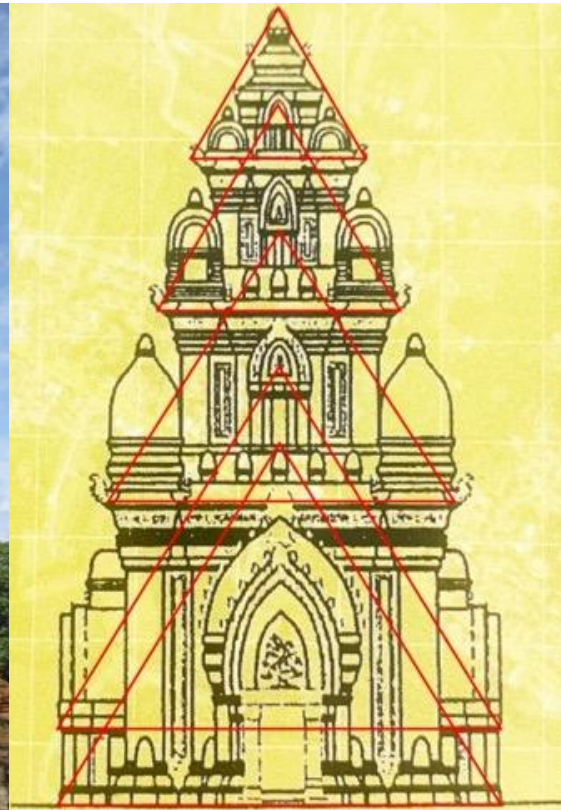


Figure 101: Geometrical analysis of the East elevation of the Tower (13th century)
 (Source: An, L.V. & Son, D. C., (2023), p.27)

5.6 Chapter conclusion 5

The carpentry traditions of the northern region, middle region, and Cham communities display both shared construction principles and distinct adaptations in their selection of materials and execution of roofing techniques, each responding to local climate, resource availability, and cultural priorities.

In the northern region, high-quality hardwoods were preferred for their durability, resistance to termites, and structural strength. Roofing was executed with heavy clay tiles laid on robust, steeply pitched timber frames, ensuring effective rainwater runoff and long-term weather resistance. The roof construction often incorporated multiple layers of battens and purlins, reflecting the emphasis on permanence and the symbolic significance of monumental architecture.

The Middle Region faced harsher climatic conditions, including typhoons and intense rainfall, leading to an emphasis on both strength and resilience. Timber selection balanced durability with availability local hardwoods. Roof structures were characterized by higher slopes and a more compact framing system to resist wind uplift. Clay tiles remained common, but lighter forms and more tightly secured fastening methods were employed to enhance storm resistance, alongside careful alignment to improve water drainage.

The Cham communities in the arid Ninh Thuan province relied on readily available local timbers, often of smaller cross-section, reflecting both material scarcity and the lighter loads required for their roofing systems. Roofs typically used palm leaves or thatch in earlier periods, later incorporating clay tiles where accessible. The framing was simpler, with fewer layers of members, optimized for rapid construction, easy maintenance, and adequate ventilation in the hot, dry climate.

Overall, while all three traditions utilized timber framing and pitched roofs as a structural norm, the northern region prioritized longevity and symbolism, the Middle Region optimized for climatic resilience, and the Cham tradition emphasized material efficiency and climatic adaptability. These differences in material selection and roofing execution underscore the dynamic interplay between environmental conditions, available resources, and cultural values in shaping architectural heritage.

About Carpenter's Tools:

The comparative study of carpenter's tools and design methods in northern Vietnam, Middle Region of Vietnam, and the Cham cultural area reveals both a shared foundation in timber-frame construction and distinct regional adaptations shaped by climate, cultural heritage, and material practice.

In the northern region, carpentry relies on standardized measuring tools such as Ruler A, grounded in fixed proportional systems and codified guild knowledge. The design methods emphasize steep roof slopes to counter heavy rainfall and cold winters, with ornamentation kept to a minimum, prioritizing structural integrity and efficiency.

In the middle region, exemplified by Ruler B, carpenters integrate precise measurement systems with a higher degree of decorative artistry. Here, design methods are tailored to withstand typhoon winds and tropical downpours,

resulting in moderately steep, aerodynamically stable roof forms. The ruler's ornamentation reflects a synthesis of functional and symbolic considerations, characteristic of the region's aesthetic sensibilities.

In contrast, Cham carpentry, represented by Ruler C, embodies a more personalized and anthropometric approach. Measurements are derived from the carpenter's own body dimensions, allowing flexibility and adaptation to available materials. Roof slopes are optimized for both wind resistance and quick water runoff in a drier, coastal climate. Ornamentation is minimal, reflecting a pragmatic and utilitarian ethos.

Overall, while the underlying geometric principles—triangular forms, proportional logic, and precision in joinery—are consistent across all three traditions, their execution varies according to environmental demands and cultural values. This diversity within a shared technological framework highlights the resilience and adaptability of Vietnam's vernacular carpentry, ensuring its continued relevance as both a functional craft and a form of intangible cultural heritage.

About Design Methods:

The analysis of design methods across the northern region, middle region, and Cham communities reveals a shared anthropometric foundation yet distinctly different approaches shaped by environmental, cultural, and technical contexts.

In the northern region, design methods were rooted in a highly codified proportional system, where measurements derived from the carpenter's body were translated into fixed modular units. This approach ensured standardization, structural accuracy, and ease of replication, aligning with the region's established guild traditions and the need for durable structures suited to pronounced seasonal changes.

The Middle Region adopted a more adaptive design methodology. While still grounded in anthropometric measurement, proportional rules were applied with greater flexibility to accommodate narrow land plots, steep roof pitches for heavy rainfall, and wind-resistant framing. This adaptive system reflects both environmental pragmatism and cultural synthesis, as the Middle Region served as a transitional zone between the architectural traditions of the north and south.

The Cham communities employed a simplified, function-driven method centered on the Thuoc Nac (Ruler C). The carpenter's lengkat served directly as the proportional basis, with minimal reliance on complex modular systems. This streamlined approach emphasized efficiency, oral knowledge transmission, and structural adequacy for the arid, wind-exposed environment of Ninh Thuan, while also embedding symbolic meaning in tool forms.

Taken together, these design traditions demonstrate a unifying principle—human-scaled measurement—expressed through regionally specific adaptations. The northern method reflects formalization, the Middle Region embodies adaptive flexibility, and the Cham approach illustrates pragmatic minimalism, forming a rich spectrum of Vietnamese and Cham carpentry heritage.

About technological history:

From the perspective of technological history, there exists a general principle in which the durability of architectural materials is often inversely proportional to the lifespan of the technology that produced them. In other words, the underlying construction technology tends to predate and outlast the physical products it creates, even as those products inevitably deteriorate. In regions with harsh climatic conditions—such as the central belt of Vietnam, characterized by prolonged rainy seasons, high humidity, and exposure to typhoons—the lifespan of architectural works made from perishable materials like bamboo and untreated timber is relatively short. This vulnerability has historically fostered a form of technological conservatism among traditional craftsmen, who, in an effort to safeguard the continuity of building practices, tend to preserve familiar techniques across generations rather than risk adopting unproven innovations.

The persistence of these inherited methods means that the “age” of a given construction technology is often far older than the surviving buildings that embody it. Moreover, the continued use of such methods exerts a profound influence on social life—not only during the period of their active application but also through their enduring impact on the architectural identity of subsequent eras.

Mixed material construction

Archaeological evidence and surviving examples of vernacular dwellings suggest that the earliest phase of architectural development in the Middle Region was characterized by a hybrid use of bamboo and wood. Bamboo, abundant and easily worked, was employed for lighter, replaceable elements, while more durable wooden timbers were reserved for key structural members. This stage reflects a transitional period when the demands of local environmental conditions had not yet driven a complete shift toward wooden architecture.

Full timber construction and structural innovation:

With the gradual refinement of carpentry tools and design methodologies, timber construction increasingly displaced bamboo, becoming the primary load-bearing material. This transition was not merely a substitution of materials but a shift in architectural thinking. In particular, a characteristic structural form emerged in which two central rows of large wooden columns defined the main axis of the truss. These columns were joined at their tops by diagonally inclined beams, also of timber, creating a rigid framework capable of supporting heavier loads and withstanding climatic stress.

The adoption of full-timber construction can be interpreted as the second phase of acculturation in the region's architectural history—an evolutionary stage in which technological advancements in tool-making and joinery techniques enabled the replacement of earlier bamboo-wood hybrids with entirely wooden structures.

Roofing techniques and stylistic hybridization:

Alongside changes in structural materials, roofing technologies underwent significant transformation. The vernacular houses of the Middle Region of Vietnamese began to integrate roofing techniques observed in Cham architecture, which had evolved to withstand the intense sunlight and monsoon rains of south-Middle Region of Vietnam. While northern Vietnamese traditions favored a single-roof form, the Middle Region developed a distinctive multi-layered roofing style that combined the Cham emphasis on climatic adaptability with the northern aesthetic of elegant proportion. This architectural hybrid—both resilient and visually refined—can be understood as the third phase of acculturation, reflecting a synthesis of material, technological, and stylistic influences.

About the role of carpenter's tools and module for design:

In terms of design methodology, anthropometric measurement systems generally precede the adoption of standardized scaled units. The Chams' Ruler C, based on direct human body proportions, likely represents an earlier stage in this developmental sequence. The Vietnamese Ruler B, by contrast, may have been a deliberate adaptation of Ruler C in which each segment length was regularized into a fixed modular unit. This shift from anthropometric approximation to modular standardization reflects an evolution in architectural planning towards greater repeatability and precision.

Interestingly, linguistic evidence may also point to a direct cultural linkage between these two measurement systems. The terms Thuoc Nac (Ruler C, Cham) and Thuoc Nach (Ruler B, Vietnamese middle region) are phonetically similar in Vietnamese, raising the possibility that the latter is a linguistic corruption of the former. If this hypothesis is correct, it would imply that the Vietnamese Middle Region carpenters not only borrowed aspects of Cham measurement practice but also reinterpreted and standardized them to align with their own building traditions.

About broader implications:

The technological and stylistic trajectory of vernacular architecture in the Middle Region of Vietnam thus reflects a layered history of adaptation, borrowing, and innovation. Each phase—whether marked by a change in materials, a new structural concept, or an evolved design methodology—represents not a wholesale replacement of earlier traditions but rather an accretion of influences. The result is a distinctive architectural culture shaped by both technological conservatism and creative synthesis, rooted in the environmental realities and intercultural exchanges of the region.

Chapter Six

Aspects of Acculturation in the Vernacular Houses

This chapter explores how cultural interaction and adaptation are reflected in the vernacular houses of Vietnam's Central Region. It examines the geographical, cultural, and social contexts that shaped architectural transformation, followed by an analysis of spatial use, carpenters' tools and design methods, construction techniques, and aesthetic expression. Through these aspects, the chapter highlights how acculturation manifests in both tangible and intangible forms—linking cultural identity with architectural evolution over time. A brief chronological overview further situates these transformations within their historical context.

6.1 Geographical, cultural, and social aspects

The utilization of locally sourced timber in conjunction with a diversity of truss configurations in vernacular houses of Vietnam's Middle Region reflects an adaptive architectural strategy finely attuned to the region's climatic extremities. The integration of robust wooden frames not only enhances the building's structural capacity to resist high-velocity winds, typhoons, and seasonal flooding but also contributes to the longevity of the structure within a hostile environment. In this context, the introduction of a mixed clay layer within the roofing system performs a dual function: thermoregulation—maintaining cooler indoor temperatures during the sweltering summer months and retaining warmth during winter—and fire prevention, thereby safeguarding both the roof and the underlying timber framework. Such measures exemplify an advanced form of environmental adaptation, wherein construction techniques serve not merely utilitarian needs but also aesthetic and symbolic purposes.

The spatial organization of these houses further reinforces their adaptability. Flexible interior layouts, often incorporating semi-open or extendable spaces, allow for direct interaction with the outdoor environment while accommodating a range of domestic, economic, and social functions. This architectural permeability strengthens the reciprocal relationship between human habitation and the natural landscape—a hallmark of vernacular architectural sustainability.

Structurally, the evolution from Type A (as described previously) to Types B, C, and D demonstrates a progressive reduction in structural components. This trend is particularly evident in the transition from the architectural traditions of the intersection zone to those of the middle region, where fewer but more strategically arranged members optimize both material efficiency and resilience. Such structural economization likely represents a deliberate engineering choice, aimed at improving the building's aerodynamic profile and load-bearing efficiency under extreme storm conditions.

The divergences between Vietnamese and Cham domestic architecture are deeply rooted in fundamental differences in cultural, social, and religious frameworks. Cham society, shaped by matrilineal traditions, expresses its gendered cosmology architecturally—most notably through the symbolic prominence of the gable, representing the maternal principle and the reverence of women. In contrast, Vietnamese society, structured along patriarchal lines, places symbolic and spatial emphasis on the altar, representing male lineage and ancestor worship. This ideological divergence manifests in differing orientations of house entrances and spatial hierarchies, effectively reversing the symbolic roles of male and female domains within the built environment.

Socioeconomic stratification is equally embedded in material and typological variation. Among the wealthier or higher-ranking strata, timber construction predominated, enabling more durable and technically sophisticated designs. Conversely, middle- and lower-income households predominantly relied on bamboo—a material that, while abundant and inexpensive, imposed limitations on structural complexity and longevity. The typological progression from Type B through Type D further reflects class distinctions, with Type C marking a critical transitional stage in which timber entirely supplants bamboo. This material substitution was accompanied by a corresponding refinement in carpentry techniques, enabled by the development of more precise design instruments and construction methodologies.

From a technological history perspective, Type C's emergence signifies more than a shift in building material—it represents a pivotal moment of vernacular architectural innovation, where indigenous design knowledge and tool-based precision converged to create a higher-order architectural form. It is perhaps for this reason that Type C served as the foundation for subsequent

adaptations into elite architectural expressions, as will be examined in the following chapter.

6.2 The used-spatial habitation

In the vernacular architecture of Middle Region of Vietnam, notable variations emerge between house Types A, B, C, and D, particularly in the arrangement and symbolic meaning of compartments and entrances. For Types A and Type C, the number of compartments is consistently odd, with the central compartment dedicated to ancestral worship and positioned directly opposite the main entrance. This spatial arrangement reflects the patriarchal orientation of Vietnamese society, in which the worship of ancestors occupies a central role in domestic life and is integrated into the everyday living space.

By contrast, Types B and Type D exhibit a more variable number of compartments—either odd or even (see Table 1)—and their entrance orientation evolves over time. Early examples of Type B often feature gable-end entrances, a spatial form more closely associated with Cham tradition. Later iterations of Type B, as well as Type D, shift toward an entrance aligned with the altar compartment, even when the altar itself is absent. This transitional ambiguity in spatial configuration suggests a period of experimentation or hybridization in which local builders adapted forms from both Cham and Vietnamese traditions, potentially leading to inconsistencies and localized variations in layout.

(1) Spatial Utilization and Cultural Symbolism

A comparative analysis of these layouts reveals deliberate cultural distinctions. In houses with an odd number of compartments and an altar-facing entrance, the arrangement conforms to Vietnamese patriarchal values, where the domestic space is designed to reinforce the centrality of ancestral veneration. Conversely, in dwellings with only one or two compartments and a gable-end entrance—particularly in Cham settlements—the absence of an altar aligns with matrilineal traditions. In Cham culture, reverence for the divine feminine, embodied in the Lady Goddess (e.g., Po Nagar) (Tran, 2001, p. 465), does not require domestic ancestor worship. Instead, religious practices are communal, taking place at temples or towers within the settlement.

This contrast underscores a deeper divergence in spatial philosophy: Vietnamese domestic architecture integrates ritual into the private sphere, while

Cham architecture externalizes it into public or community space. Such differences are not merely functional but are rooted in fundamentally different conceptions of family, gender, and the sacred.

(2) Historical and Regional Continuities in the Gable Entrance Tradition

From a broader historical perspective, gable-end entrances have a long and geographically diverse presence in early religious and residential structures across East and Southeast Asia. Archaeological and historical records show that shrines, temples, monasteries, and pagodas—whether in China, Japan, or mainland Southeast Asia—frequently employed gable entrances in their earliest forms (see Figures 102-109). In the Japanese context, this arrangement is known as *tsuma-iri* (妻入), literally “wife entrance” or “entrance of the woman,” a linguistic trace of gendered spatial symbolism that parallels the Cham association between the gable and feminine divinity.

A notable transformation can be observed in Japanese Shinto shrines, where the gable entrance evolved into a front-facing main roof entrance extending to the ridge beam, while still preserving the symbolic essence of the gable through architectural ornamentation at the front lobby (see Figure 103). Such adaptations indicate that while the physical form of the entrance may change, its symbolic value persists—a phenomenon mirrored in the transition from Type B gable entrances to the main roof entrances in Types D and Type C in the Middle Region of Vietnam.



Figure 102: The “Kumano Hongu Taisha” Shrine, Wakayama prefecture, Japan (1889)
(Source: Author)



Figure 103: The “Osu Kannon” pagoda, Nagoya City, Aichi prefecture, Japan (re-located 1612).
(Source: Author)



Figure 104: The “Giac Luong” pagoda, Thua Thien Hue province, Vietnam (1533s)

(Source: Author)



Figure 105: The Shine of Duong No Dinh Vietnam communal hall, Thua Thien Hue province, Vietnam (1471)

(Source: Author)



Figure 106: The “Xieng Thong” pagoda, Luang Prabang, Laos (constructed 1560.)

(Source: Author)



Figure 107: The “Wat Phatum Wanaram” pagoda of the Grand Palace, Thailand (constructed 1857)

(Source: Author)



Figure 108: The “Ba Penh” pagoda, Phnom Penh, Cambodia (1373)

(Source: Author)

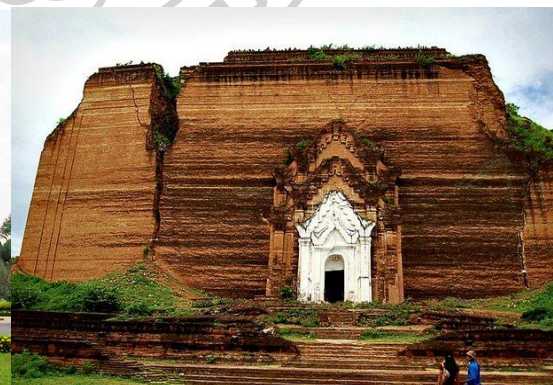


Figure 109: The “Mingun Pahtodawgyi” monastery, Mandalay, Myanmar (1790s)

(Source: Author)

(3) Underlying Religious and Mythological Associations

The recurrence of gable-end entrances across cultures may point to an ancient architectural archetype associated with divine or protective symbolism.

Vietnamese legend attributes the origins of house construction to the Lady Goddess *Cử Thiên Huyền Nữ*, who is said to have taught humanity the principles of building. (Tran, 2001, pp. 425-426) In Cham belief systems, analogous figures include *Po Ina Nugar Humu Aram* (Mother of the Forest), *Po Ina Nugar Humu Cavat* (Mother of Birds), and *Po Nagar* (Mother Goddess of the Cham people). Across Southeast Asia, agricultural societies often incorporate similar maternal archetypes into their cosmology, suggesting a shared cultural substrate that predates later religious differentiation.

(4) Architectural Transformation as an Index of Acculturation

The gradual shift from gable-end entrances in Type B to main roof entrances in types D and C can thus be read as an early stage of architectural acculturation. This process not only altered the orientation and symbolism of entrances but also redefined the relationship between domestic space, ritual practice, and cultural identity. As construction techniques evolved—coupled with the increasing availability of wooden materials and advanced carpentry tools—the house became not only a shelter but also a vessel for expressing hybridized cultural values. This transformation, while technological in execution, is fundamentally socio-cultural in meaning, representing a layered negotiation between Cham matrilineal traditions and Vietnamese patriarchal norms.

6.3 Carpenter's tools and Design method

The Vietnamese carpenters in the northern region traditionally employed the *Thuoc Sam*—a square-shaped measuring and design tool. The use of this instrument inherently dictated that the roof angle in northern Vietnamese vernacular architecture (as represented by Type A) be determined through the proportional relationships of three base-triangle units: the vertical span (*Khoang Dung*, *b*), the horizontal span (*Khoang Ngang*, *a*), and the flow span (*Khoang Chay*, *c*). This triangular proportional system results in a roof slope that does not run parallel to the slope of the diagonal beam. Such a design method closely parallels those found in the vernacular architecture of Southern China and Japan, suggesting a possible shared or transmitted carpentry tradition within East Asian timber-framing cultures. Notably, this approach offers a degree of flexibility, as the roof slope can be locally adjusted at each *Khoang Chay* (flow span) of the purlins by modifying the dimension of

Khoang Dung (b), thereby allowing variations in the curvature and visual deflection of the roofline.

By contrast, carpenters in Middle Region of Vietnam predominantly utilized the *Thuoc Nach*, an equilateral triangle-shaped design tool. This instrument, in turn, derives from the *Thuoc Nac* traditionally used by Cham carpenters. Its geometric basis in the equilateral triangle leads to a fundamentally different roof design principle: the slope is determined entirely from the outset and remains parallel to the diagonal beam across all purlin spans. Consequently, the method applied in the Middle Region (Types B, C, and D) does not permit localized adjustments to the roof curvature after initial layout. Instead, the roof form is predetermined as part of an integrated design process—reflecting a more rigid but also more geometrically unified construction approach.

In the northern system (Type A), the discrepancy between the roof slope and the diagonal beam slope is resolved through the insertion of a locally adjusted timber element known as “*Banh Dong*”. This fills the spatial gap between the purlins and the curve-shaped diagonal beam, or *Ke-Bay*. The inclusion of such adaptive joinery reflects a tradition of on-site modification, where structural geometry could be fine-tuned during assembly to accommodate specific environmental or aesthetic needs. By contrast, in the Middle Region system (Types B, C, and D), such adjustments are unnecessary because the roof slope and diagonal beam slope are inherently parallel, a direct outcome of the equilateral triangle principle.

The differences between these two design methods—both in measuring tools and geometric logic—are not merely technical variations. They point toward distinct cultural and technological origins, suggesting differential pathways of knowledge transmission and adaptation. The square-based proportional system of the northern region may represent an architectural legacy influenced by northern East Asian building traditions, while the equilateral triangle system of the middle region, inherited from Cham practices, aligns more closely with South and Southeast Asian geometric conceptions of roof form.

This divergence in design methodology can thus be interpreted as a second manifestation of architectural acculturation, wherein shifts in tools and geometric principles signal deeper cultural interactions and transformations.

Such changes reflect the complex process through which vernacular architecture evolves—not simply as a response to environmental demands, but also as an outcome of sustained contact, assimilation, and selective adaptation of external construction knowledge into local building traditions.

6.4 Constructional technique

Type B vernacular houses, locally referred to as employing the “*Keo*” truss system, are characterized by a longitudinal orientation of the trusses and the presence of a single, large central column. By contrast, both Type C and Type D structures incorporate two large central columns within each truss. Despite these variations, all three types share a consistent structural logic: each truss comprises vertical columns, substantial horizontal beams, and straight-shaped diagonal beams aligned with the roof slope, thereby defining the roof angle. These elements are reinforced by tie beams at the column neck and head tie beams at the column tops in the latitudinal direction.

The presence of straight-shaped diagonal beams across Types B, C, and D—despite their differences in column arrangement—strongly suggests a shared structural ancestry. Type B’s single central column may represent an earlier phase of development, whereas the adoption of double central columns in Types C and D could indicate later technical refinements or the influence of other regional traditions.

From an environmental and symbolic perspective, the roof forms of these types reveal adaptive strategies. Both the original Type B and Type D employed double-roofed layers, a configuration that enhances thermal performance and resilience to the region’s heavy rainfall. In contrast, Type C often features multi-roofed layers, which not only provide environmental benefits but also embody Feng-Shui principles—most notably through the integration of a green tree fence and a water tank positioned in front of the house to regulate microclimate and symbolically balance the elements. These environmental, spiritual, and aesthetic considerations, combined with the use of rustic, locally sourced materials, contribute to a distinctive architectural identity that is largely absent in the vernacular traditions of northern Vietnam. This represents the third significant manifestation of acculturation—a transformation rooted in the evolution of construction techniques.

Roofing techniques provide further insight into these acculturative processes. In Type C architecture, two principal roofing methods have been

documented. The first employs a single layer of *Ngoi Am-Duong* (Yin and Yang) interlocking tiles placed directly on rafters, a technique that is also prevalent in Hoi An Ancient Town. The second method, found primarily in the Hue area, features multiple layers of roof tiles reinforced with clay. This latter approach is distinctive to the Middle Region and likely derives from the original Type B, reflecting a localized adaptation in response to climatic demands and available materials.

When compared to northern Vietnamese vernacular architecture, the first roofing method of Type C exhibits notable technical parallels, particularly with the traditions of southern China and historical Hoi An. This is unsurprising given Hoi An's historical role as a major international trading port of the Kingdom of Cochin-China in the 16th–17th centuries, during which significant settlement occurred by both Japanese and southern Chinese immigrants. The similarities in tile placement directly on rafters suggest technical cross-pollination between Vietnamese, Chinese, and Japanese building practices.

Conversely, the second roofing method of Type C—characterized by clay reinforcement—is structurally and materially distinct from the roofing practices of Type A in the north. Its technical logic and material composition indicate stronger affinities with Cham construction traditions, particularly given the Chams' long-standing mastery in combining earthen materials with timber structures. This divergence underscores a branch of acculturation that occurred not along the north–south axis of Vietnam, but rather through sustained cultural and technical exchange between the Vietnamese of the Middle Region and the Cham people.

Taken together, the truss arrangements, roof configurations, and tiling methods of Types B, C, and D reflect a layered history of technical innovation, environmental adaptation, and intercultural influence. These architectural features embody the cumulative effects of acculturation—first through tool adoption and design principles, then through structural system refinements, and finally through roofing techniques that merge functional performance with symbolic meaning.

6.5 Architectural scale and aesthetic

From the perspective of architectural aesthetics, notable distinctions can be observed among the three typologies. Types B and D are generally smaller in scale than Type C and often reveal slight irregularities or deformities in their

overall form—particularly attributable to the use of double-roofed layers, which, while functionally advantageous for climate adaptation, tend to produce less geometrical precision and formal harmony. Type C, by contrast, exhibits greater scale, proportion, and regularity, qualities that collectively convey a sense of grandeur and refinement.

When examined in the broader framework of the three previously discussed bases—structural evolution, environmental adaptation, and roofing innovation—it becomes evident that these typologies also reflect an aesthetic trajectory that parallels technological advancement. Architectural history, both in Vietnam and elsewhere, often progresses from simplicity to complexity, from rustic pragmatism to sophisticated expression. Within this sequence, Type B represents the most basic stage, with a straightforward truss configuration and modest decorative treatment. Type D demonstrates a transitional phase, in which structural refinement is accompanied by a more coherent visual composition, yet still retains traces of rusticity. Type C, with its carefully articulated multi-roof layers, proportional balance, and ornamental integration, epitomizes the most advanced stage of this developmental arc.

The visual impression of Type C houses—characterized by their symmetry, proportion, and deliberate interplay between functional and decorative elements—suggests that they were conceived not solely as shelters or climate-responsive structures, but as deliberate aesthetic statements. The increased scale, combined with harmonious roof layering, ornamental detail, and Feng-Shui-informed landscaping, reflects an intentional pursuit of architectural beauty and social prestige. This shift implies a gradual transformation in vernacular architecture from a purely functional craft to a medium for cultural representation, social distinction, and symbolic communication.

This process can be understood as the fourth manifestation of acculturation—the aestheticization of vernacular architecture—where external influences, technological capabilities, and local cultural values converge to refine form, proportion, and ornamentation. Here, aesthetic sophistication becomes both the product and the marker of cultural interaction, representing not merely a stylistic evolution, but a redefinition of architectural identity in the middle region.

6.6 Chronology

The chronological framework of this study spans from the 16th to the 18th centuries, corresponding to the territorial and cultural landscape of the Kingdom of Cochin-China. While the earlier case studies of northern Vietnamese vernacular houses extend from the mid-16th century through the first half of the 20th century, it is crucial to recognize that the physical age of surviving structures often belies the much older provenance of their construction technologies. Many vernacular houses listed in Table 1, though erected within the last two centuries, were built using techniques whose origins extend far earlier—suggesting a pattern of technological regeneration, preservation, and continuity that likely dates back to at least the early Cochin-China period.

Within the Middle Region of Vietnam, the absence of Type A vernacular houses—a form common in the northern region—points to a distinctive architectural trajectory. Only Types B, C, and D have been documented in this region. Among these, Type B occurs in both the north-middle and south-middle zones, yet it is generally modest in scale, architecturally simple, and functionally limited for residential use. In contrast, the sudden appearance of Types C and D within the Middle Region is noteworthy: there are no direct precedents for these forms in other regions of Vietnam, nor are comparable configurations found elsewhere in Southeast Asia. This abrupt emergence raises important questions about the mechanisms of architectural innovation and cultural exchange, particularly given that wooden vernacular architecture in this region relies on passive design strategies and manual construction methods deeply embedded in local tradition.

The problem of chronology is compounded by the nature of vernacular building culture: while the construction date of a specific house may be ascertainable, the underlying architectural principles and craftsmanship are often inherited across multiple generations. Such technologies, once embedded in community knowledge, can persist for centuries, outlasting any single structure and creating a continuum in which form and method are transmitted with incremental adaptation rather than sudden reinvention.

A closer comparative analysis of structural characteristics reveals a sequential relationship between these typologies. Type B, while structurally distinct from Type A, displays notable affinities with Types C and D in truss

configuration. Type D, in turn, shares features with both Type B and Type C—mirroring Type B in roofing technique and Type C in compartmental arrangement. This dual affiliation positions Type D as a probable transitional form, bridging the simplicity of Type B with the complexity and refinement of Type C. In light of this, a plausible chronological order emerges: Type B precedes Type D, which in turn predates Type C.

This proposed sequence adds a temporal dimension to the acculturation framework established in the previous four bases, situating architectural transformation within a phased process of adaptation. Rather than a sudden leap from simplicity to sophistication, the evidence points to an intermediate stage in which local builders selectively integrated structural, spatial, and technical innovations, resulting in a layered evolution of form. Such a model underscores the interplay of continuity and change in vernacular architecture, where the persistence of traditional methods coexists with gradual but significant innovations shaped by environmental, cultural, and cross-regional influences.

6.7 Chapter conclusion 6

Drawing on the six analytical bases presented above, it can be concluded that the surviving vernacular houses of Vietnam's Middle Region exhibit distinct regional characteristics that cannot be fully explained by direct transmission from the north. Typological evidence suggests that Types C and D were developed through a process of adaptive refinement: their spatial configurations evolved from the habitation patterns of Type A, while their construction techniques derived, at least in part, from Type B. This synthesis of spatial planning and structural adaptation reflects a deliberate, selective process of cultural and technological borrowing.

Among the identified typologies, Type B appears to be the oldest surviving form in the middle region. Its structural simplicity, reduced scale, and functional constraints do not diminish its historical value; rather, they indicate its role as a technological and cultural bridge. The origins of Type B can plausibly be associated with the indigenous Cham people and/or other ancient Southeast Asian groups inhabiting the region before the large-scale Vietnamese migrations. Architecturally, Type B expresses a dualistic mentality—one that accommodates both pragmatic and symbolic needs—deeply rooted in a matrilineal worldview. This stands in contrast to the monistic architectural

ideology of the Vietnamese, whose social and built environments were shaped under the influence of Chinese patriarchal traditions during the millennium of northern domination.

In this light, it is reasonable to infer that Vietnamese settlers in the Middle Region consciously adopted key elements of Cham construction knowledge, particularly those embodied in Type B. Through a process of gradual adaptation, Type B evolved into Type D—an intermediate form—and subsequently into Type C, which exhibits greater spatial complexity and architectural refinement. These newly developed house types fulfilled both residential and ceremonial functions while responding to the specific climatic, environmental, and social conditions of the middle region.

This process of architectural transformation unfolded within a broader historical context. From the 16th to the 18th centuries, the territory of present-day Vietnam was politically divided into two kingdoms: Tonkin in the north and Cochin-China in the center-south. Although both realms were governed by Vietnamese elites, their cultural orientations diverged. Tonkin, situated in the northern region, remained within the sphere of East Asian civilization, heavily influenced by Chinese governance, social structure, and architectural principles. Cochin-China, by contrast, encompassed the former territories of the Cham kingdom and retained strong links to Southeast Asian cultural patterns.

This geopolitical division had significant implications for architectural development. The Middle Region became a zone of cultural convergence, where the conservative traditions and building techniques brought by northern migrants encountered and intermingled with the established Cham construction heritage. Over a span of two to three centuries, this interaction produced a hybrid vernacular architecture that embodied both East Asian and Southeast Asian influences.

In this context, Types C and D stand as architectural artifacts of cultural negotiation and synthesis. They are not merely functional dwellings but tangible evidence of a deep process of acculturation—one that blended imported construction logic with indigenous structural ingenuity. This hybridization process illustrates a broader historical phenomenon: the way architecture operates as a repository of cultural memory, embodying and materializing shifts in identity, worldview, and social organization.

Thus, the study of these vernacular forms extends beyond typological classification; it offers critical insights into the historical dynamics of cultural contact, adaptation, and integration. By tracing the evolution from Type B through Type D to Type C, we gain a clearer understanding of how Vietnamese settlers in the Middle Region navigated the intersection of two great cultural spheres—East Asia and Southeast Asia—producing an architectural legacy that is regionally distinct, historically layered, and deeply symbolic of Vietnam’s plural cultural heritage.



Chapter Seven

Discussion on the Acculturation in the Vernacular Houses

This chapter synthesizes the findings from previous analyses to discuss the process and stages of acculturation in the vernacular houses of Vietnam's Central Region. It identifies three main phases—Exchange and Symbiosis, Early Hybrid, and Mature Acculturation—each representing a distinct level of cultural and architectural integration between Vietnamese and Cham traditions. By tracing these progressive transformations, the chapter clarifies how cultural interaction gradually shaped the regional architectural identity and contributed to the formation of a unique vernacular house typology.

7.1 The Stage of Exchange and Symbiosis

Drawing on the aforementioned considerations, the process of acculturation in the vernacular architecture of the Kingdom of Cochin-China between the 16th and 18th centuries can be more fully understood within the historical, socio-cultural, and technological context of the period.

From 1558 onward, a substantial number of Vietnamese from the northern and north-central "intersection zone"—notably Thanh Hoa, Nghe An, and Ha Tinh Provinces followed Lord *Nguyen Hoang* to settle in the prefecture of Thuan Hoa. This territory encompassed present-day Quang Binh, Quang Tri, and Thua Thien Hue Provinces, later expanding further southward to Quang Nam, Quang Ngai, Binh Dinh, Phu Yen, Khanh Hoa, Ninh Thuan, and Binh Thuan Provinces. These areas, historically belonging to the Champa Kingdom, formed the geographic foundation of the newly consolidated polity of *Dang Trong* (Cochin-China), distinguished from *Dang Ngoai* (Tonkin) in the north. Under *Nguyen* rule, distinct administrative institutions, social customs, attire, and architectural forms emerged, fostering a sense of political autonomy and cultural identity among Vietnamese settlers in the region.

The two principal communities that co-inhabited the middle region—the Vietnamese migrants and the indigenous Chams—possessed markedly different socio-economic strengths and cultural traditions. The Vietnamese brought with them advanced wet-rice cultivation techniques honed over centuries in the Red river delta and its peripheries, while the Chams specialized in maritime trade, fishing, aquaculture, and highly developed craft

industries.(Li, 1998, pp. 139-152). Despite these complementary skill sets, historical evidence suggests that relations between the two groups were often fraught, characterized by territorial disputes, armed conflict, and tensions rooted in divergent languages, religions, and belief systems. Yet, the political realities of the time compelled coexistence. This pragmatic cohabitation created opportunities for mutual observation, limited cultural exchange, and the gradual sharing of technical knowledge—an interplay that found concrete expression in the built environment, including vernacular housing.

The initial stage of cohabitation—which may be broadly dated from the late 16th to the early 17th century, following *Nguyen Hoang's* pacification of *Thuan Hoa*—was likely defined by cautious interaction. During this period, the Vietnamese settlers appear to have maintained much of their northern-derived cultural identity and construction habits, while engaging in selective exchanges with the Chams. These exchanges likely centered on practical matters: adapting agricultural techniques to local soil and climate conditions, developing strategies for coping with natural disasters, and managing the unique challenges posed by the central region's harsh seasonal rhythms of drought and flooding.

From an architectural-technical standpoint, it is important to recognize that construction methods—especially those relying on traditional timber joinery, hand-hewn materials, and environmentally responsive forms—evolve incrementally over generations rather than emerging fully formed. This reality increases the plausibility that the Vietnamese migrants, in their early decades in the middle region, drew upon the construction expertise of the Chams. The Type B vernacular house, still found in vestigial form in certain Cham-influenced areas, may well have been the most readily adaptable model at that stage, providing both a structural and symbolic bridge between the two cultures.

It is precisely the stark differences in social structure—matrilineal traditions among the Chams versus the Confucian-patriarchal order of the Vietnamese—that made this architectural exchange so transformative. Rather than leading to the wholesale adoption of Cham building forms, these differences provided fertile ground for hybridization, as the Vietnamese selectively integrated Cham construction techniques into their own spatial and symbolic frameworks. Over time, this dynamic of cautious borrowing,

adaptation, and reinterpretation set the stage for the emergence of new vernacular house types (notably Types D and C)—products of a gradual acculturation process that would shape the architectural landscape of the Middle Region for centuries to come (see Figures 110, 111).

7.2 The Early hybrid stage of acculturation

Enduring the harsh climatic conditions of the Middle Region of Vietnamese region and navigating the challenges of intergenerational inheritance, the middle region–Vietnamese emigrants were compelled to adapt architectural knowledge acquired from the indigenous Chams to suit their own socio-cultural and environmental realities. Such adaptations, however, were implemented within the sphere of vernacular practice, largely independent from the formal political or symbolic interventions of the ruling elite. This autonomy in architectural evolution enabled communities to reconfigure existing construction methods into forms better suited to their functional needs, material availability, and environmental constraints.

It is highly plausible that the earliest architectural manifestation of this adaptive process was the emergence of Type D, which appears to have been the preferred model among the general populace in the early phase of acculturation, likely dating to the early 17th century. Structurally, Type D represents a deliberate synthesis: it appropriates the spatial floor plan of Type A—with its organization shaped by long-standing northern Vietnamese traditions—while incorporating the truss system and characteristic double-roof layering of Type B, a distinctly Cham-derived feature. This hybridization initially produced a form that may have appeared unconventional to contemporary observers, marking it as an innovative but transitional type in the broader vernacular continuum.

Following this initial stage, early Type C emerged as a more refined creation, appearing slightly later than Type D. The shift from a single large central column in the truss system of Type B to paired central columns in types C and D reflects a significant departure in structural logic, possibly motivated by both spatial considerations and symbolic preferences. Equally important was the increasing flexibility in the number of compartments, which in its early stages allowed for both even and odd configurations but eventually became constrained by ritual and geomantic principles that favored odd numbers. The introduction of clay roofing not only enhanced fire resistance—a major concern

in timber-rich settlements—but also improved thermal regulation, mitigating the intense solar radiation characteristic of the region (see Figures 109, 110).

Although much of the indigenous Cham construction repertoire was eventually subsumed within a new vernacular framework, certain elements persisted as tangible reminders of earlier influences. These include the Thuoc Nac carpenter's tool, the “Keo” straight-shaped diagonal beam, and the double-roof layering technique—features that remain evident in surviving Middle Region vernacular houses and that serve as silent witnesses to a complex history of cultural and technical exchange.

From a broader perspective, this architectural evolution demonstrates the dual strategy of the middle region–Vietnamese emigrants: they retained core cultural and structural traditions inherited from their ancestral homeland while selectively incorporating techniques of proven efficacy from the indigenous Chams. This selective acculturation process underscores their adaptive pragmatism, allowing them to both safeguard a distinct Vietnamese identity and enhance the habitability of their dwellings in a new and challenging environment. Crucially, this synthesis contributed to the emergence of a regional architectural idiom that remains distinct from the northern Vietnamese tradition, both in historical development and in its enduring physical form.

The case of types D and C thus provides a concrete example of how vernacular architecture serves as a living record of cultural negotiation, where form, technique, and symbolism are shaped not by unilateral influence but by a dynamic interplay between different cultural traditions mediated by environmental and social necessity.

7.3 The Later mature stage of acculturation

Although the middle region–Vietnamese emigrants of the early modern period remained under the influence of the political and cultural orientation of the Cochinchina feudal government, they were compelled to maintain their cultural heritage and social customs as a means of affirming their ethnic identity and differentiating themselves from the indigenous Chams. Nevertheless, the demonstrable superiority of Cham construction techniques—particularly their climatic adaptability and architectural pragmatism—gradually encouraged a selective acceptance of indigenous innovations. This process was not one of passive adoption, but rather of critical assimilation, whereby only

those elements that complemented Vietnamese socio-cultural frameworks and environmental needs were incorporated.

In this context, Type D emerged as the dominant form in the central and south-central regions, while Type C—in both its early and later variants—was more prevalent in the north-central and central-middle regions. Its prominence was particularly notable in and around the city of Hue, the site of *Kim Long* (金龍), the capital of the Kingdom of Cochin-China between 1636 and 1687 (Le, 1972, pp. 145-147). The spatial and technical refinement evident in the early Type C suggests that it may have been favored as a residential form for the higher social strata within the capital. Over time, incremental modifications to its structural configuration and ornamental detail resulted in the later Type C, an evolution that reflects the shifting functional demands and aesthetic aspirations of an increasingly stratified urban society (see Figures 110, 111).

The availability of skilled carpenter and artisan guilds played a decisive role in this transformation. Their expertise not only ensured the structural reliability and craftsmanship of new building types but also enabled the rapid dissemination of improved techniques throughout the region. In this regard, these artisans acted as custodians and transmitters of hybridized architectural knowledge, blending Vietnamese, Cham, and, in later periods, imperial stylistic conventions. The same construction principles evident in Type C can be discerned in the *Đình* communal halls of the middle region—an architectural form absent from Cham villages—as well as in the imperial palaces of the Cochin-China kingdom. This structural continuity suggests that these diverse building types share a common technical lineage arising from the acculturation between Vietnamese emigrants and the Chams, thereby producing a distinct regional style that contrasted sharply with the contemporaneous architecture of the Tonkin kingdom.

From a technical perspective, the elevation of these buildings expresses the aesthetic aspirations and symbolic messaging of the architecture, whereas the longitudinal cross-section reveals the underlying structural logic and construction methods. Remarkably, the longitudinal cross-sections of the early Type C, later Type C, the *Dinh* communal halls, and the imperial architecture of the Nguyen Dynasty (1802–1945) in Hue are strikingly similar. This structural consistency underscores the adaptability of the Type C model as a versatile architectural protoType Capable of supporting multiple functions—

residential, civic, and ceremonial—across different periods and socio-political contexts.

At the later stage of acculturation, the middle region–Vietnamese emigrants demonstrated a deliberate strategy of selective preservation: retaining the most effective Cham construction techniques, particularly those that could not be replaced within a short timeframe due to their proven environmental responsiveness or technical sophistication. The resulting architectural forms diverged significantly from the vernacular houses of northern Vietnam, while also bearing little resemblance to the indigenous Cham dwellings. This divergence illustrates a process of Vietnamization, whereby Cham-origin forms and techniques were reinterpreted within a Vietnamese cultural and symbolic framework, producing architectural types that were both regionally distinct and unmistakably Vietnamese in identity.

Ultimately, the architectural evolution of types C and D—together with related civic and imperial forms—provides a compelling case study of vernacular acculturation as a creative synthesis. Here, the middle region–Vietnamese emigrants neither wholly rejected nor uncritically absorbed the architectural heritage of the Chams. Instead, they reconfigured its technical origins into new typologies that remain culturally resonant and structurally relevant, preserving a distinct Vietnamese identity while embodying the pragmatic adaptability necessary for survival in a complex socio-environmental landscape.

7.4 Regarding the physical changes of the vernacular house since then to now

According to the studies of Pie Grounrou and Leo Caster (as mentioned in Chapter 2), traditional houses of this type continued to exist and remained popular until the early decades of the 20th century. During that period, repair and construction activities were thriving, providing these scholars with abundant opportunities to access and study this architectural form in depth.

However, from a historical perspective, by the late 19th century, Vietnam's economy under the Nguyen Dynasty (1802–1945) had begun to decline due to French invasion and exploitation. The country's financial resources were primarily directed toward military preparation and defense rather than architectural development. Furthermore, the introduction of new Western and locally produced materials—such as cement, concrete, and

patterned tiles—significantly transformed architectural tastes in general, and preferences for traditional housing in particular.

As traditional houses aged and became outdated within the social context of early 20th-century Vietnam, many people began to adopt new architectural styles and materials. Two main trends emerged: complete demolition and reconstruction, or renovation of existing structures. In renovation cases, the wooden frame was typically preserved, while the foundation was raised to prevent flooding, and the roof was re-covered with modern waterproof materials. Despite these structural and material changes, the spatial organization and domestic customs within the houses remained largely unchanged.

In the early 21st century, the buying, selling, and “migration” of the vernacular houses from Middle region of Vietnam to the South—where they were repurposed for luxury resorts, restaurants, and cafés—demonstrated both the functional and aesthetic value of this architectural form. However, this phenomenon also raises serious concerns about the displacement of architectural heritage from its original, organically connected natural environment. Such relocation results in irreversible losses of historical and cultural significance. Once a heritage structure is moved or destroyed, it can erase collective memory of its existence and diminish awareness of the historical, cultural, and technological values it embodies.

7.5 Chapter conclusion 7

The architectural evolution of vernacular house Types C and D in Middle Region of Vietnam offers a compelling lens through which to understand acculturation as a multifaceted and negotiated phenomenon—one that defies simplistic narratives of unidirectional influence or passive cultural absorption. Rather than a linear transmission of architectural forms and construction techniques, this process emerges as a complex sequence of adaptive engagements, shaped by the sustained interaction between Vietnamese migrants from the north-central “intersection zone” (Thanh Hoa, Nghe An, Ha Tinh) and the indigenous Cham communities of the former Champa territories.

This encounter unfolded in identifiable phases. The initial stage, defined by cautious coexistence in the late 16th and early 17th centuries, was marked by selective observation and pragmatic borrowing. As environmental and social realities demanded adaptive solutions, Vietnamese settlers incorporated proven

Cham construction practices—most notably the “Keo” straight diagonal beam, the double-roof layering system, and the use of specialized carpentry tools—while maintaining core spatial hierarchies and symbolic arrangements rooted in Confucian principles. Over time, this selective adoption gave way to a more deliberate reconfiguration of both inherited Vietnamese and acquired Cham architectural knowledge, producing regionally distinct idioms that were neither direct imitations nor mere composites of their sources.

The resultant hybrid forms embodied both pragmatic and symbolic imperatives. On the pragmatic side, Cham-derived techniques offered superior climatic responsiveness, structural efficiency, and material economy, making them well-suited to the region’s alternating extremes of monsoon rains and drought. On the symbolic side, the Vietnamese imposed their own cosmological and ritual frameworks upon these forms, ensuring that architectural adaptation did not compromise the cultural coherence of domestic, civic, or ceremonial space. This dual emphasis on environmental performance and cultural integrity is a hallmark of successful vernacular adaptation.

The persistence of a shared structural logic—observable from early and later Type C houses through to the *Dinh* communal halls and even the imperial architecture of the *Nguyen* Dynasty—attests to the enduring viability of these hybrid solutions. Such continuity underscores the central role of artisan guilds, whose technical expertise enabled not only the refinement and standardization of hybrid forms but also their diffusion across multiple building typologies. These artisans acted as both custodians of established knowledge and agents of innovation, facilitating a transference of techniques from the vernacular domain into monumental and state-sponsored architecture.

In the later stages of acculturation, this architectural synthesis matured into a distinct regional vernacular tradition. It remained unmistakably Vietnamese in identity yet differentiated from the contemporaneous architecture of both Tonkin to the north and the Cham heartlands to the south. This divergence was not accidental but the product of a deliberate strategy of selective preservation and reinterpretation—what might be termed a process of Vietnamization—through which Cham-origin features were reframed within

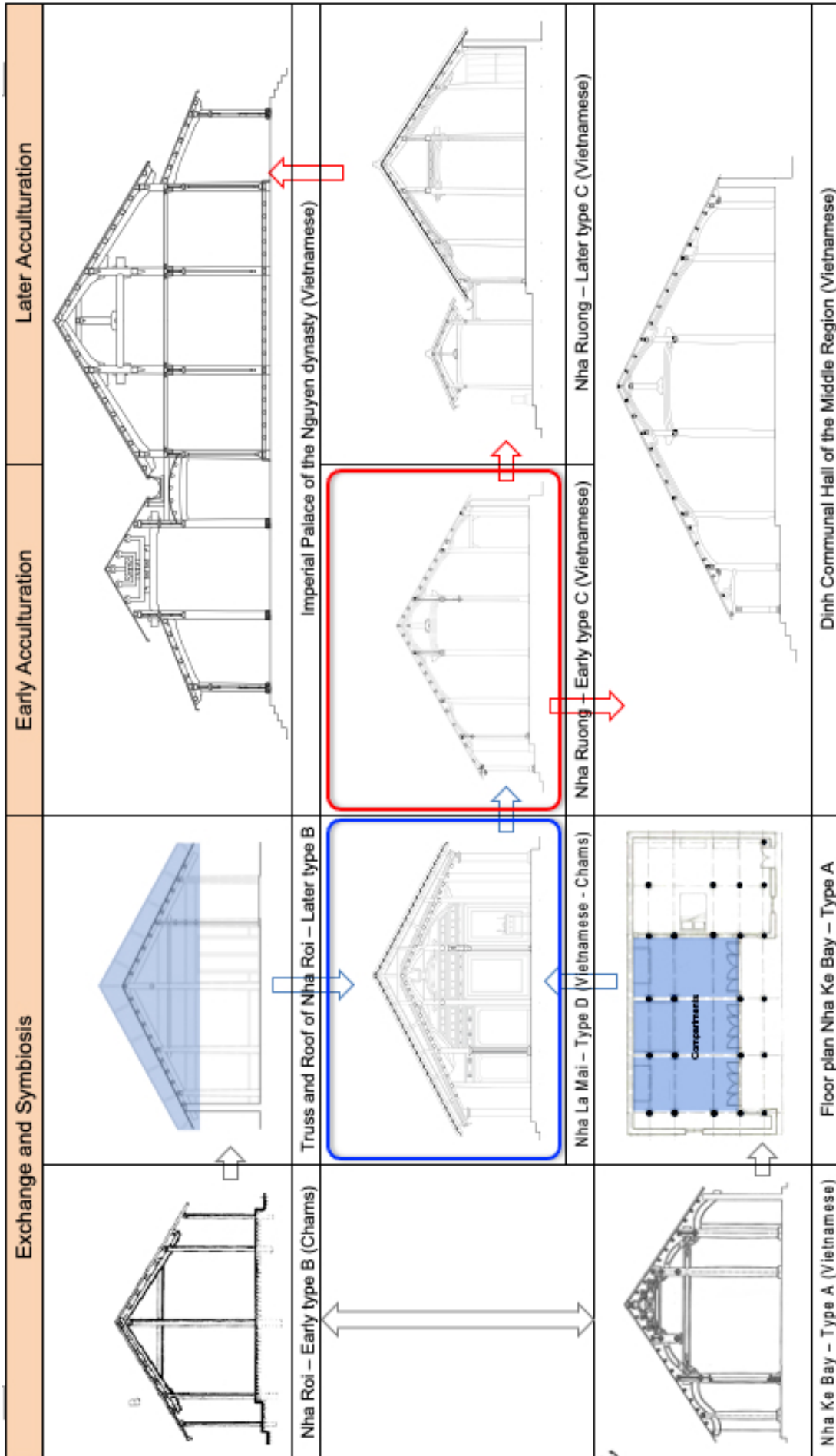


Figure 110: Diagramming of the Acculturation Process in the Middle Region of mnam.

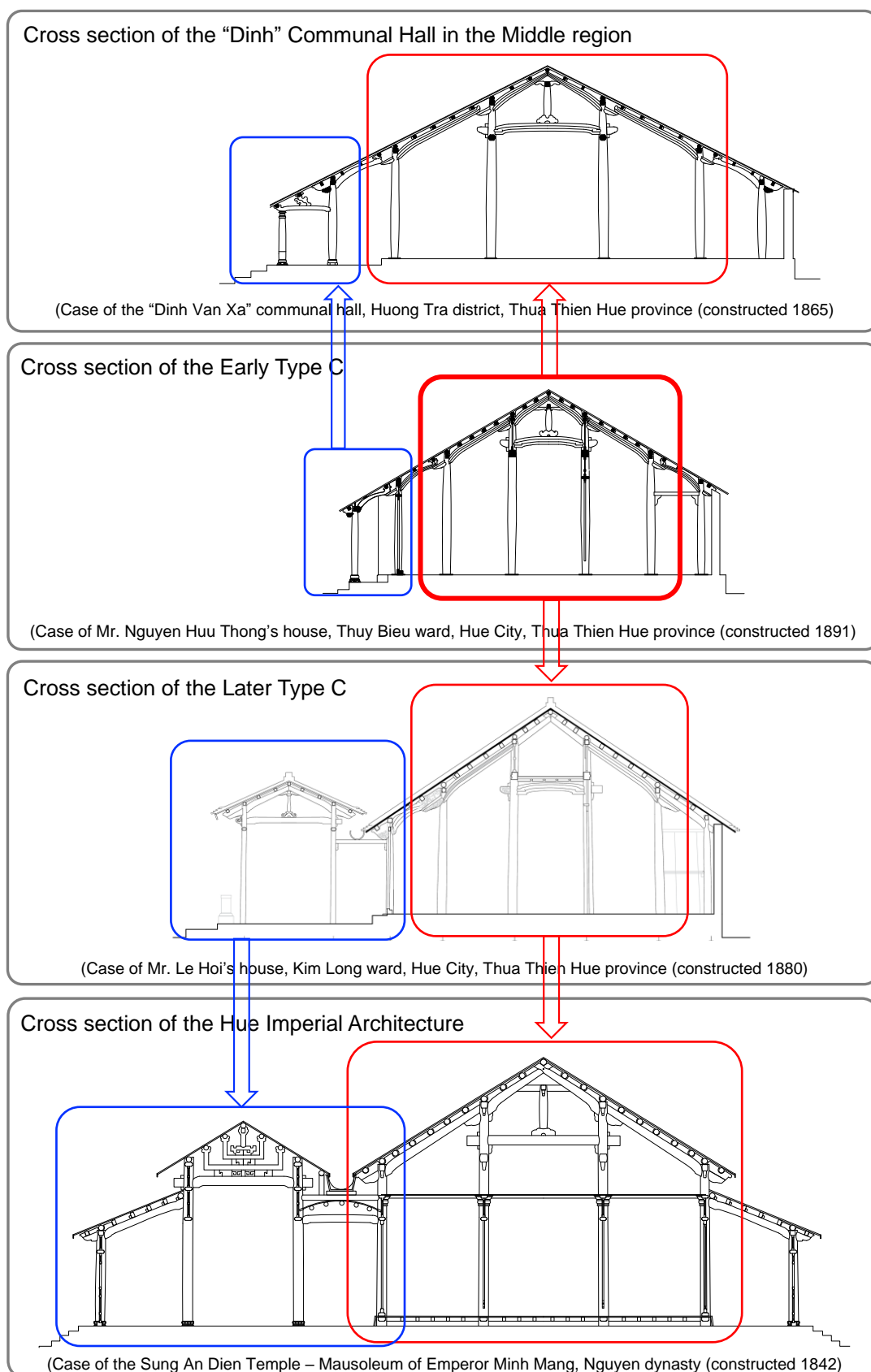
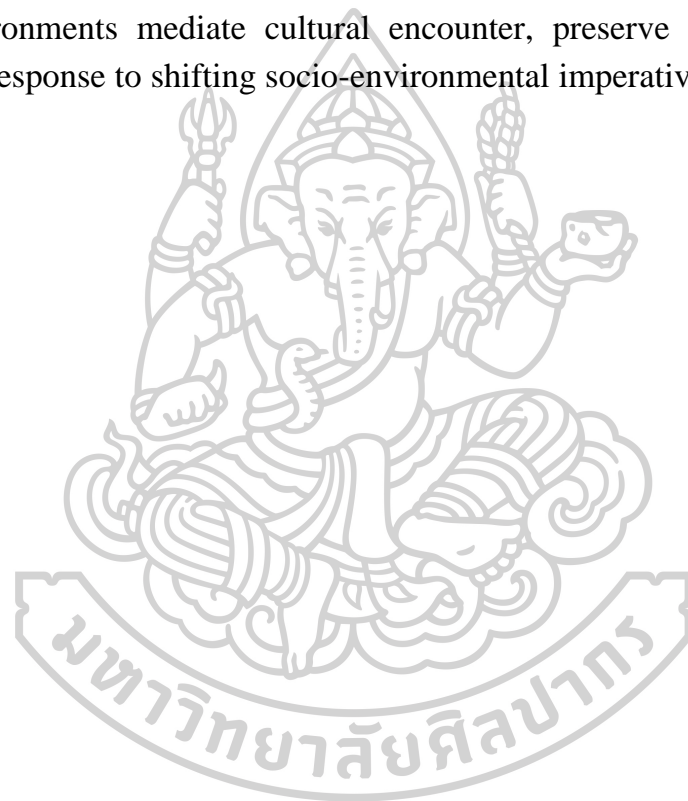


Figure 111: The similarity in the feature of the trusses among types of architecture.

From a broader perspective, the case of types C and D demonstrates how vernacular architecture functions as a living record of cultural negotiation. The built environment becomes both an archive and a medium: it stores the technical memory of intercultural exchange while simultaneously embodying adaptive strategies for environmental and social survival. The architectural landscape of the middle region, therefore, is not simply a static remnant of past interaction but a dynamic testament to resilience, hybridity, and innovation. In this light, the study of such forms contributes not only to the understanding of regional Vietnamese architectural history but also to broader discourses on how built environments mediate cultural encounter, preserve local identity, and evolve in response to shifting socio-environmental imperatives.



Chapter Eight

Conclusion and Future Directions

This chapter presents the key results and contributions of the study, highlighting the insights gained into the acculturation process and its impact on vernacular architecture in Vietnam's Middle Region. It summarizes the main findings, discusses the academic significance of the research, and evaluates its broader applicability for architectural conservation, heritage studies, and future research. By consolidating the study's outcomes, this chapter emphasizes the value of understanding cultural interaction in shaping traditional architectural forms.

8.1 Study results

The remaining three identified types of vernacular houses in the Middle Region of Vietnam—Type B, Type C, and Type D—serve as enduring architectural embodiments of the deep-rooted traditions, cultural values, and construction practices of the Vietnamese people. Despite the cultural and political complexities of their historical context, these house types demonstrate a remarkable continuity of form and function, reflecting the adaptability of vernacular architecture in the face of environmental, social, and technological change.

In essence, both the indigenous Chams and the Vietnamese share significant similarities in the utilization of locally available materials, as well as in their practices of sourcing, processing, and adapting these materials for architectural purposes. The shared tropical climate of the region, with its characteristic extremes of heat, humidity, and seasonal rainfall, has necessitated convergent approaches to mitigating environmental challenges—such as regulating interior temperatures, preventing structural degradation, and withstanding high winds or storms. This ecological parallelism, combined with geographic proximity, made cultural and technical exchange between the two communities inevitable.

The process of architectural acculturation between middle region–Vietnamese emigrants and the indigenous Chams unfolded between the 16th and 18th centuries, manifesting in progressive shifts in tool use, design methodologies, construction materials, building techniques, spatial

organization, and conceptual approaches to domestic life. This process may be conceptualized in three distinct yet interconnected stages:

The stage of Exchange and Symbiosis – This initial phase was characterized by the coexistence of two architectural traditions and the early adoption of certain Cham techniques into Vietnamese building practices. It is during this stage that the early and later variations of Type B appeared, reflecting both the Vietnamese structural framework and selective indigenous technical adaptations.

The Early hybrid stage of Acculturation – Marked by the creation of Type D, this period represents a more deliberate fusion of cultural and technical influences. The hybridization of floor plans, structural truss systems, and roofing methods suggests a growing confidence in integrating Cham-derived elements into a distinctly Vietnamese framework. The emergence of the early Type C, slightly later in this stage, reflects an architectural evolution towards greater refinement, spatial hierarchy, and possibly social stratification.

The Later mature stage of Acculturation – This final phase witnessed the maturation of these hybrid forms into the later Type C and other novel architectural variations. By this point, Cham construction techniques—particularly in roofing systems, carpentry tools, and beam configurations—had been selectively retained and indigenized, while Vietnamese architectural identity was firmly reasserted.

The architectural forms that persist today—most notably Type C and Type D—are thus products of a centuries-long process of cultural negotiation and adaptation. This phenomenon is neither unique to Vietnam nor confined to the Cham-Vietnamese relationship; it reflects a broader Southeast Asian pattern in which political change, migration, and intercultural contact act as catalysts for architectural innovation while reinforcing cultural distinctiveness.

Importantly, the study of these processes underscores the dual role of acculturation: it serves both as a vehicle for technological advancement and as a means of safeguarding cultural identity. In the case of the middle region, Vietnamese emigrants successfully preserved the core principles of their architectural heritage while selectively incorporating external elements that improved structural resilience, climatic adaptability, and spatial comfort. This selective assimilation ensured that the resulting architectural vocabulary remained recognizably Vietnamese, even when born of intercultural synthesis.

The historical experience of the Middle Region offers a broader lesson for contemporary architectural conservation and innovation: cultural exchange, when approached with discernment, can enrich a tradition without eroding its identity. Vietnam's architectural heritage thus stands as a testament to resilience, sustainability, and the enduring human capacity to integrate the new without abandoning the old—ultimately shaping a living tradition that continues to evolve in response to changing needs, environments, and social aspirations.

This study provides significant contributions to the field of architectural heritage conservation and vernacular architecture studies in Vietnam and Southeast Asia. By systematically examining the materials, construction techniques, and design principles of vernacular houses in the middle region—particularly Types B, C, and D—it advances our understanding of how intercultural interactions between Vietnamese emigrants and the indigenous Cham community shaped architectural adaptation from the 16th to 18th centuries.

8.2 Contribution of the study

Clarification of Acculturation Processes – The research effectively reconstructs the chronological sequence and technical pathways through which Vietnamese vernacular architecture integrated Cham influences. By framing these processes into three distinct stages—exchange and symbiosis, early acculturation, and later acculturation—the study offers a clear and structured model for interpreting cultural hybridization in architecture.

Preservation of Cultural Identity – The findings demonstrate that architectural acculturation in the Middle Region was not a passive adoption of foreign techniques but a selective and adaptive process. This distinction is crucial in understanding how communities preserve cultural identity while embracing technical improvements, offering an instructive precedent for modern heritage management.

Documentation of Endangered Knowledge – Through detailed description of indigenous construction methods—such as the use of clay roofing for thermal regulation and fire prevention, the “Keo” straight-shaped diagonal beam, and traditional carpentry tools—this study preserves technical knowledge that is increasingly at risk of disappearing due to modernization and urban expansion.

Interdisciplinary Relevance – The study’s integration of architectural history, ethnography, and climate-adaptive design principles ensures its relevance not only to historians and conservationists but also to architects, urban planners, and sustainability researchers seeking context-specific solutions.

Contribution to Comparative Southeast Asian Studies – By situating the Vietnamese–Cham acculturation process within the broader context of Southeast Asian cultural exchange, the study provides a comparative framework for analyzing similar phenomena across the region, thereby expanding its scholarly and practical utility.

Overall, the effectiveness of this research lies in its ability to bridge historical analysis with practical conservation strategies. It offers both a precise reconstruction of past architectural evolution and actionable insights for safeguarding vernacular heritage in the face of environmental challenges and socio-cultural change. In doing so, the study reinforces the value of historically grounded, culturally sensitive approaches to architectural preservation and innovation.

8.3 Academic significance of the study

The findings of this study yield important academic implications for the fields of vernacular architecture, cultural heritage conservation, and Southeast Asian studies. By documenting and analyzing the intercultural processes that shaped vernacular houses in Middle Region of Vietnam between the 16th and 18th centuries, the research advances both theoretical understanding and methodological approaches to architectural heritage.

First, the study demonstrates that vernacular houses are not static products of tradition but dynamic outcomes of cultural negotiation. The identification of house Types B, C, and D as products of intercultural interaction between Vietnamese emigrants and the indigenous Cham population provides compelling evidence of acculturation as a formative architectural process. These results highlight how domestic architecture functions simultaneously as a repository of cultural memory and as a medium for technical innovation, thereby offering a lens through which scholars can interrogate the broader relationship between architecture, identity, and adaptation.

Second, the research contributes to the discourse on cultural hybridity and authenticity. The analysis reveals that while Vietnamese communities selectively adopted Cham techniques—particularly in roofing systems, carpentry methods, and spatial configurations—they preserved the fundamental principles of Vietnamese vernacular architecture. This selective assimilation underscores the capacity of architectural traditions to evolve while maintaining recognizable cultural identities. Such findings challenge simplistic notions of cultural “purity” and instead emphasize hybridity as a legitimate and even necessary dimension of architectural continuity.

Third, the study provides methodological insights for future scholarship. Through its systematic examination of construction techniques, material practices, and spatial organization, the research establishes an analytical framework that can be applied comparatively across Southeast Asia and beyond. The tripartite model of acculturation—encompassing exchange and symbiosis, early fusion, and later synthesis—offers a conceptual tool for understanding how intercultural contact manifests in built environments across different temporal and geographical contexts. This methodological contribution strengthens the potential for cross-cultural and transregional studies in architectural history.

Fourth, the results carry broader theoretical implications for heritage conservation and sustainable architectural practice. By demonstrating how past communities successfully integrated external influences without compromising their cultural distinctiveness, the study provides a historical precedent for contemporary debates about adaptation, resilience, and sustainability. In particular, it illustrates that cultural resilience does not emerge from rigid preservation of tradition but from a capacity to engage with change critically and selectively. This insight is especially relevant for present-day Vietnam, where rapid urbanization and globalization pose significant challenges to the safeguarding of vernacular heritage.

Finally, the academic meaning of this research lies in its ability to reposition Vietnamese vernacular architecture within regional and global narratives of cultural exchange. Far from being an isolated case, the Vietnamese–Cham encounter exemplifies a broader Southeast Asian pattern in which political shifts, migration flows, and intercultural encounters served as catalysts for architectural innovation. By situating the study in this wider

comparative context, the findings contribute to a more holistic understanding of Southeast Asian architectural heritage as a dynamic, interconnected, and evolving field of inquiry.

In sum, this study enriches architectural scholarship by bridging empirical documentation with theoretical reflection. It demonstrates that the vernacular houses of Middle Region of Vietnam are not only valuable for their material and historical significance but also for the conceptual insights they offer into processes of cultural negotiation, technological adaptation, and identity formation. As such, the research contributes to ongoing academic debates on heritage, hybridity, and sustainability, while also providing a foundation for practical applications in conservation and architectural design.

8.4 Applicability of the study

The outcomes of this research possess significant applicability across a range of professional and academic domains, particularly in the fields of architectural conservation, restoration, and the adaptive reuse of vernacular architecture within the Middle Region of Vietnam. Through a systematic documentation and in-depth analysis of spatial organization, construction techniques, and locally sourced material usage, the study generates a robust body of knowledge that can serve as an authoritative reference for architects, heritage conservation specialists, urban planners, and policy-makers. This body of work facilitates the development of informed strategies that not only safeguard the tangible and intangible cultural heritage embedded in traditional dwellings, but also harmonize such preservation efforts with contemporary functional requirements and sustainable development goals.

Beyond its contribution to professional practice, the findings provide an academically rigorous resource for higher education curricula in architecture, cultural heritage management, and traditional construction techniques. The integration of this research into training and capacity-building programs can enhance professional competencies in heritage-sensitive design and planning. Furthermore, the study offers an evidence-based foundation for community-led heritage initiatives, fostering local engagement and strengthening cultural identity.

The methodological framework employed—combining architectural survey, typological classification, and contextual interpretation—demonstrates a level of flexibility and transferability that enables its application to similar

research in other regions of Vietnam and in comparative vernacular studies internationally. As such, the research not only enriches the understanding of regional architectural traditions but also contributes to global discourses on sustainable building practices, climate-responsive design, and the preservation of cultural landscapes in the context of rapid socio-economic transformation./.



REFERENCES

- Berry, J. W. (1997). Immigration, Acculturation, and Adaptation. *Applied psychology*, 46(1), 5-34. <https://doi.org/https://doi.org/10.1111/j.1464-0597.1997.tb01087.x>
- Britov, I. V. (2025). The Vietnamese Myth of the Dragon and the Fairy in a Modern Context. *Asia and Africa Today*(4), 65-73. <https://doi.org/https://doi.org/10.31857/S0321507525040041>
- Cabinet of Le dynasty. (2004a). *Dai Viet Su Ky Toan Thu (大越史記全書)* (Vol. 2). Khoa Hoc Xa Hoi.
- Cabinet of Le Dynasty. (2004b). *Dai Viet Su Ky Toan Thu (大越史記全書)* (Vol. 3). Khoa Hoc Xa Hoi.
- Cabinet of Le dynasty. (2004c). *Dai Viet Su Ky Toan Thu (大越史記全書)* (Vol. 1). Khoa Hoc Xa Hoi.
- Cadière, C. (2000). *Văn Hóa, Tín Ngưỡng Và Thực Hành Tôn Giáo Người Việt" (Culture, Beliefs, and Religious Practices of the Vietnamese People)* (T. H. Do, Trans.). Thuan Hoa. <https://opac.nlv.gov.vn/chi-tiet-tai-lieu/van-hoa-tin-nguong,-gia-dinh-viet-nam-qua-nhan-quan-hoc-gia-l.-cadiere-chu-but-20251245920518142931>
- Cao, D. S. (2006). *A Study of Traditionally Cultural Values in the Nha La Mai Vernacular House in the South-Middle Region of Vietnam*. University of Architectural Ho Chi Minh City].
- Cao, D. S., Le, V. a., & Nimsamer, P. (2025). Acculturation Phenomenon in Vernacular Architecture between Vietnamese and Chams in the Kingdom of Cochinchina (16th–18th)–Southeast Asia. *International Journal of Architectural Heritage*, 19(9), 1682-1713. <https://doi.org/10.1080/15583058.2024.2370402>
- Chamberlain, J. (1998). The origin of Sek: implications for Tai and Vietnamese history. *Journal of the Siam Society*, 86, 27-48. https://thesiamsociety.org/wp-content/uploads/1998/03/JSS_086_0c_Chamberlain_OriginsOfSek.pdf
- Chandler, D. (2008). *A history of Cambodia (4th Ed.)*. Routledge. <https://doi.org/https://doi.org/10.4324/9780429495519>
- Chu, Q. T. (2003). *Kiến trúc Dân gian Truyền thống Việt Nam (The Traditional Folk-Architecture of Viet Nam)*. My Thuật (The Art).
- Coedès, G. (1968). *The Indianized States of Southeast Asia* (University of Hawaii Press)
- Cooke, N., & Li, T. (2005). *Water Frontier: Commerce and the Chinese in the Lower Mekong Region, 1750–1880*. NUS Press and Rowan & Littlefield. <https://nuspress.nus.edu.sg/products/water-frontier#:~:text=Water%20Frontier:%20Commerce%20and%20the,246%20pages%2C%20240mm%20x%20160mm>
- Craste, L. (1939). Etude Sur L'habitation Annamite a Hué et Dans Les Environs. *Bulletin des Amis du Vieux Hue (Magazine of B.A.V.H)*, 39, 29_39.
- Dao, D. A. (1957). *Sino-Vietnamese Dictionary*. Truong Thi Publishing House. <https://quansachmuathu.vn/han-viet-tu-dien-dao-duy-anh-2>
- Duong, T. N. M. (2013). Đi tìm những dấu ấn của thần Vishnu trong tôn giáo Hindu của người Chăm (Tracing the imprints of the god Vishnu in the Hindu religion of the Cham people). *Journal of Viet Nam Cultural Heritage*, 2(43), 85-89. <https://giaovn.blogspot.com/2020/10/muc-luc-tap-chi-di-san-van-hoa-2002.html>

- Evans, G. (2003). *A Short History of Laos: The Land in Between*. Allen & Unwin.
- General Statistics Office. (2019). *Completed Results of the 2019 Viet Nam Population and Housing Census*. United Nations Viet Nam Retrieved from <https://vietnam.un.org/en/28931-results-population-and-housing-census-0142019>
- González-Ruibal, A. (2006). The Past is Tomorrow. Towards an Archaeology of the Vanishing Present. *Norwegian Archaeological Review*, 39(2), 110-125. <https://doi.org/10.1080/00293650601030073>
- Gourou, P. (2001a). Bước Đầu Khảo Sát Về Nhà Ở Thừa Thiên - Huế (Preliminary Survey on Housing in Thua Thien Hue) translated and introduced by Dao Hung. *Journal of Research and Development, Thua Thien Hue*, 4(34), 92-93. <http://jrd.vn/Tra-cuu/Chi-tiet/tid/Buoc-dau-khao-sat-ve-nha-o-Thua-Thien-Hue/>
- Gourou, P. (2001b). Bước Đầu Khảo Sát Về Nhà Ở Thừa Thiên - Huế (Preliminary Survey on Housing in Thua Thien Hue) translated and introduced by Dao Hung. *Journal of Research and Development, Thua Thien Hue*, 4(36), 30-40.
- Hall, K. R. (2011). *A History of Early Southeast Asia: Maritime Trade and Societal Development, 100–1500*. Rowman & Littlefield.
- Hardy, A. (2005). *Red Hills: Migrants and the State in the Highlands of Vietnam*. NIAS Press.
- Hardy, A. D., Cucarzi, M., & Zolese, P. (2009). *Champa and the archaeology of Mỹ Sơn (Vietnam)*. NUS press. https://books.google.com.vn/books?id=fj8l8v_yP5oC&printsec=frontcover#
- Harrison, R. (2012). *Heritage: critical approaches*. Routledge. <https://doi.org/https://doi.org/10.4324/9780203108857>
- Hayashi, H., Nakagawa, T., & Le, V. A. (2009). Study on the Design Methodology of the Traditional Wooden Houses in the Central Vietnam *Journal of Architecture and Planning (Transactions of AIJ)*, 74(638), 945-954. <https://doi.org/10.3130/aija.74.945>
- He, J.-D., Peng, M.-S., Quang, H. H., Dang, K. P., Trieu, A. V., Wu, S.-F., Jin, J.-Q., Murphy, R. W., Yao, Y.-G., & Zhang, Y.-P. (2012). Patrilineal Perspective on the Austronesian Diffusion in Mainland Southeast Asia. *PLoS One*, 7(5), e36437. <https://doi.org/https://doi.org/10.1371/journal.pone.0036437>
- Higham, C. (1996). *The bronze age of Southeast Asia*. Cambridge University Press.
- Higham, C. (2014). *Early Mainland Southeast Asia: From First Humans to Angkor*. River Books. <https://books.google.com.vn/books?id=iaoWnwEACAAJ>
- Hoang, T. Q. (2016). Traditional Roof Structures in Vietnamese Vernacular Architecture. *Architectural Journal*, 4.
- Hoang, T. Q., & Nguyen, V. H. (2015). Environmental Adaptations in Vietnamese Vernacular Architecture. *Architecture Magazine*.
- Inrasara. (2003). *Văn Hoá Xã Hội Chăm (Social Culture of the Chams)*. Van Hoa. <https://vietbooks.info/threads/van-hoa-xa-hoi-cham-nghien-cuu-va-doi-thoai-nxb-van-hoc-2003-inrasara-353-trang.3094/>
- Jamieson, N. L. (1993). *Understanding Vietnam*. University of California Press.
- Kim, N. C., Van Toi, L., & Hiep, T. H. (2010). Co Loa: an investigation of Vietnam's ancient capital. *Antiquity*, 84(326), 1011-1027.
- Kusno, A. (2010). *The appearances of memory: Mnemonic practices of architecture and urban form in Indonesia*. Duke University Press.
- Le, C. T. (2023). Religious architecture of Chams in Vietnam. *Science Journal of*

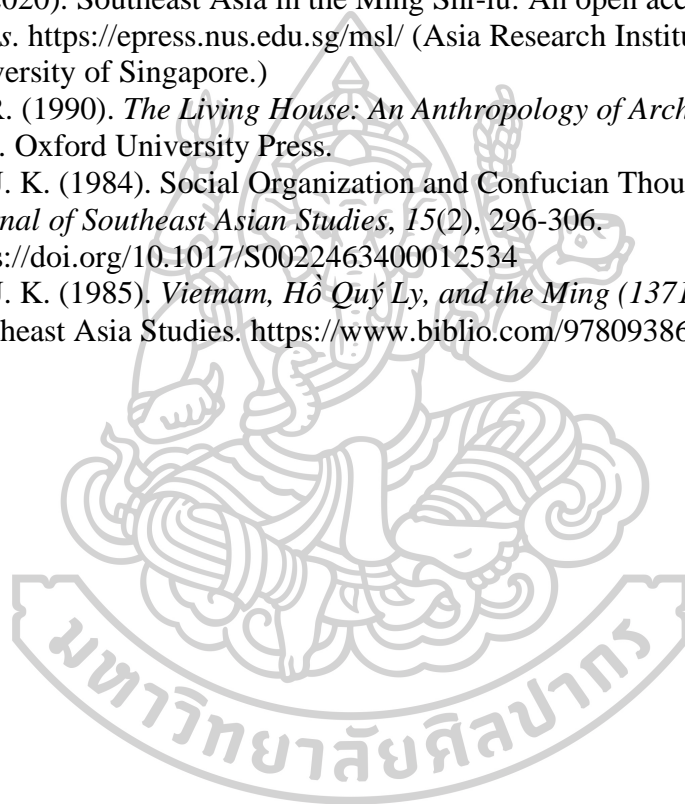
- Architecture and Construction*, 12/2023(51), 04-09.
<https://vjol.info.vn/index.php/hau/article/view/96155/81237>
- Le, D. D., Pham, V. d., Vu, H. T., & Pham, M. D. (2011). *Kiến Trúc Chăm: Truyền Thống và Biến Đổi (Cham Architecture: Tradition and Transformation)*. KHXH.
- Le, D. T. (2018). Feng Shui and Settlement Patterns in Northern Vietnam. *Asian Cultural Studies*, , 10(2), 95-100.
- Le, M. H., & Vu, N. T. (2019). Cultural Significance of Orientation in Vietnamese Traditional Houses. *Vietnamese Journal of Cultural Heritage*, 5(1), 45 - 62.
- Le, Q. D. (1972). *撫邊雜錄 (Phu Bien Tap Luc), Volume 2 (Translation of Le Xuan Giao)*. Saigon.
- Le, T. H. (2022). Tile Types and Their Cultural Significance in Middle Region of Vietnam. *Journal of Cultural Heritage Studies*, 20(1), 45-62.
- Le, T. H., & Nguyen, M. H. (2019). Vernacular Roofing Techniques in Northern Vietnam. *Journal of Asian Vernacular Architecture*, 11(2), 134-150.
- Le, T. H., & Nguyen, M. H. (2022). Environmental Adaptation and Materiality in Vietnamese Vernacular Architecture. *Journal of Tropical Architecture*, 16(2), 88-105.
- Le, T. K. (1955). *Việt Nam: Histoire et Civilisation*. . Les Éditions de Minuit.
<https://excerpts.numilog.com/books/9782707333544.pdf>
- Le, V. A. (2007). “トウオックサムについて” (Regarding the Thuoc Sam) ベトナム・フエ・阮朝王宮の復原的研究その 129 (Reconstruction study on the Imperial City of the Nguyen Dynasty in Hue, Vietnam. No.129).
- Le, V. A., & Cao, D. S. (2023). Study on Vietnamese Design Methods of Traditional Vernacular Architecture and Discussion on Their Technical Origins. *International Journal of Architectural Heritage*, 18(4).
<https://doi.org/10.1080/15583058.2023.2177211> (Taylor & Fansis)
- Le, V. A., & Nguyen, T. T. V. (2002a). Công nghệ chế tác Nhà Rường truyền thống Huế. Phần II: Hiệu quả chế tác của công cụ (Crafting Technology of Traditional Huế Rường Houses. Part II: The Effectiveness of Crafting Tools). *Journal of Development Research, Thua Thien Hue*, 3(37). <http://jrd.vn/Tra-cuu/Chi-tiet/tid/Cong-nghe-che-tac-nha-Ruong-truyen-thong-Hue-Phan-II-Hieu-qua-che-tac-cua-cong-cu/>
- Le, V. A., & Nguyen, T. T. V. (2002b). Công nghệ chế tác Nhà Rường truyền thống Huế. Phần III: Một số khái niệm và thuật ngữ cơ bản (Crafting Technology of Traditional Huế Rường Houses. Part III: Some Basic Concepts and Terminologies). *Journal of Development Research, Thua Thien Hue*, 4(38).
<http://jrd.vn/Tra-cuu/Chi-tiet/tid/Cong-nghe-che-tac-nha-Ruong-truyen-thong-Hue-Phan-III-Mot-so-khai-niem-va-thuat-ngu-co-ban/>
- Li, T. (1998). *Nguyen Cochinchina Southern Vietnam in the Seventeenth and Eighteenth Centuries*. Cornell University Press.
<http://www.jstor.org/stable/10.7591/j.ctv3mtc8t>
- Li, T. (1999). *Xứ Dang Trong – Lịch Sử Kinh Tế Xã Hội Việt Nam thế kỷ 17-18 (The Dang Trong – History of Social Economic of Vietnam 17th – 18th centuries)*. Tre. <https://hopsach.vn/xu-dang-trong-lich-su-kinh-te-xa-hoi-viet-nam-the-ky-17-va-18>
- Liu, D., Duong, N. T., Ton, N. D., Van Phong, N., Pakendorf, B., Van Hai, N., & Stoneking, M. (2020). Extensive Ethnolinguistic Diversity in Vietnam Reflects

- Multiple Sources of Genetic Diversity. *Mol Biol Evol*, 37(9), 2503-2519.
<https://doi.org/10.1093/molbev/msaa099>
- Lockhart, B. (2011). *The Cham Encounter with the Vietnamese*. In Trần Kỳ Phương & Andrew Hardy (Eds.), *Champa and Beyond: Integration in Southeast Asia* ISEAS Publishing.
- Logan, W. (2002). *The disappearing "Asian" city: Protecting Asia's urban heritage in a globalizing world*. CQUniversity.
- Ly, L. N., & Waters, J. (1997). *Tracing the Origins of Chinese Characters*. The Gioi Publishing House. <https://vietbooks.info/threads/tim-ve-coi-nguon-chu-han-nxb-the-gioi-1997-ly-lac-nghi-1281-trang.19867/>
- Marr, D. G. (1984). *Vietnamese tradition on trial, 1920–1945*. University of California Press. <https://www.amazon.com/Vietnamese-Tradition-Trial-1920-1945-David/dp/0520050819>
- Miksic, J. N., & Yian, G. G. (2016). *Ancient Southeast Asia*. Routledge. (Taylor & Fransis Group)
- Naikaku Bunko. 魯般經 (*Lu Ban Jing*) (Vol. 58-8). National Archives of Japan).
- Nas, P. J. M. (2006). *The past in the present : architecture in Indonesia*. NAI Publishers. <https://cir.nii.ac.jp/crid/1971430859864215222>
- Ngo, S. L. (1971). *Dai Viet sử ký toàn thư [Complete annals of Đại Việt]*. Social Sciences Publishing House.
- Nguyen, D. T. (1993). *Văn hóa làng Việt Nam (The Culture of Vietnamese Villages)*. Culture and Information Publishing House.
- Nguyen, D. T. (2000). *Góp phần tìm hiểu Kiến trúc Truyền thống Việt Nam (Contribution for Understanding of the Vietnamese Traditional Architecture)*, . Xay Dung <https://opac.nlv.gov.vn/chi-tiet-tai-lieu/gop-phan-tim-hieu-ban-sac-kien-truc-truyen-thong-viet-nam-20251220150518142931>
- Nguyen, H. (2017). Indochina at the end of the 19th Century by French painter. *Architecture Magazine* 3.
- Nguyen, M. H. (2016). Traditional Compound Layouts in Northern Vietnamese Rural Houses. *Vietnamese Journal of Architecture*, 8(3), 23-39.
- Nguyen, M. H. (2018). Cultural Identity and Vernacular Housing in Middle Region of Vietnam. *Journal of Asian Architecture*, 12(2), 145 - 163.
- Nguyen, M. H., & Le, T. H. (2018). Spiritual Foundations: Ritual and Construction in Vietnamese Traditional Houses. *Journal of Vernacular Architecture Studies*, 13(2), 95-112.
- Nguyen, M. H., & Le, T. H. (2021). Vernacular Housing in Central and South-Middle Region of Vietnam: The Case of Nha La Mai. *Journal of Tropical Architecture and Sustainable Building*, 12(2), 98-155.
- Nguyen, M. H., & Le, T. H. (2022). Craftsmanship and Cultural Transmission in Vietnamese Vernacular Architecture. *Journal of Southeast Asian Architectural History*, 22(1), 45-64.
- Nguyen, T. L. (2015). Ethnolinguistic Influences in Vietnamese Vernacular Architecture. *Tạp chí Di sản Văn hoá (Vietnam national Cultural Heritage magazine)*.
- Nguyen, T. L., & Bui, Q. D. (2010). Carpentry Techniques in Traditional Vietnamese Architecture. *Hanoi University of Architecture Journal*, 2(44), 35-47.
- Nguyen, T. T. V., & Le, V. A. (2001). Thuật ngữ kiến trúc cổ dùng trong Nhà Rường

- Huế (Ancient Architectural Terminology Used in the Nha Ruong of Hue). *Journal of Development Research, Thua Thien Hue*, 3(33). <http://jrd.vn/Tra-cuu/Chi-tiet/tid/Thuat-ngu-kien-truc-co-dung-trong-nha-ruong-Hue/>
- Nguyen, T. T. V., Le, V. A., Vu, H. M., Nguyen, T. T., & Phan, T. Y. (2010). *Thuật ngữ kiến trúc Nha Ruong truyền thống Huế (Architectural Terminology of the "Nha Ruong" Traditional House of Hue)*. Thuan Hoa Publisher.
- Nguyen, V. H. (2012). *Kiến trúc dân gian Việt Nam (Vietnamese Vernacular Architecture)*. Xây Dựng (Construction).
- Nguyen, V. H., & Pham, T. N. (2020). Preservation and Conservation of Vietnamese Vernacular Houses. *Heritage Science Review*, 8(1), 80-101.
- Nguyen, V. Q. (2020). Religious Practices and Spatial Organization in Cham Communities. *Journal of Ethnographic Studies*, 14(2), 88-105.
- Nguyen, V. T. (2019). Symbolism in Vietnamese Timber Architecture. *Vietnamese Cultural Studies*, 7(1), 22-39.
- Oliver, P. (2007). *Built to meet needs: Cultural issues in vernacular architecture*. Routledge. <https://doi.org/https://doi.org/10.4324/9780080476308>
- Peng, M.-S., Quang, H. H., Dang, K. P., Trieu, A. V., Wang, H.-W., Yao, Y.-G., Kong, Q.-P., & Zhang, Y.-P. (2010). Tracing the Austronesian footprint in Mainland Southeast Asia: a perspective from mitochondrial DNA. *Molecular biology and evolution*, 27(10), 2417-2430. <https://doi.org/https://doi.org/10.1093/molbev/msq131>
- Pham, L. T. (2014). *Socio-Economic Influences on the Architecture of Northern Vietnam*. Culture and Architecture Press.
- Pham, L. V. (2017). Spatial Hierarchies in Traditional Vietnamese Houses. *Journal of Asian Architectural Heritage*, 9(3), 120-123.
- Pham, L. V. (2018). User Adaptability in Cham Residential Design. *Vietnamese Journal of Architecture*, 10(2).
- Pham, Q. A. (2017). Timber Resources and Sustainable Practices in Vietnamese Vernacular Building. *Asian Journal of Environmental Design*, 5(1), 57-70.
- Phan, T. T. (2015). *Nhà ở truyền thống vùng Trung Bộ (Traditional House in the Central region)*. Thuan Hoa.
- Phan, X. B., Phan, A., Phan, V. D., & Minh, V. k. h. x. h. t. T. p. H. C. (1991). *Văn hóa Chăm*. Khoa học xã hội. <https://vietbooks.info/threads/van-hoa-cham-nxb-khoa-hoc-xa-hoi-1991-phan-xuan-bien-392-trang.83569/>
- Pluvier, J. M. (1995). *Historical Atlas of South-East Asia*. E.J. Brill.
- Po, D. (2003). *Văn Hóa và Xã Hội Chăm (Cham culture and society)*. Éditions Sudestasié.
- Po, D. (2012). Cham Muslims of the Mekong Delta: Place and mobility in the cosmopolitan periphery. *Journal of the Economic and Social History of the Orient*, 55(4-5).
- Pugnaroni, P., & Carlorosi, C. (2013). *Cham-Pa Architecture – Vietnam Towers Roads*. Universita Politecnica Delle Marche.
- Quang, N. V. (2005). Vernacular Housing in Central Vietnam: Adaptation and Transformation. *Journal of Vietnamese Studies*. *Journal of Vietnamese Studies*, 3(2), 45_70.
- Rapoport, A. (1969). *House Form And Culture*. Prentice-Hall, Inc. <https://www.goodreads.com/book/show/11619105-house-form-and-culture>

- Redfield, R., Linton, R., & Herskovits, M. J. (1936). Memorandum for the study of acculturation. *American anthropologist*, 38(1), 149-152.
- Showa Woman's University and Vietnam Ministry of Construction. (1997). *Investigation of traditional folk houses surveying nationwide in Vietnam (Documents for investigation in Bac Ninh province)*.
- Sicheng, L. (1996a). 营造法式 卷第二十九 (Ying-Tsao-Fa-Shih of the Song). 29.
- Sicheng, L. (1996b). 宋营造法式 卷上 (Ying-Tsao-Fa-Shih of the Song) (Vol. 1).
- Southworth, W. A. (2001). *The Origins of Campā in Central Vietnam: A Preliminary Review*. In K. M. Nguyen & A. Hardy (Eds.), *Champa and the archaeology of Mỹ Sơn (Vietnam)*. University of London, School of Oriental and African Studies. <https://books.google.com.vn/books?id=M-Uh0AEACAAJ>
- Taylor, K. W. (1998). Surface orientations in Vietnam: Beyond histories of nation and region. *Asian Studies*, 57(4), 949-978.
<https://doi.org/https://doi.org/10.2307/2659300> (Duke University Press)
- Taylor, K. W. (2013). *A History of The Vietnamese*. Cambridge University Press.
<https://doi.org/10.1017/CBO9781139021210>
- The National Department of History of Nguyen Dynasty. (1960). *Đại Nam Nhất Thống Chí (大南一統志), Kinh Sư (京師)* (Vol. 3). Nha Van Hoa, Bo Quoc Gia Giao Duc.
- The National Department of History of Nguyen Dynasty. (2002). *Đại Nam thực Lục 大南寔錄 (The Veritable Records of Đại Nam)* (Vol. 1). Giao Duc.
- Tran, K. P., & Lockhart, B. (2011). *The Cham of Vietnam: History, Society and Art*. NUS Press.
- Tran, K. P., Shigeda Y., Akiko O. (2018). Nhà xưa Quảng Nam: Tìm hiểu tên gọi các bộ phận cấu kiện của Nhà Ruong (Ancient Houses of Quảng Nam: An Inquiry into the Terminology of Structural Components of the Nhà Ruong House). *Journal of Development Research, Thua Thien Hue*, 4(34).
- Tran, N. T. (2001). *Tìm Về Bản Sắc Văn Hóa Việt Nam (Re-finding Cultural Identity of Viet Nam)*. General Ho Chi Minh City.
https://www.tusachcuaban.net/product/tim-ve-ban-sac-van-hoa-viet-nam-nxb-tong-hop-2001-tran-ngoc-them/?gad_source=1&gad_campaignid=19576715493
- Tran, Q. H., & Le, V. T. (2003). Mortise and Tenon Joinery in Middle Region of Vietnam: A Technical and Cultural Analysis. *National Hanoi University Press*.
- Tran, Q. V. (2003). Xứ Huế Dưới Góc Nhìn Chính Trị Văn hoá (Hue area observed from a Political and Cultural). *Tạp chí Di sản Văn hoá (Vietnam national Cultural Heritage magazine)*, 3.
https://dsvh.gov.vn/Upload/files/Tap%20chi%20DSVH/So%203/0302_Xu%20Hue%20duoi%20goc%20nhin%20dia%20chinh%20tri%20van%20hoa.pdf
- Tran, T. Q. H. (2005). The origin and evolution of the Vietnamese vernacular architecture. *Magazine of National University Singapore*, VHN3.TB3.132.
- Tran, T. Q. H. (2017). Spatial Organization and Ritual Functions in Northern Vietnamese Houses. *Vietnamese Journal of Architecture*, 12(4), 70_88.
- Truong, C., Le, A., & Watsantachad, N. (2024). An Architectural Study on Hue Imperial City (1802-1883) of the Nguyen Dynasty and Its Original Characteristics, Vietnam. 520-547. <https://doi.org/10.13189/cea.2024.120138>
- Truong, V. M. (2023). *Văn Hóa Và Lịch sử Champa (Champa Culture and History from Indrapura, Amaravati to Vijaya)* (Vol. 1). Ho Chi Minh National University.

- Tuyen, Q. D. (2023). The Cham Civilization and Its People—An Overview of Bhum Cham. In Q. D. Tuyen (Ed.), *Heritage Conservation and Tourism Development at Cham Sacred Sites in Vietnam: Living Heritage Has A Heart* (pp. 29-41). Springer Nature Singapore. https://doi.org/10.1007/978-981-99-3350-1_2
- Vickery, M. (2005). Champa revised. . *National University of Singapore*, 37, 89. <https://ari.nus.edu.sg/publications/wps-37-champa-revised/>
- Vietnamese National Association of Architects. (2002). *Nhà ở dân gian các vùng nông thôn Việt Nam - Nhà ở dân tộc Chăm tại tỉnh Ninh Thuận và Bình Thuận (The vernacular houses in the Rural areas of Vietnamese – The houses of the Chams in Ninh Thuan and Binh Thuan provinces)*. Ha Noi.
- Vu, V. K. (1999). *Great Dictionary of Nom Characters*. Van Nghe Publishing House.
- Wade, G. (2020). Southeast Asia in the Ming Shi-lu: An open access resource. *NUS Press*. <https://epress.nus.edu.sg/msl/> (Asia Research Institute, National University of Singapore.)
- Waterson, R. (1990). *The Living House: An Anthropology of Architecture in South-East Asia*. Oxford University Press.
- Whitmore, J. K. (1984). Social Organization and Confucian Thought in Vietnam. *Journal of Southeast Asian Studies*, 15(2), 296-306. <https://doi.org/10.1017/S0022463400012534>
- Whitmore, J. K. (1985). *Vietnam, Hồ Quý Ly, and the Ming (1371–1421)*. Yale Univ Southeast Asia Studies. <https://www.biblio.com/9780938692225>



Appendices

Appendix AI: The inventories of the vernacular house in the study area

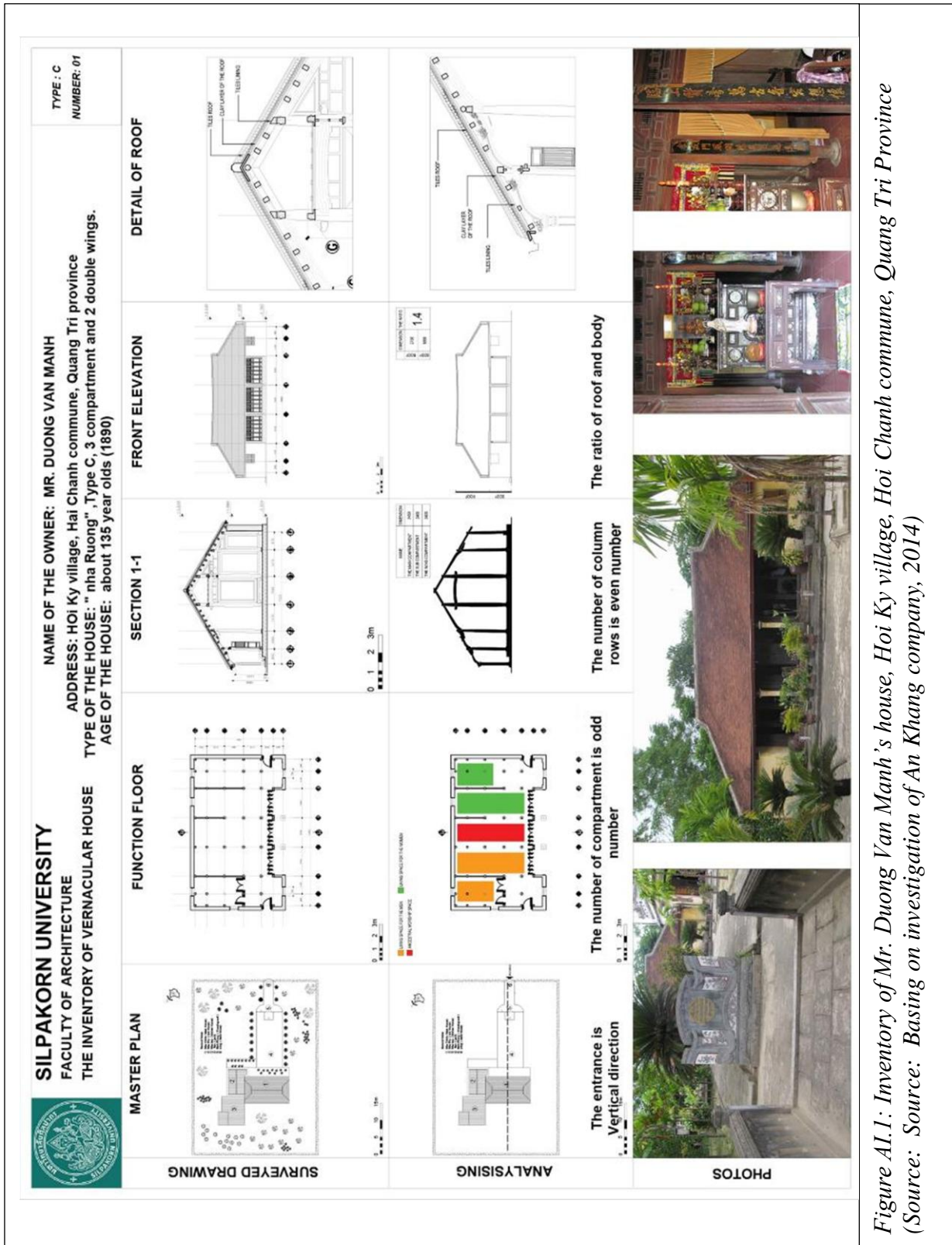


Figure AI.1: Inventory of Mr. Duong Van Manh's house, Hoi Ky village, Hoi Chanh commune, Quang Tri Province (Source: Basing on investigation of An Khang company, 2014)

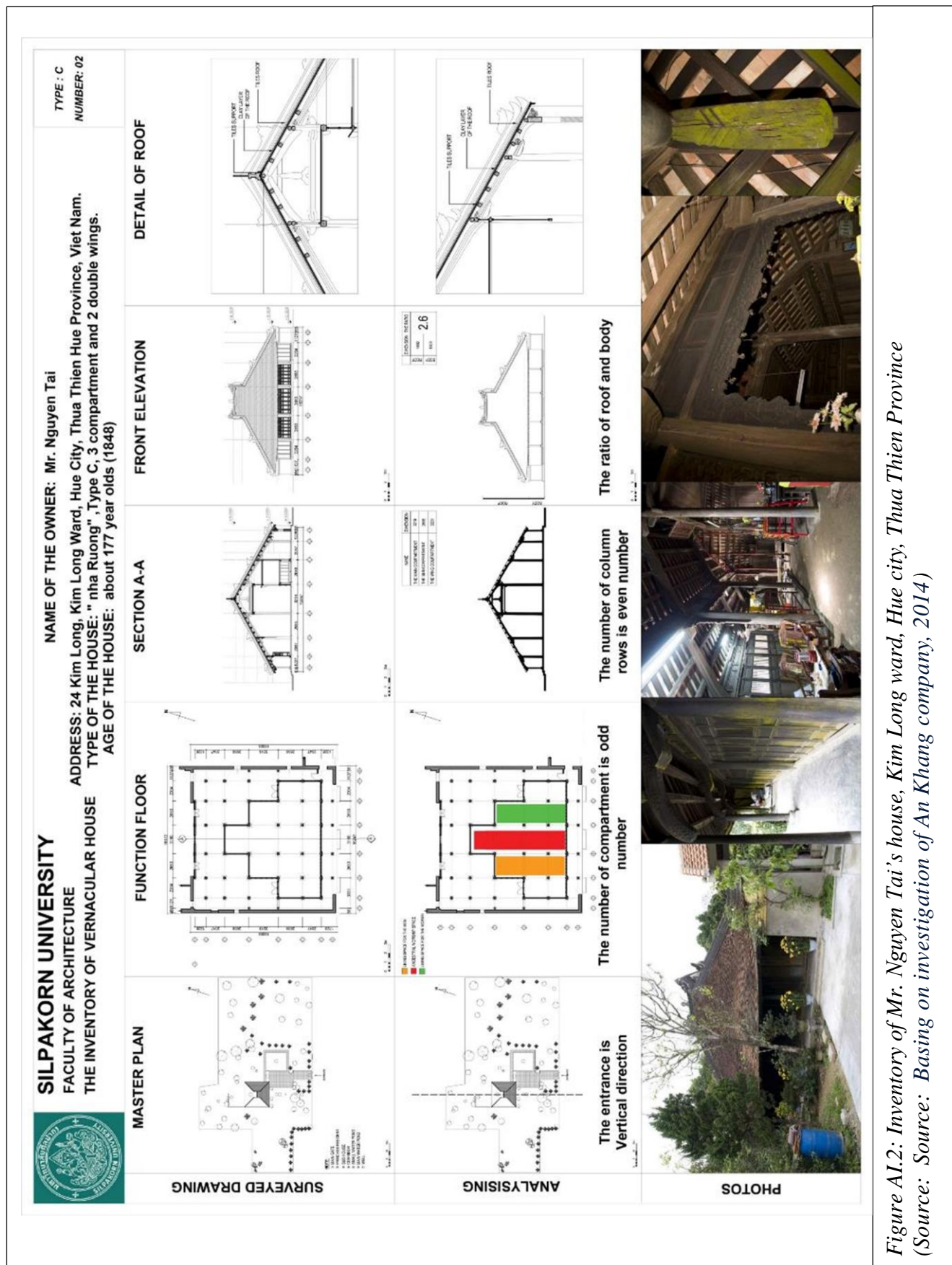


Figure AI.2: Inventory of Mr. Nguyen Tai's house, Kim Long ward, Hue city, Thua Thien Province (Source: Basing on investigation of An Khang company, 2014)

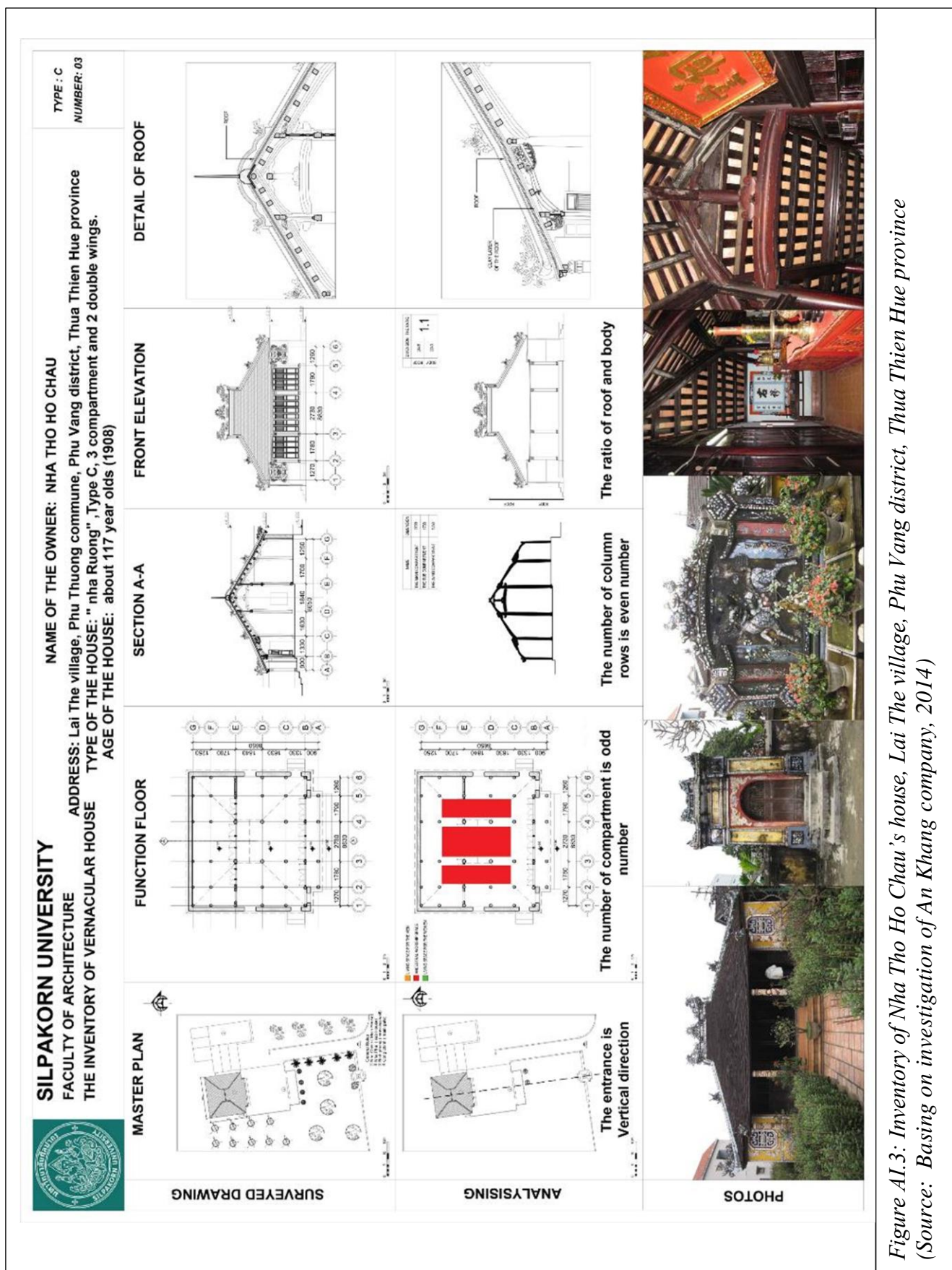


Figure A1.3: Inventory of Nha Tho Chau's house, Lai The village, Phu Vang district, Thua Thien Hue province (Source: Basing on investigation of An Khang company, 2014)

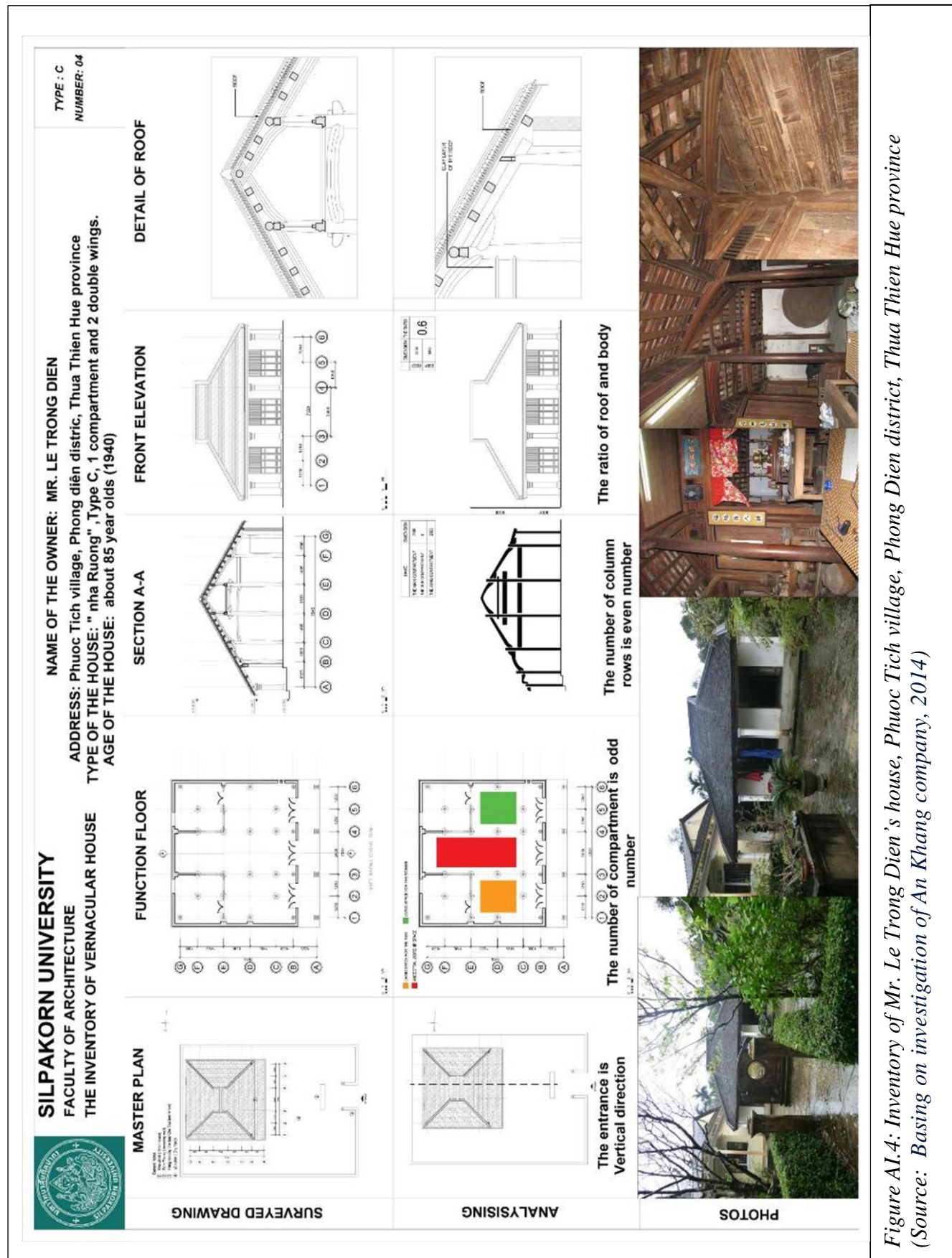


Figure A1.4: Inventory of Mr. Le Trong Dien's house, Phuoc Tich village, Phong Dien district, Thua Thien Hue province (Source: Basing on investigation of An Khang company, 2014)

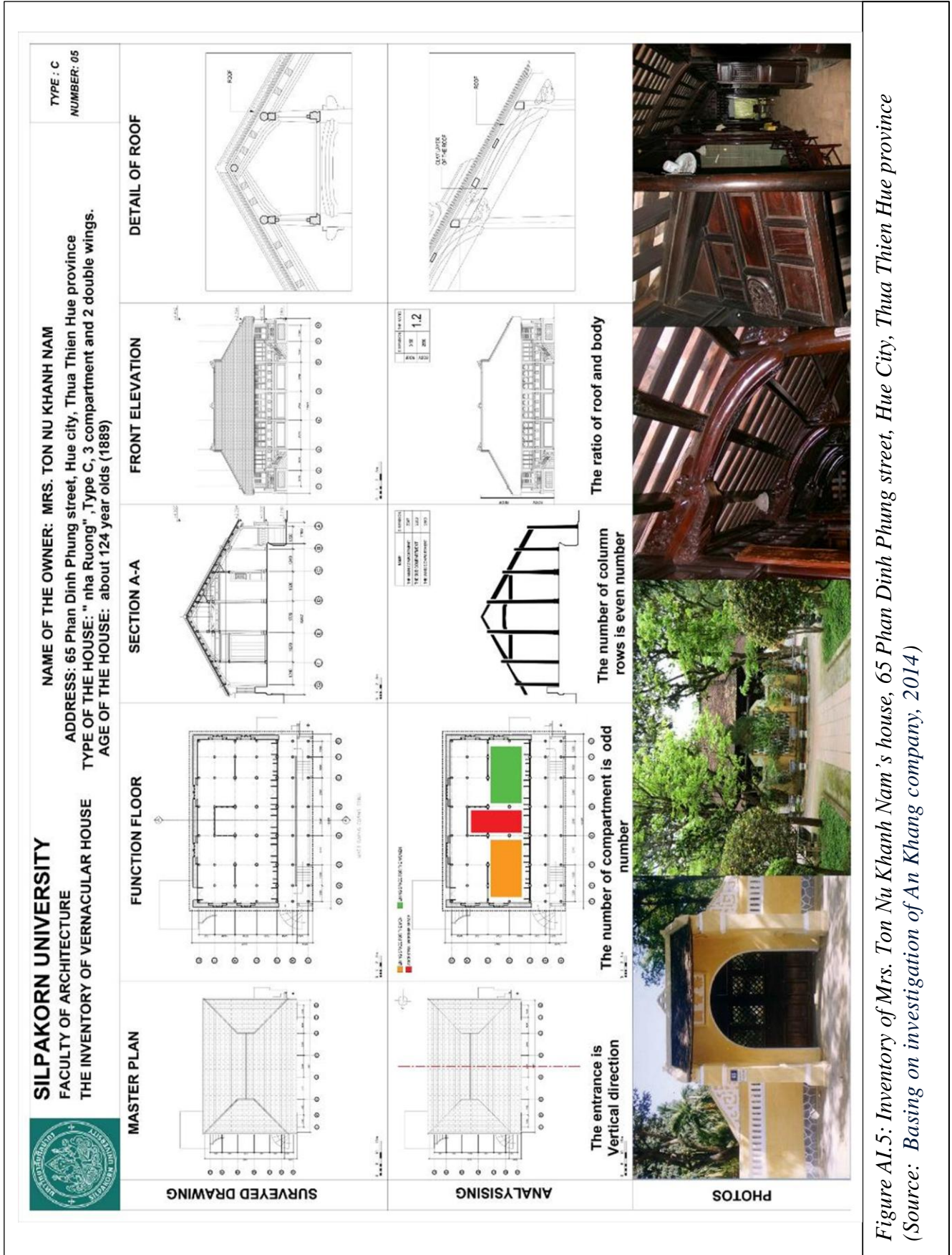


Figure AI.5: Inventory of Mrs. Ton Nu Khanh Nam's house, 65 Phan Dinh Phung street, Hue City, Thua Thien Hue province (Source: Basing on investigation of An Khang company, 2014)

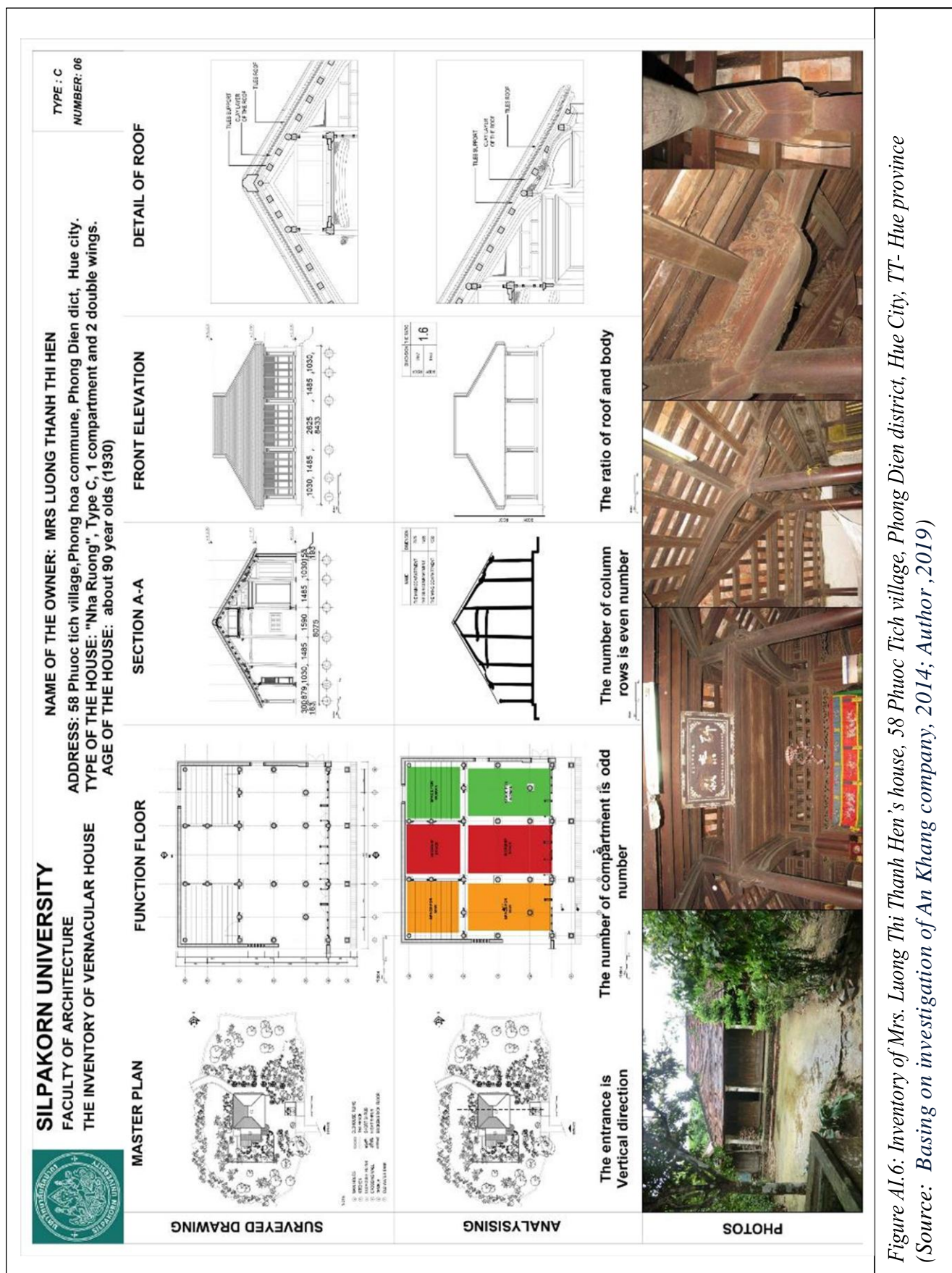


Figure A1.6- Inventory of Mrs. Luong Thi Thanh Hen's house, 58 Phuoc Tich village, Phong Dien district, Hue City, TT- Hue province (Source: Basing on investigation of An Khang company, 2014; Author , 2019)

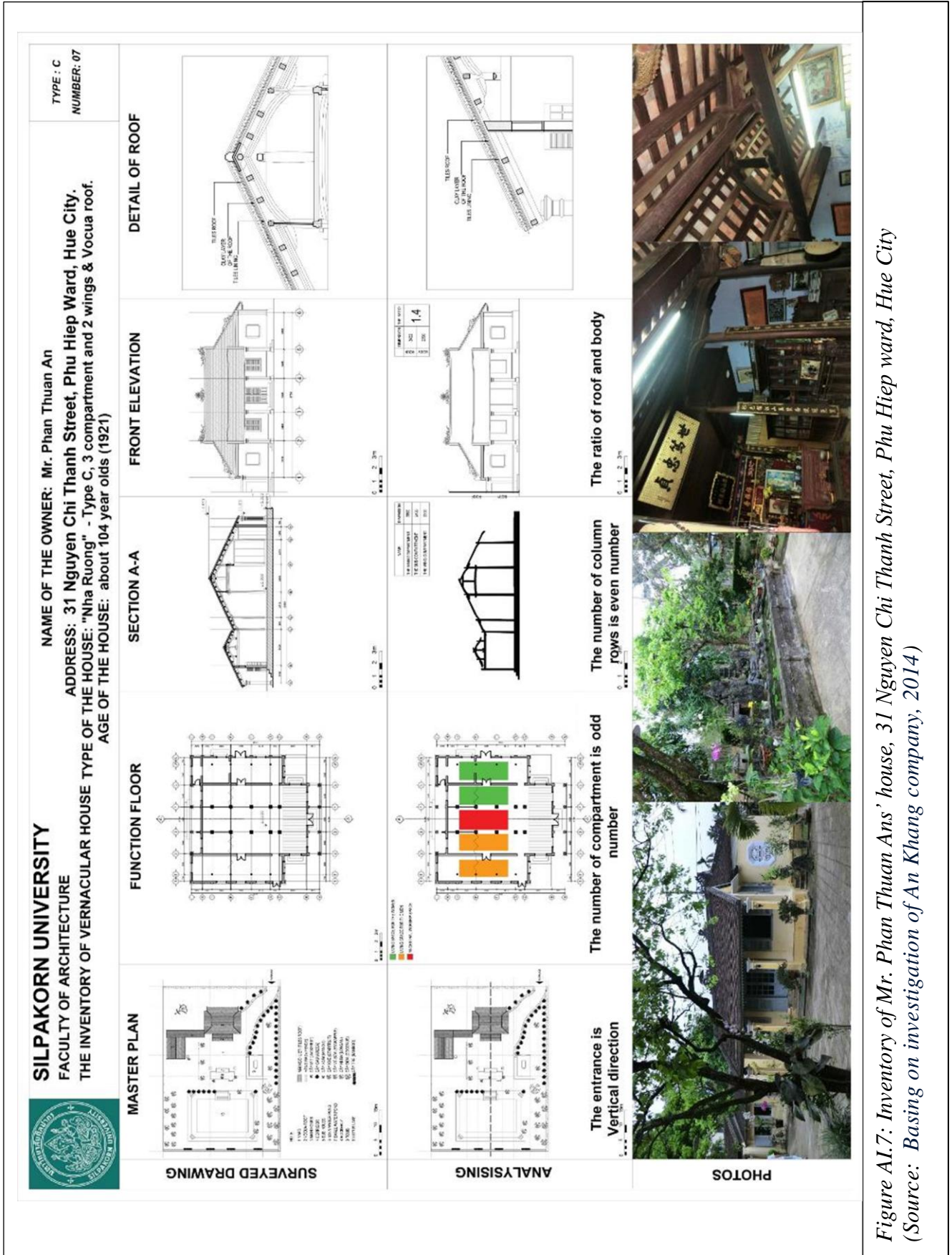


Figure AI.7: Inventory of Mr. Phan Thuan Ans' house, 31 Nguyen Chi Thanh Street, Phu Hiep ward, Hue City (Source: Basing on investigation of An Khang company, 2014)

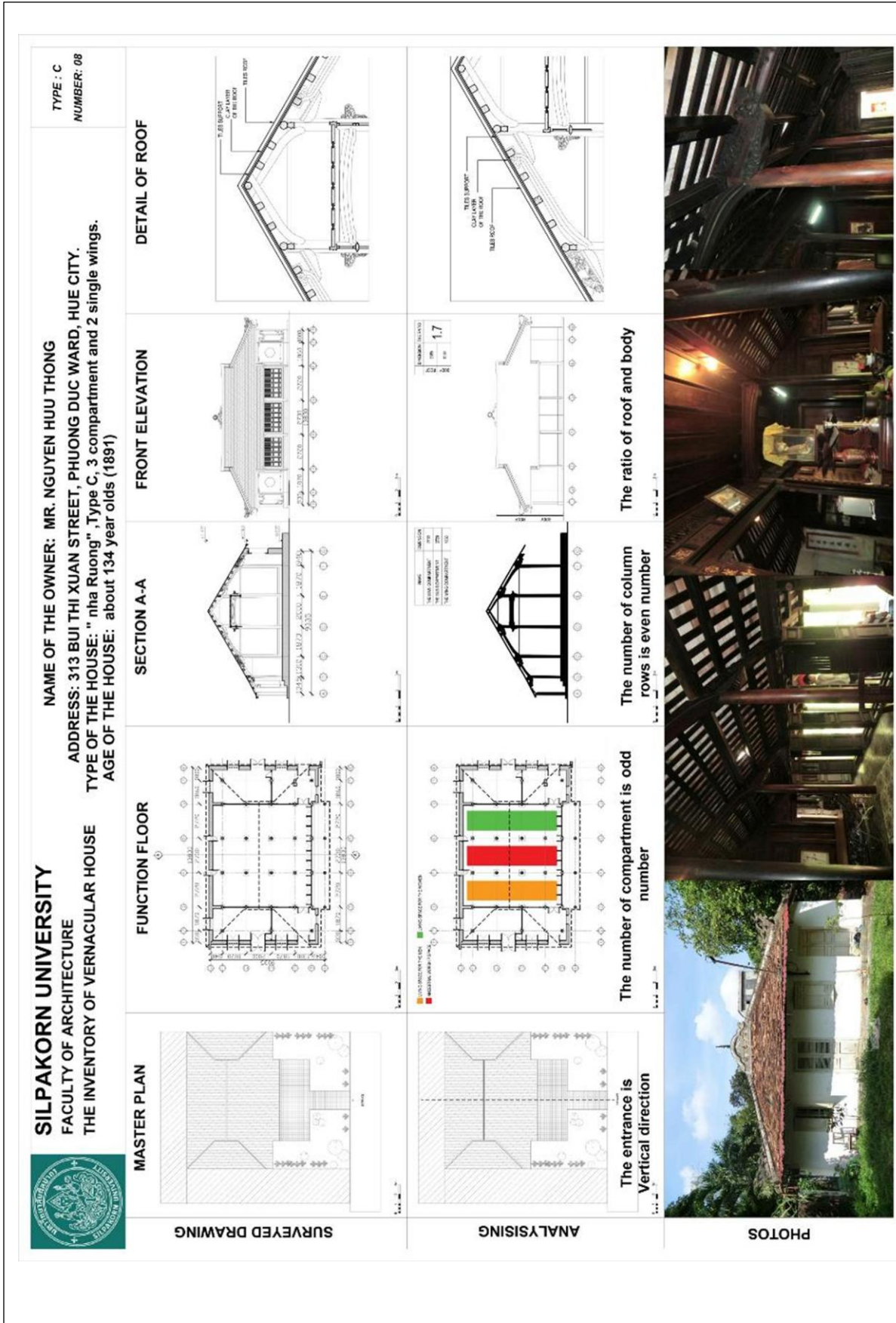


Figure AI.8: Inventory of Mr. Nguyen Huu Thong's house, 313 Bui Thi Xuan Street, Phuong Duc ward, Hue City (Source: Basing on investigation of An Khang company, 2014)

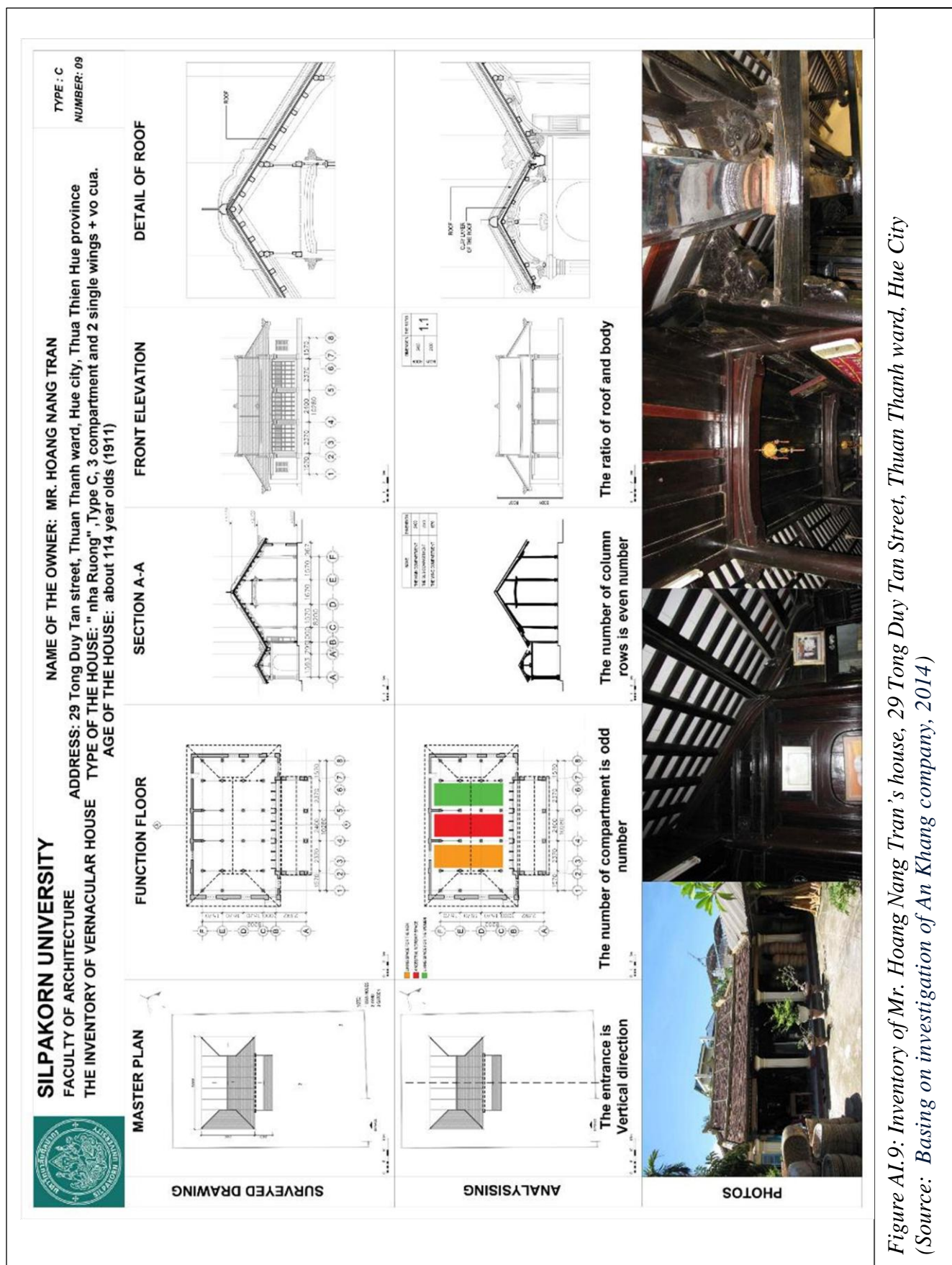


Figure A1.9: Inventory of Mr. Hoang Nang Tran's house, 29 Tong Duy Tan Street, Thuan Thanh ward, Hue City (Source: Basing on investigation of An Khang company, 2014)

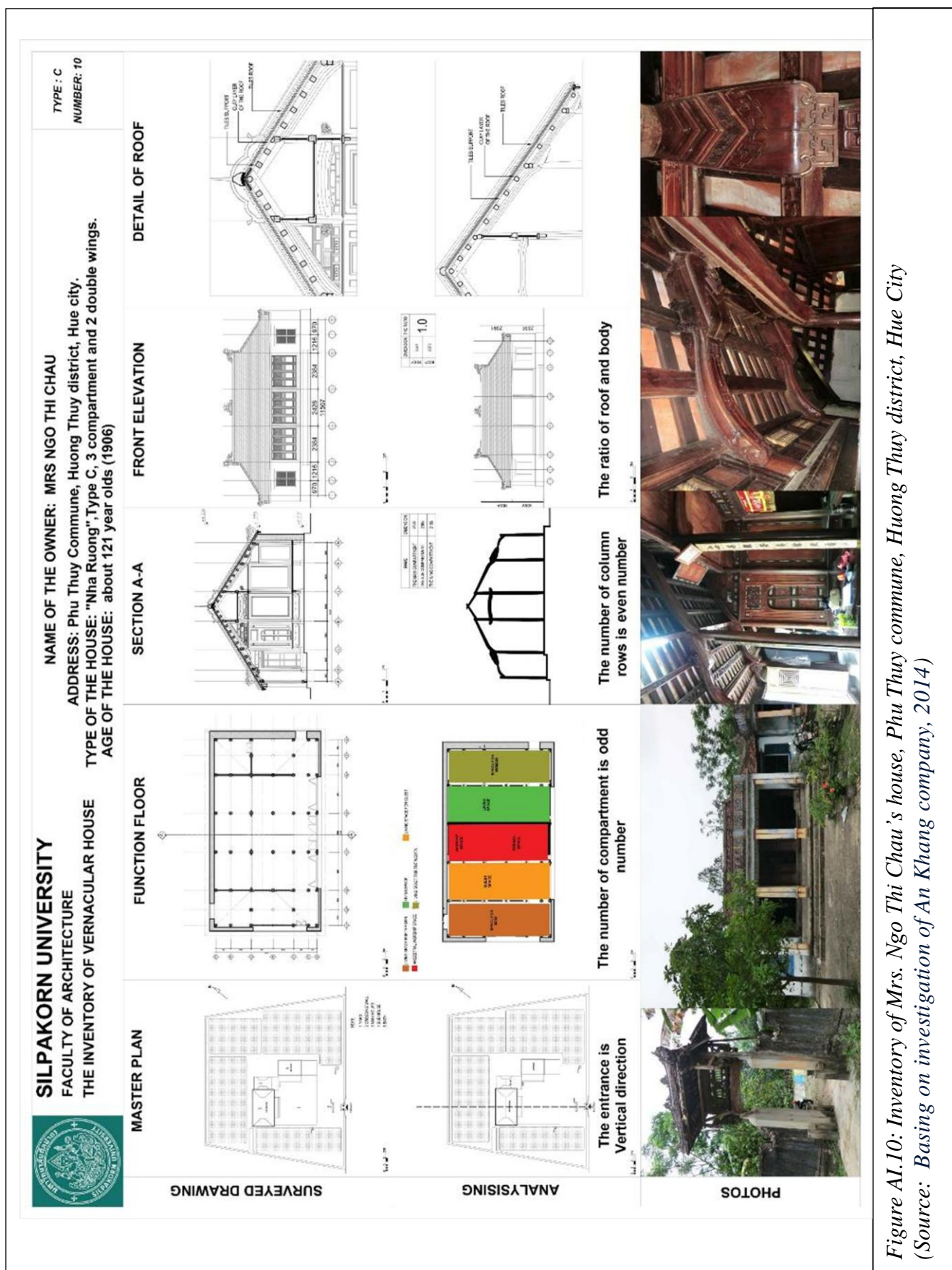


Figure AI.10: Inventory of Mrs. Ngo Thi Chau's house, Phu Thuy commune, Huong Thuy district, Hue City (Source: Basing on investigation of An Khang company, 2014)

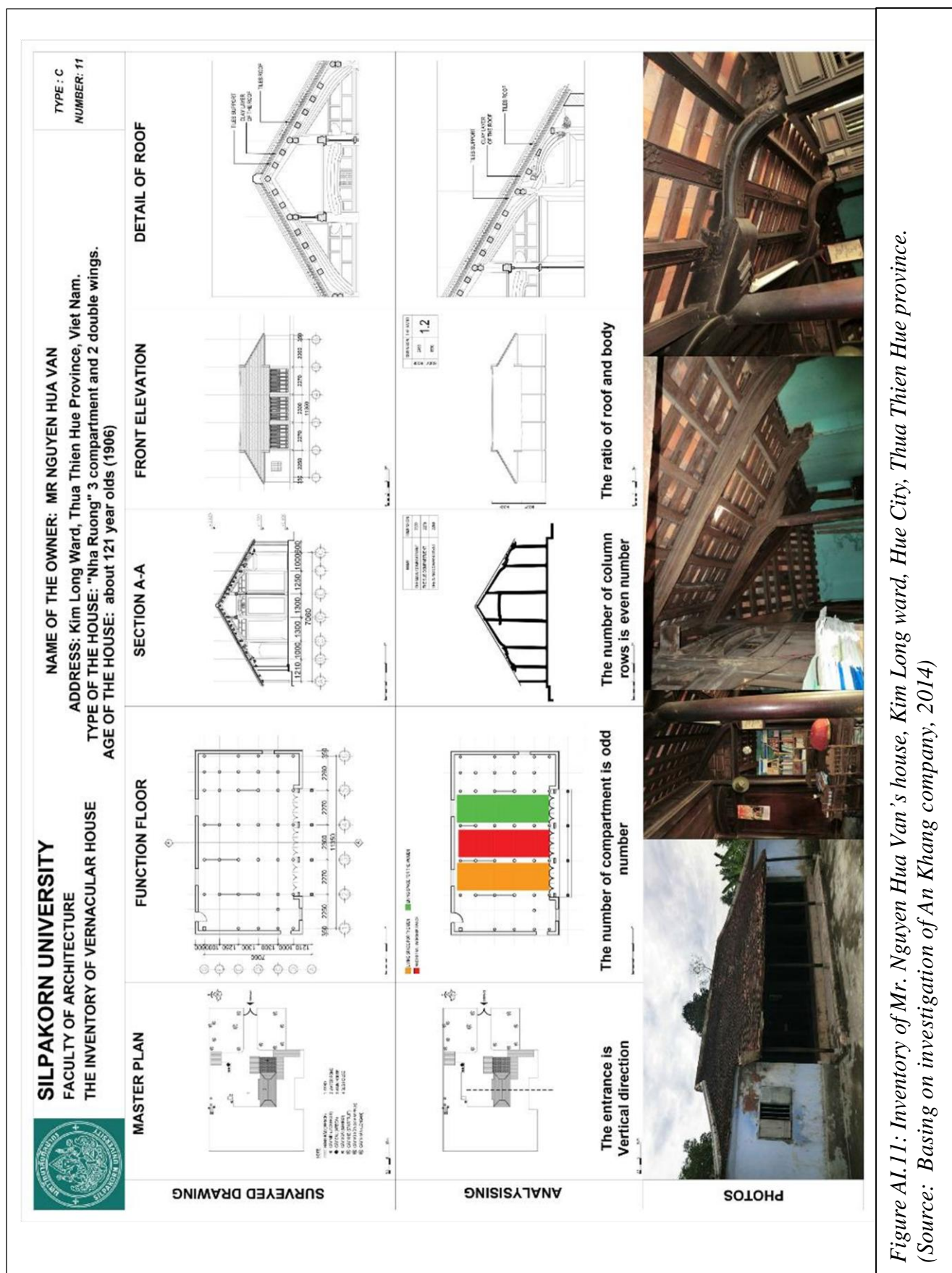


Figure A1.11: Inventory of Mr. Nguyen Hua Van's house, Kim Long ward, Hue City, Thua Thien Hue province. (Source: Basing on investigation of An Khang company, 2014)

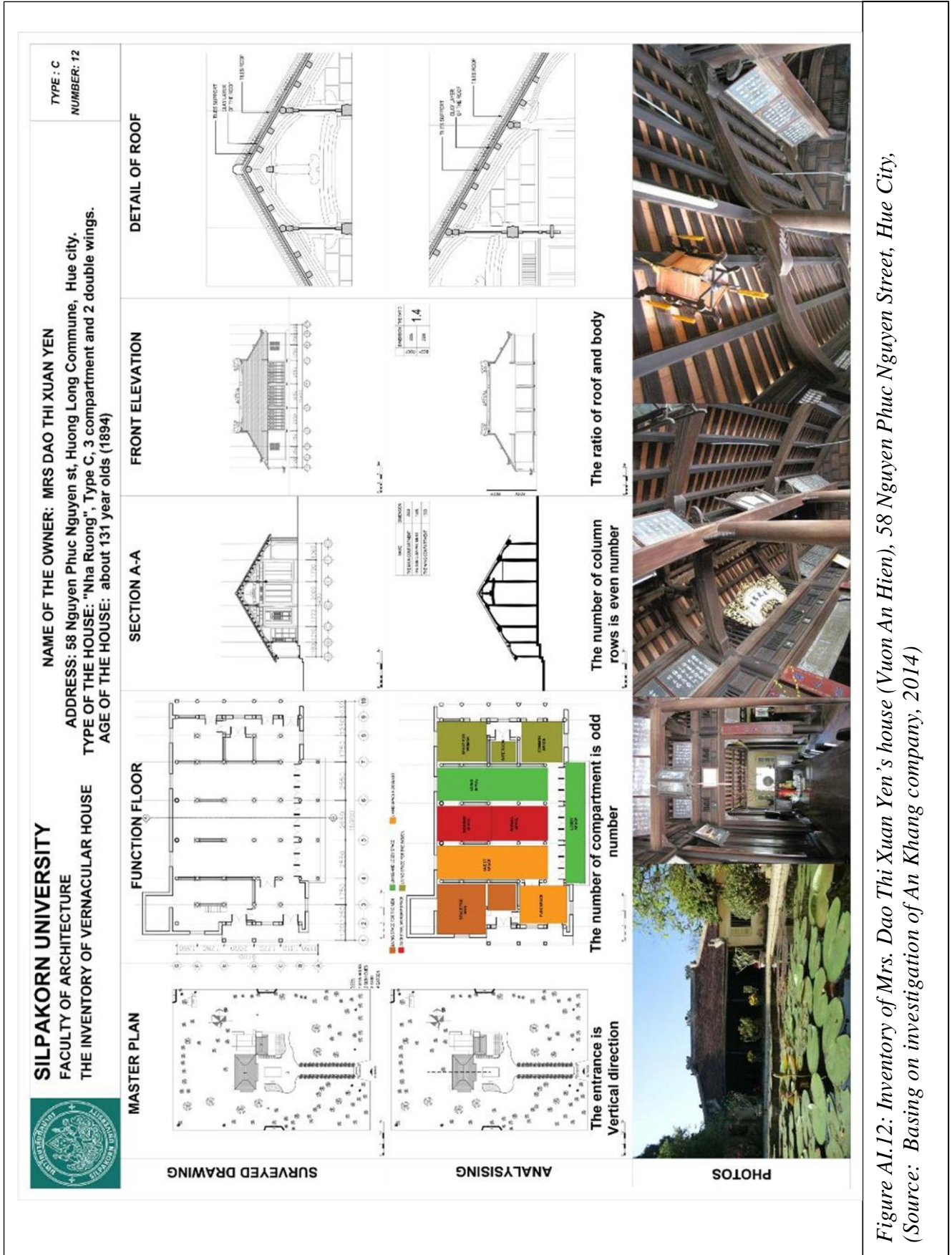


Figure AI.12: Inventory of Mrs. Dao Thi Xuan Yen's house (Vuon An Hien), 58 Nguyen Phuc Nguyen Street, Hue City, (Source: Basing on investigation of An Khang company, 2014)

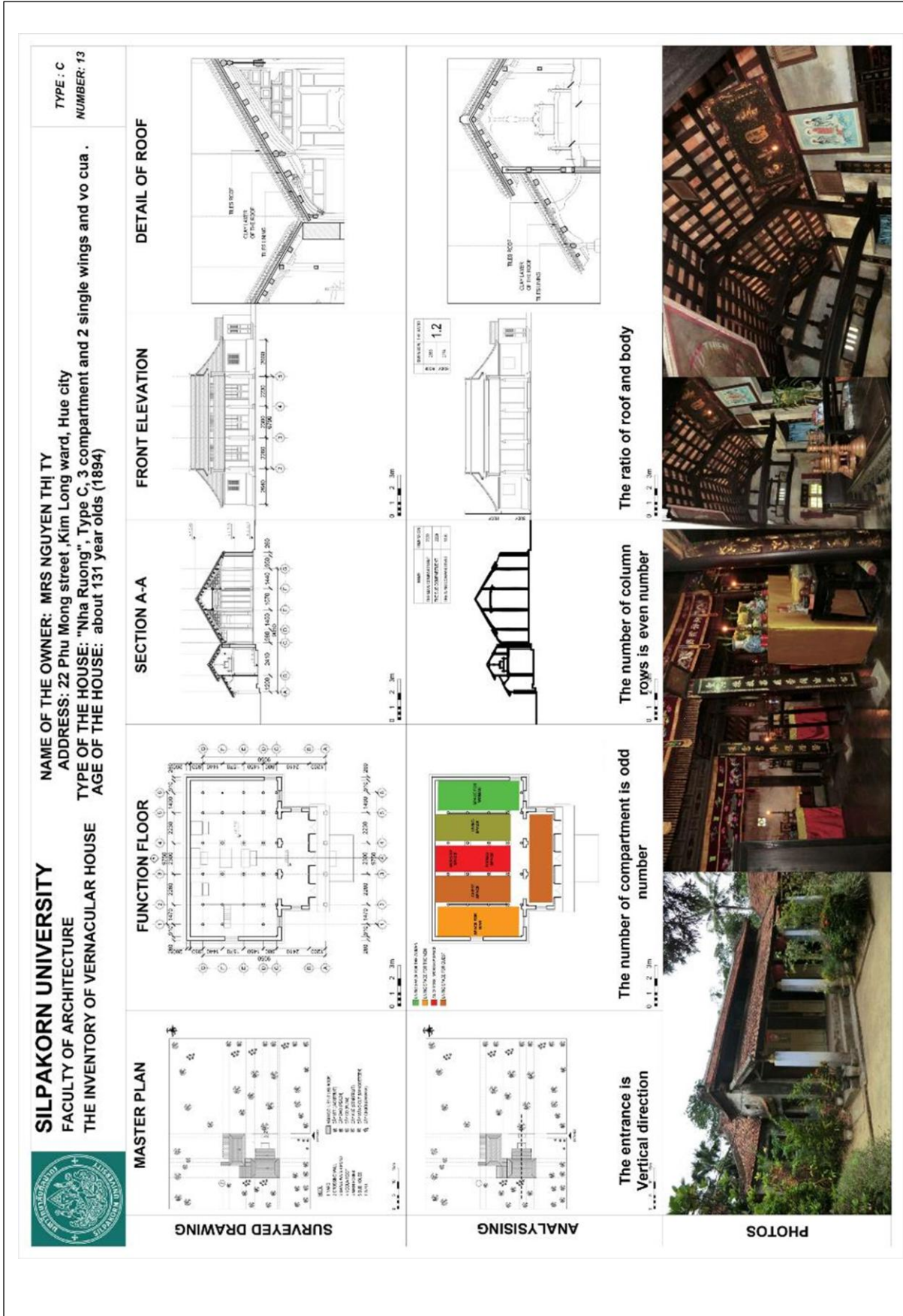


Figure AI.13: Inventory of Mrs. Nguyen Thi Ty's house, 22 Phu Mong Street, Kim Long, Hue city, (Source: Basing on investigation of An Khang company, 2014)

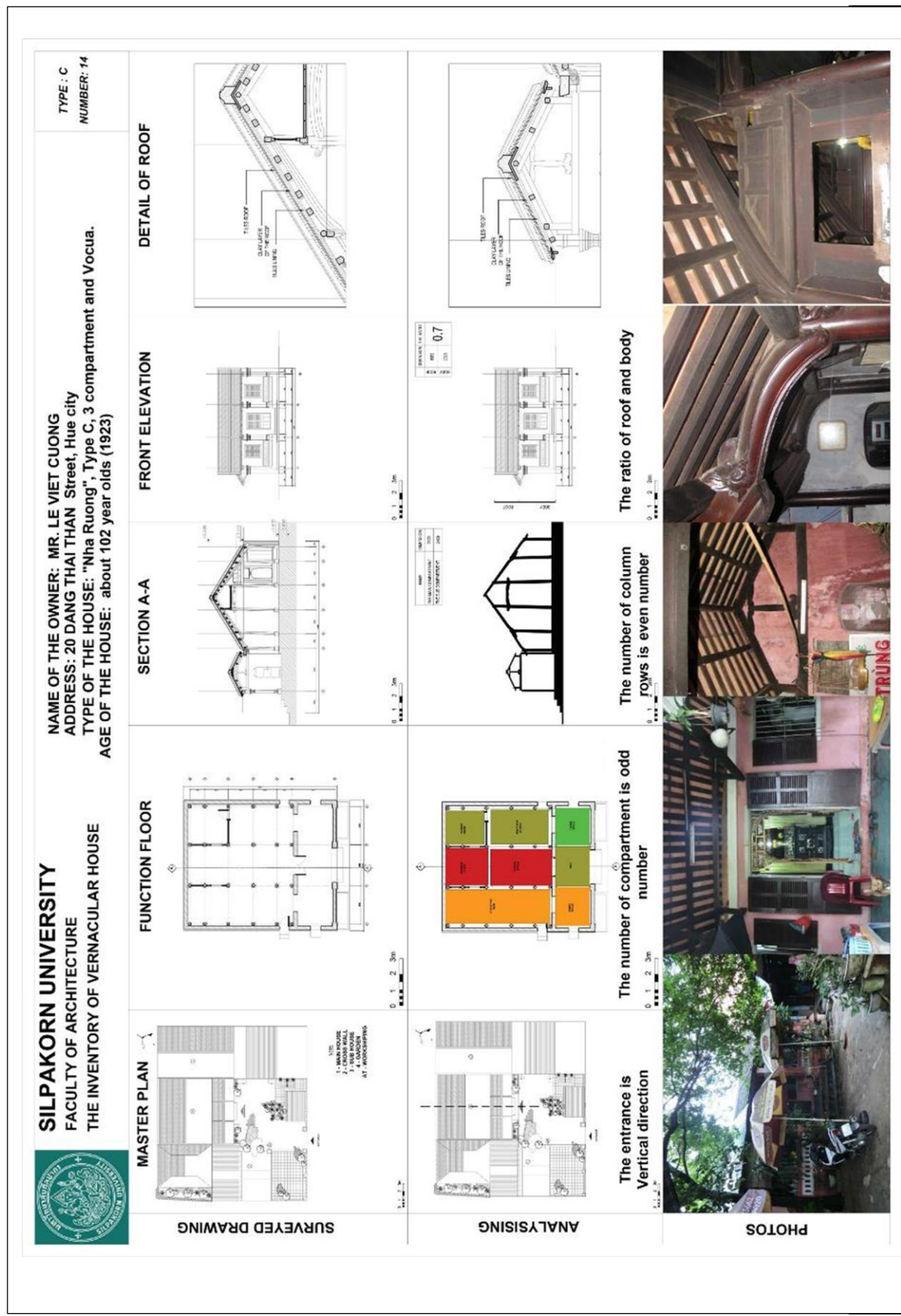


Figure AI.14: Inventory of Mr. Le Viet Cuong's house, 20 Dang Thai Than street, Hue city, (Source: Basing on investigation of An Khang company, 2014)

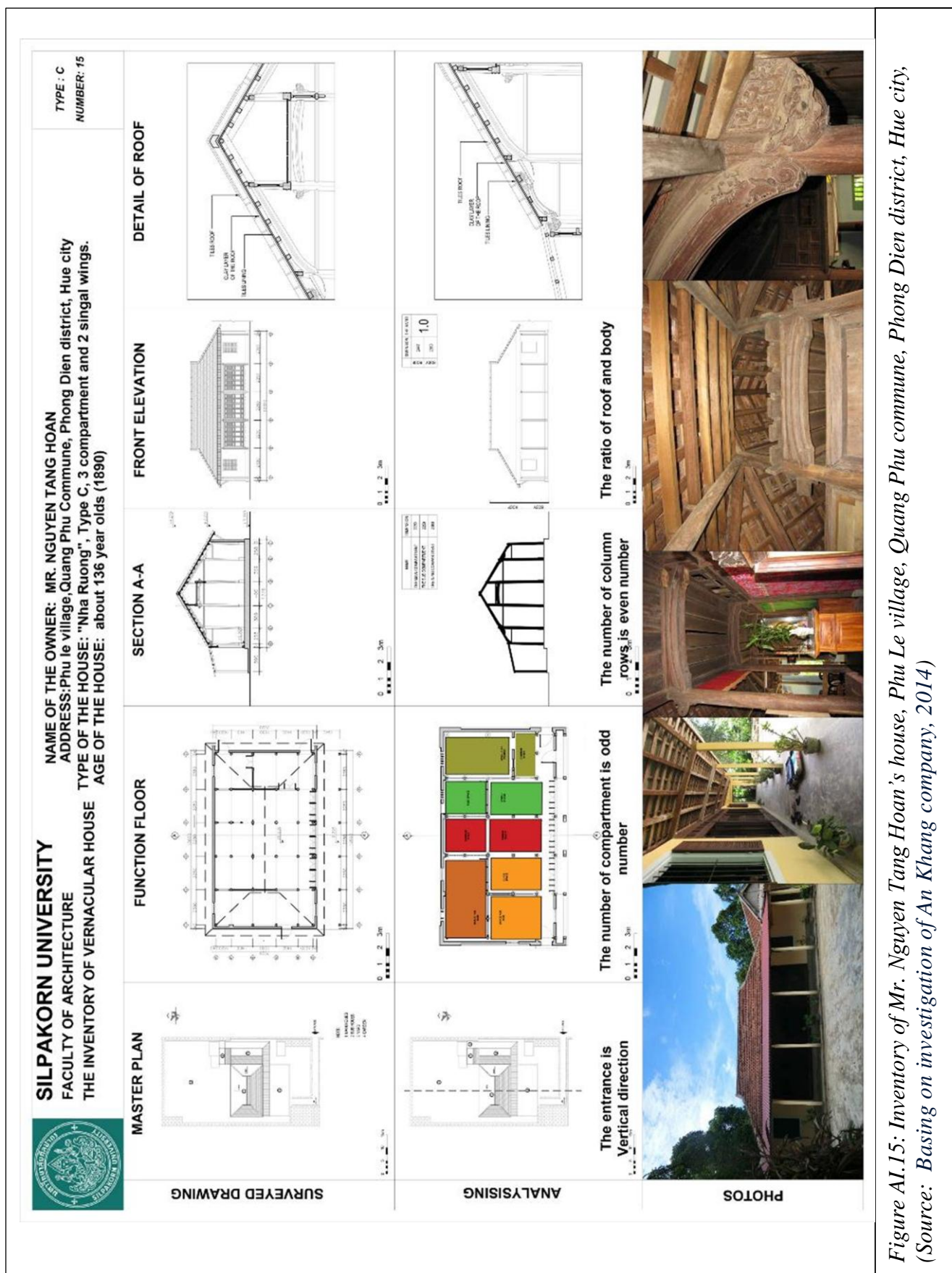


Figure AI.15: Inventory of Mr. Nguyen Tang Hoan's house, Phu Le village, Quang Phu commune, Phong Dien district, Hue city, (Source: Basing on investigation of An Khang company, 2014)

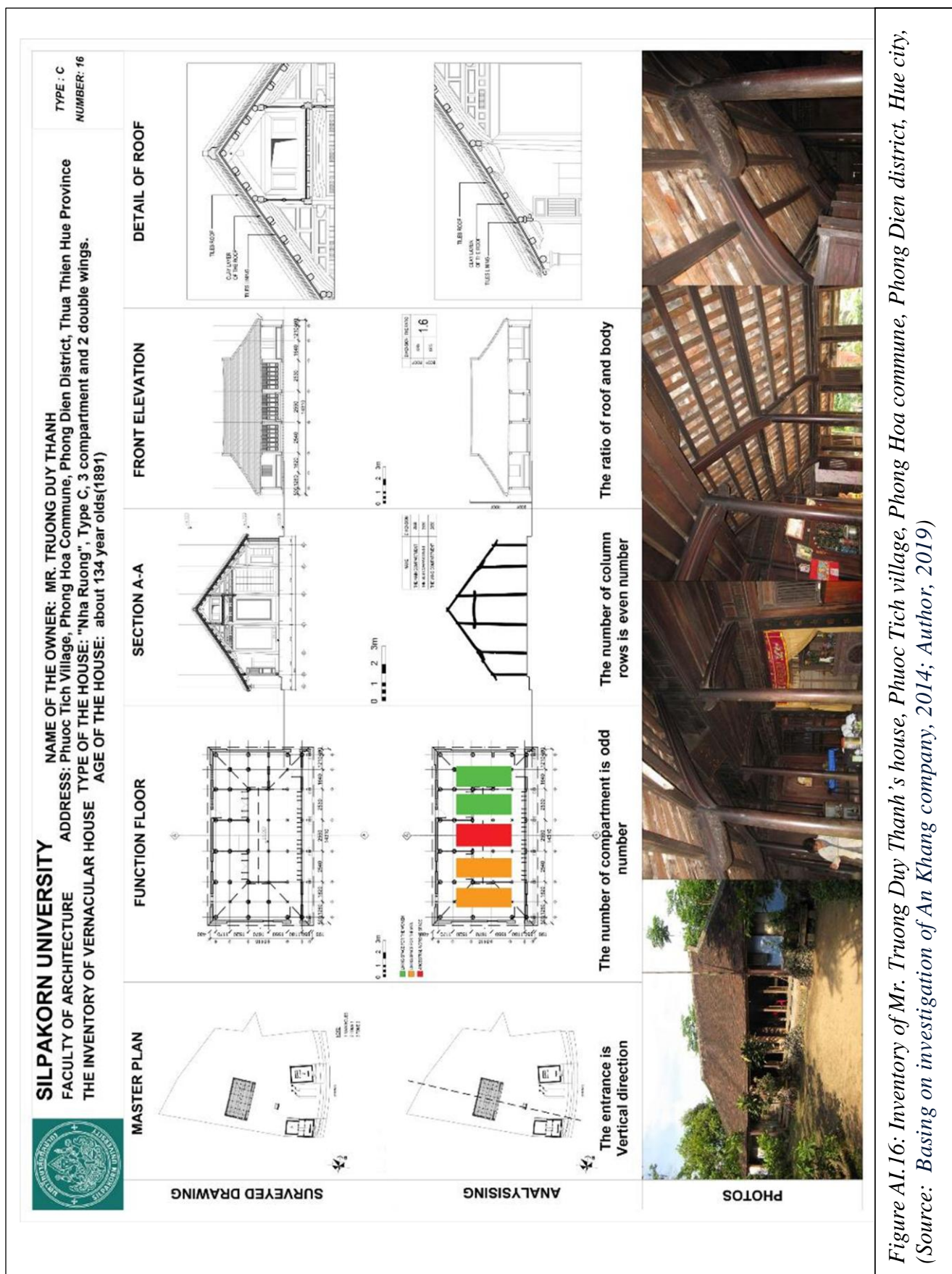


Figure AI.16: Inventory of Mr. Truong Duy Thanh's house, Phuoc Tich village, Phong Hoa commune, Phong Dien district, Hue city, (Source: Basing on investigation of An Khang company, 2014; Author, 2019)

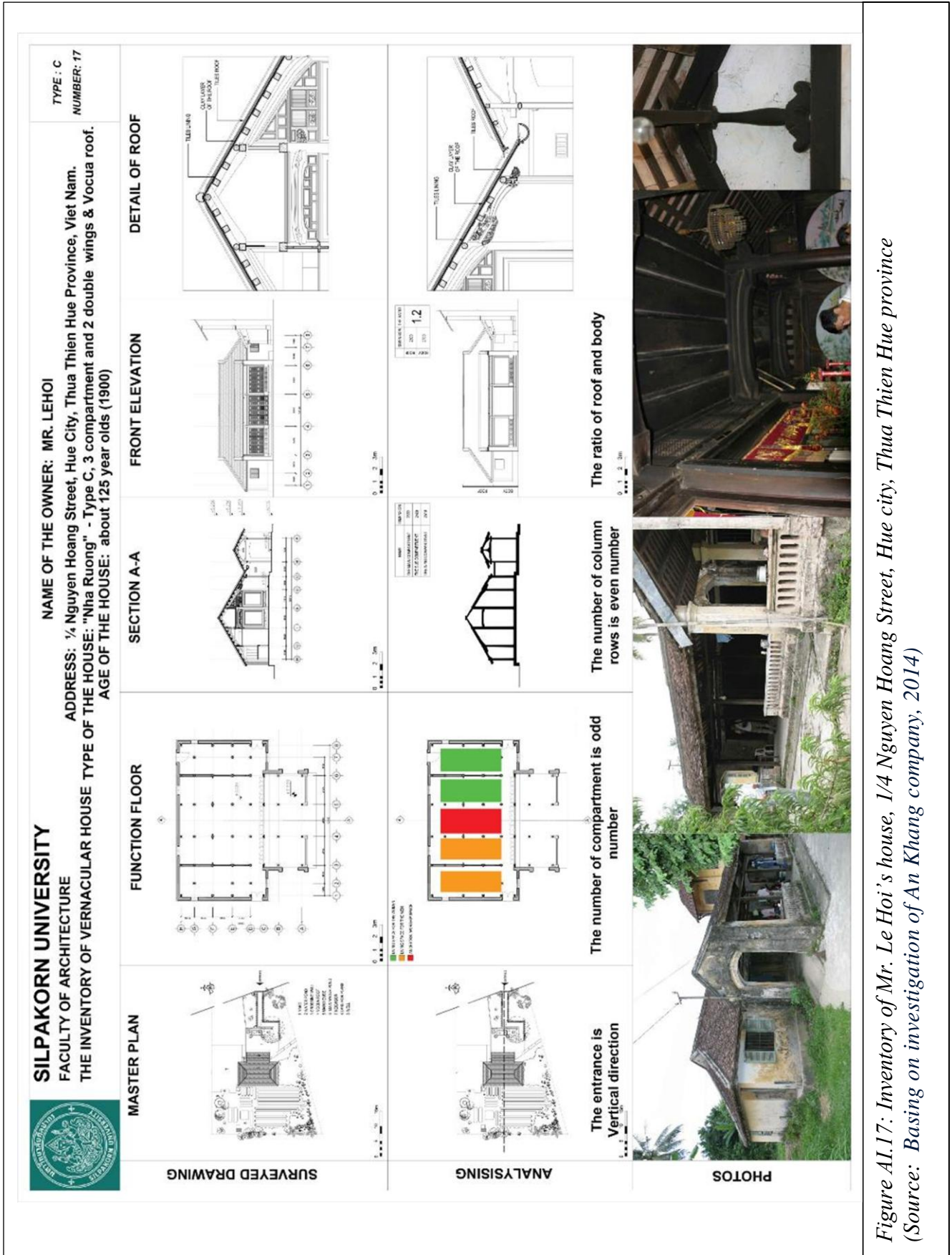


Figure A1.17: Inventory of Mr. Le Hoi's house, 1/4 Nguyen Hoang Street, Hue city, Thua Thien Hue province (Source: Basing on investigation of An Khang company, 2014)

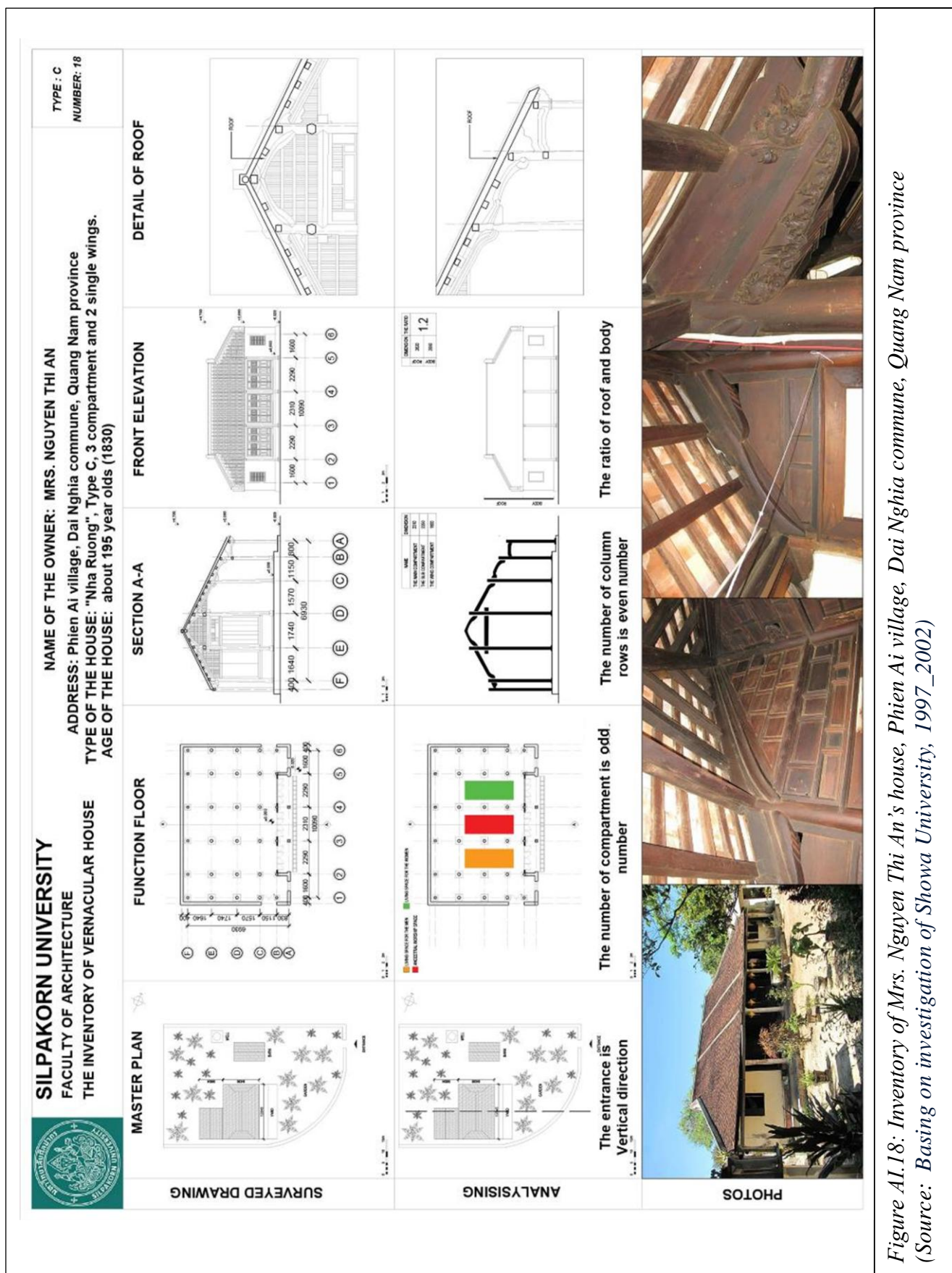


Figure A1.18: Inventory of Mrs. Nguyen Thi An's house, Phien Ai village, Dai Nghia commune, Quang Nam province (Source: Basing on investigation of Showa University, 1997_2002)

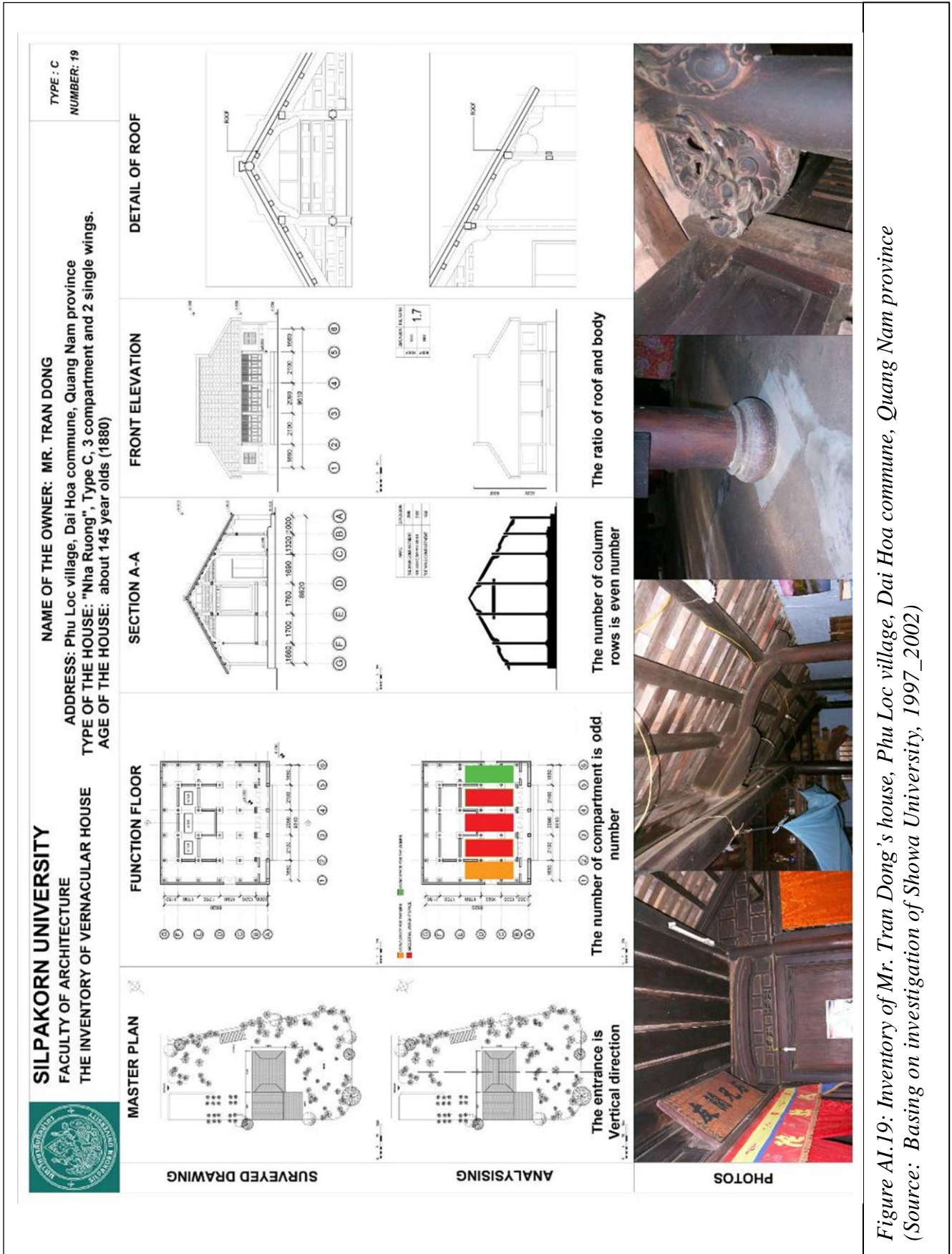


Figure A1.19: Inventory of Mr. Tran Dong's house, Phu Loc village, Dai Hoa commune, Quang Nam province (Source: Basing on investigation of Showa University, 1997_2002)



Figure AI.20: Inventory of Mr. Nguyen Duc Bay's house, Nghia Nam village, Dai Hoa commune, Quang Nam province (Source: Basing on investigation of Showa University, 1997_2002)

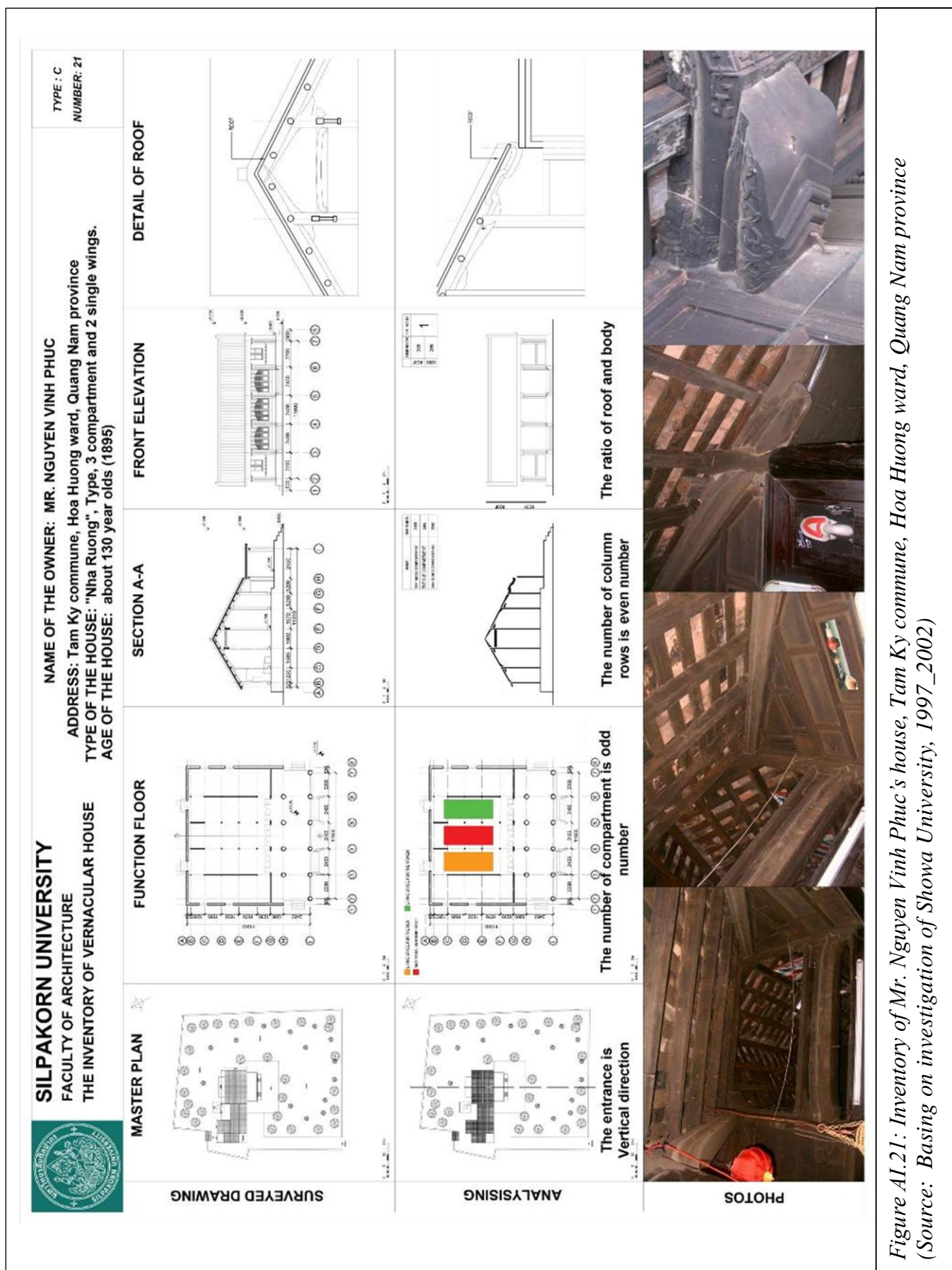


Figure A1.21: Inventory of Mr. Nguyen Vinh Phuc's house, Tam Ky commune, Hoa Huong ward, Quang Nam province (Source: Basing on investigation of Showa University, 1997_2002)

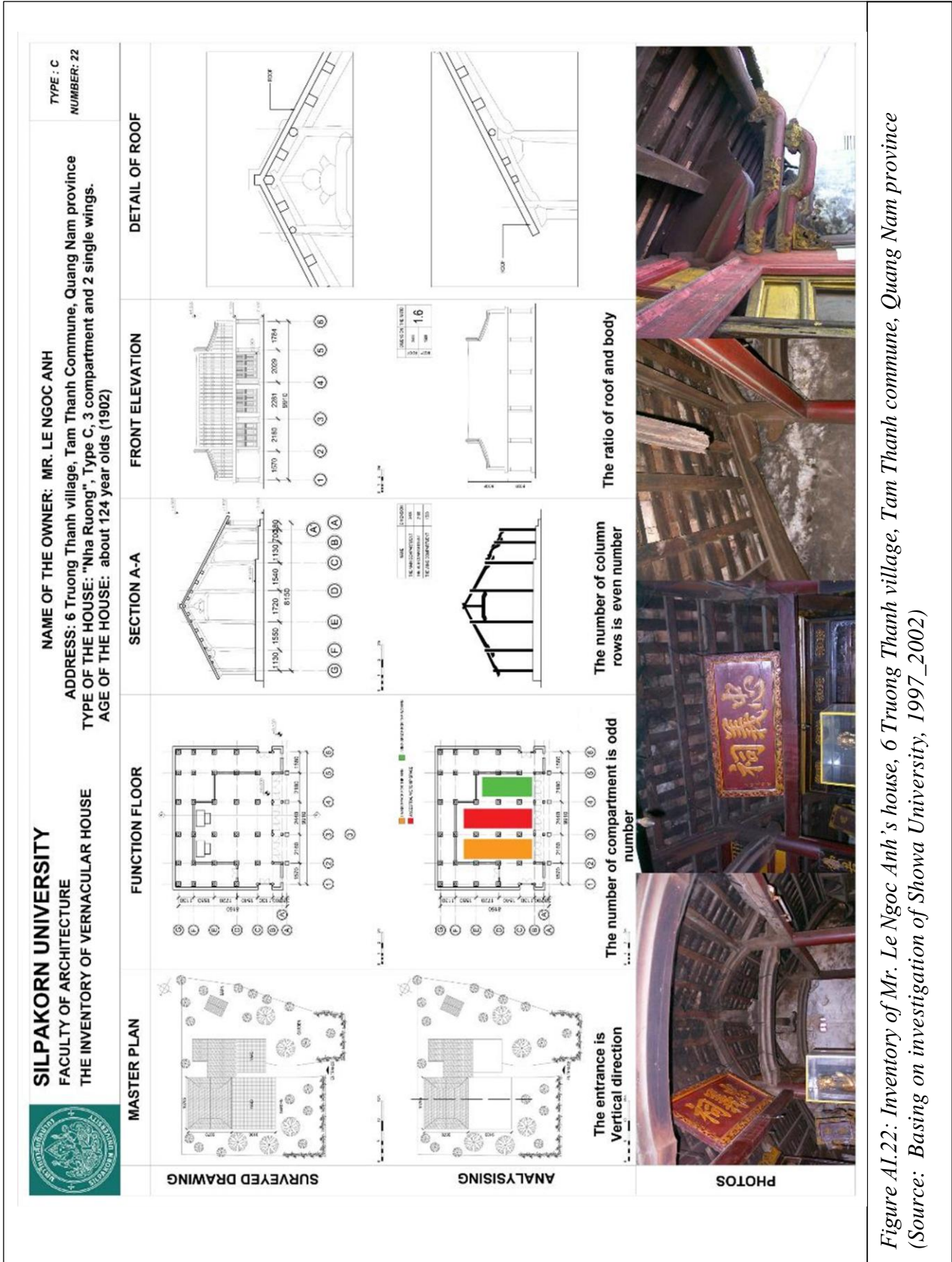


Figure A1.22: Inventory of Mr. Le Ngoc Anh's house, 6 Truong Thanh village, Tam Thanh commune, Quang Nam province (Source: Basing on investigation of Showa University, 1997_2002)

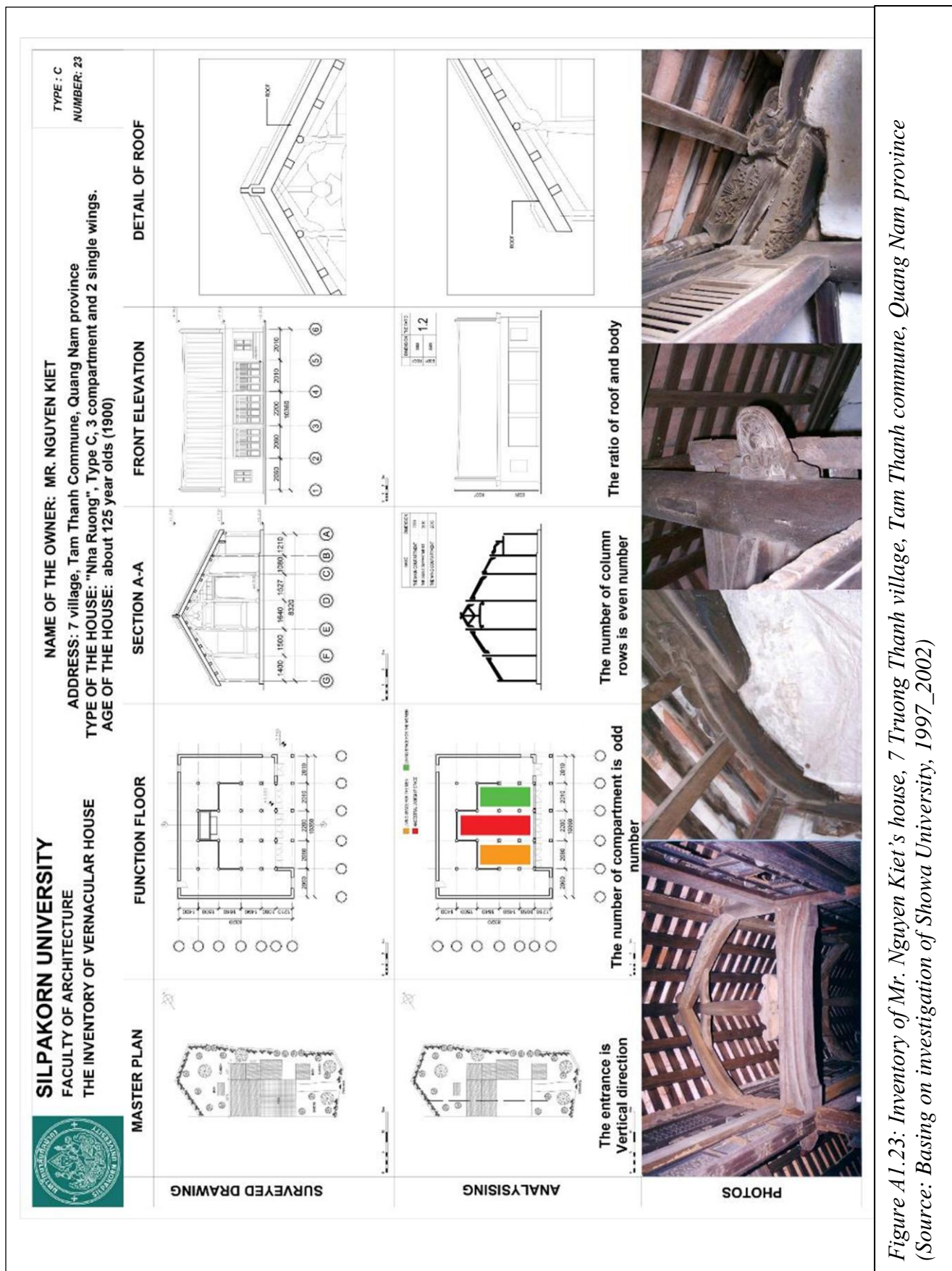


Figure A1.23: Inventory of Mr. Nguyen Kiet's house, 7 Truong Thanh village, Tam Thanh commune, Quang Nam province (Source: Basing on investigation of Showa University, 1997_2002)

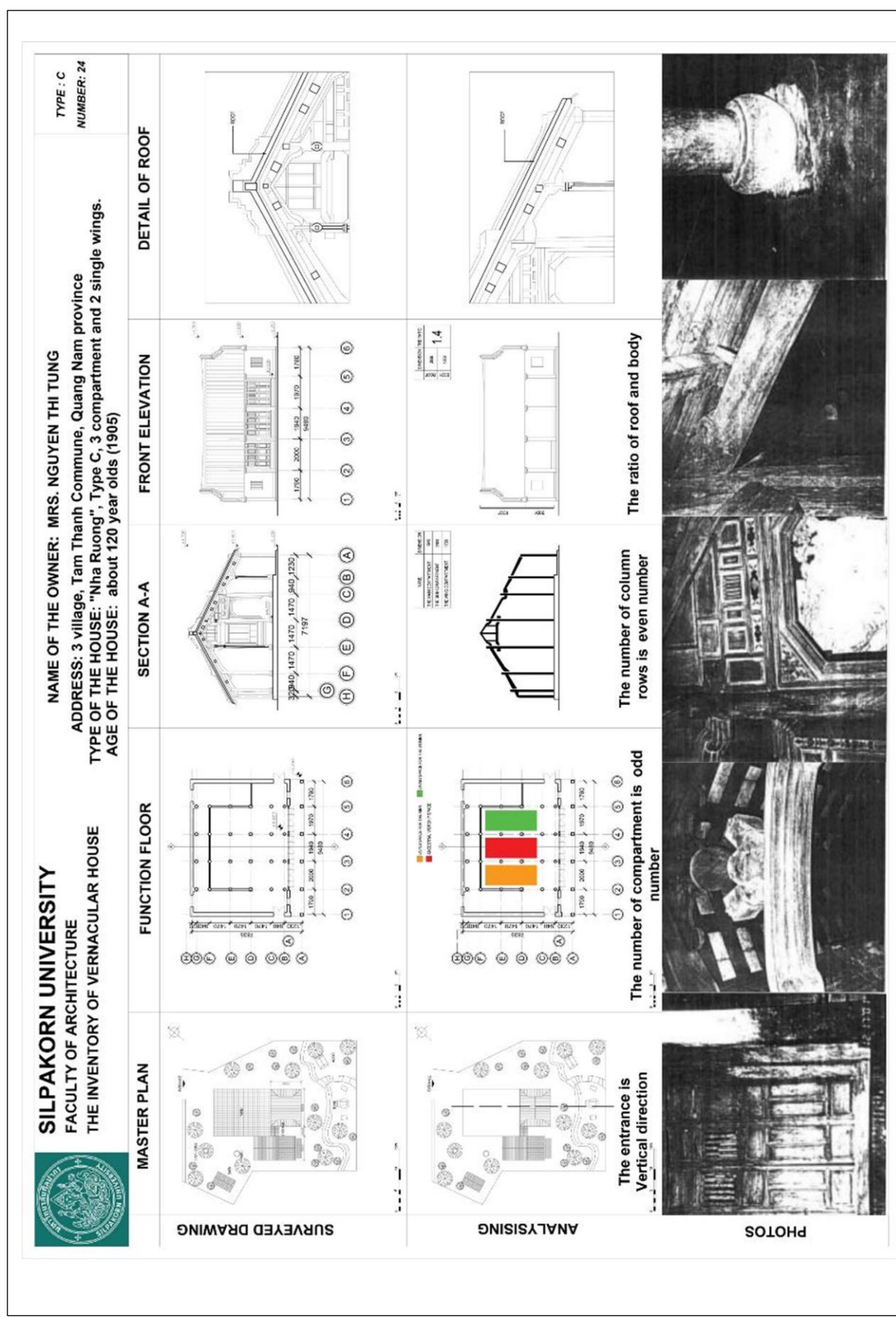


Figure A1.24: Inventory of Mrs. Nguyen Thi Tung's house, 3 Truong Thanh village, Tam Thanh commune, Quang Nam province (Source: Basing on investigation of Showa University, 1997_2002)

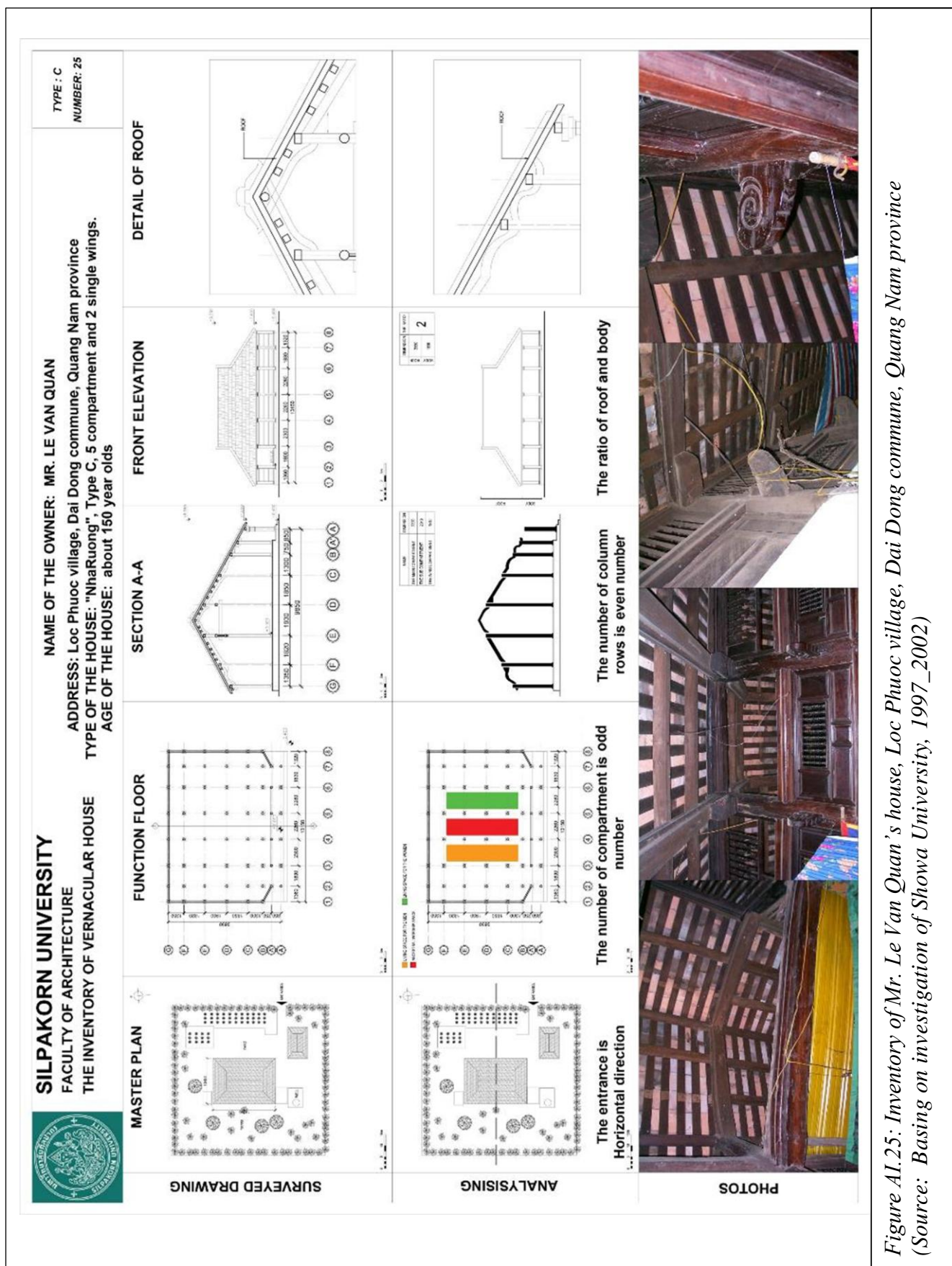


Figure A1.25: Inventory of Mr. Le Van Quan's house, Loc Phuoc village, Dai Dong commune, Quang Nam province (Source: Basing on investigation of Showa University, 1997_2002)

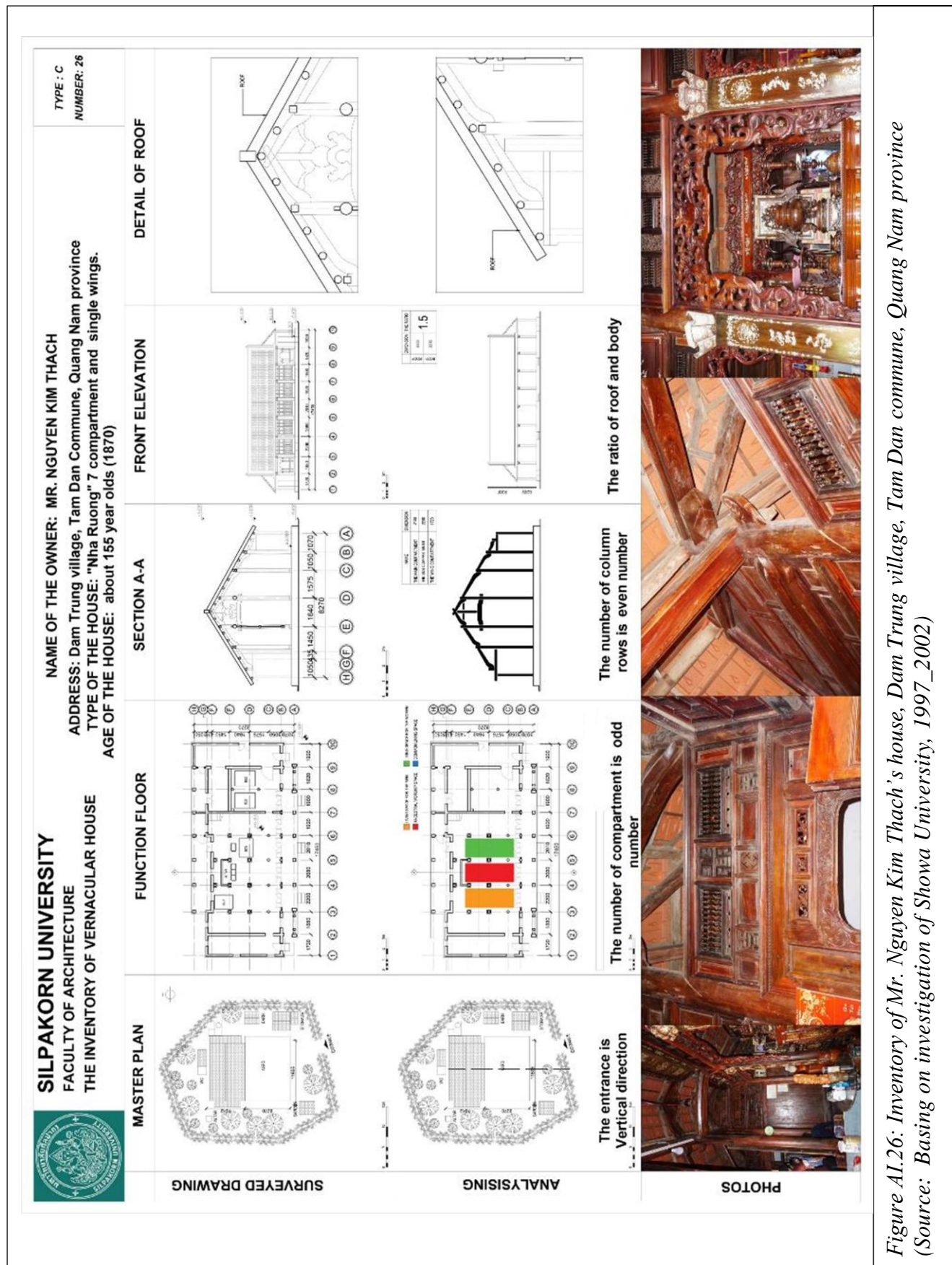


Figure A1.26: Inventory of Mr. Nguyen Kim Thach's house, Dam Trung village, Tam Dan commune, Quang Nam province (Source: Basing on investigation of Showa University, 1997_2002)

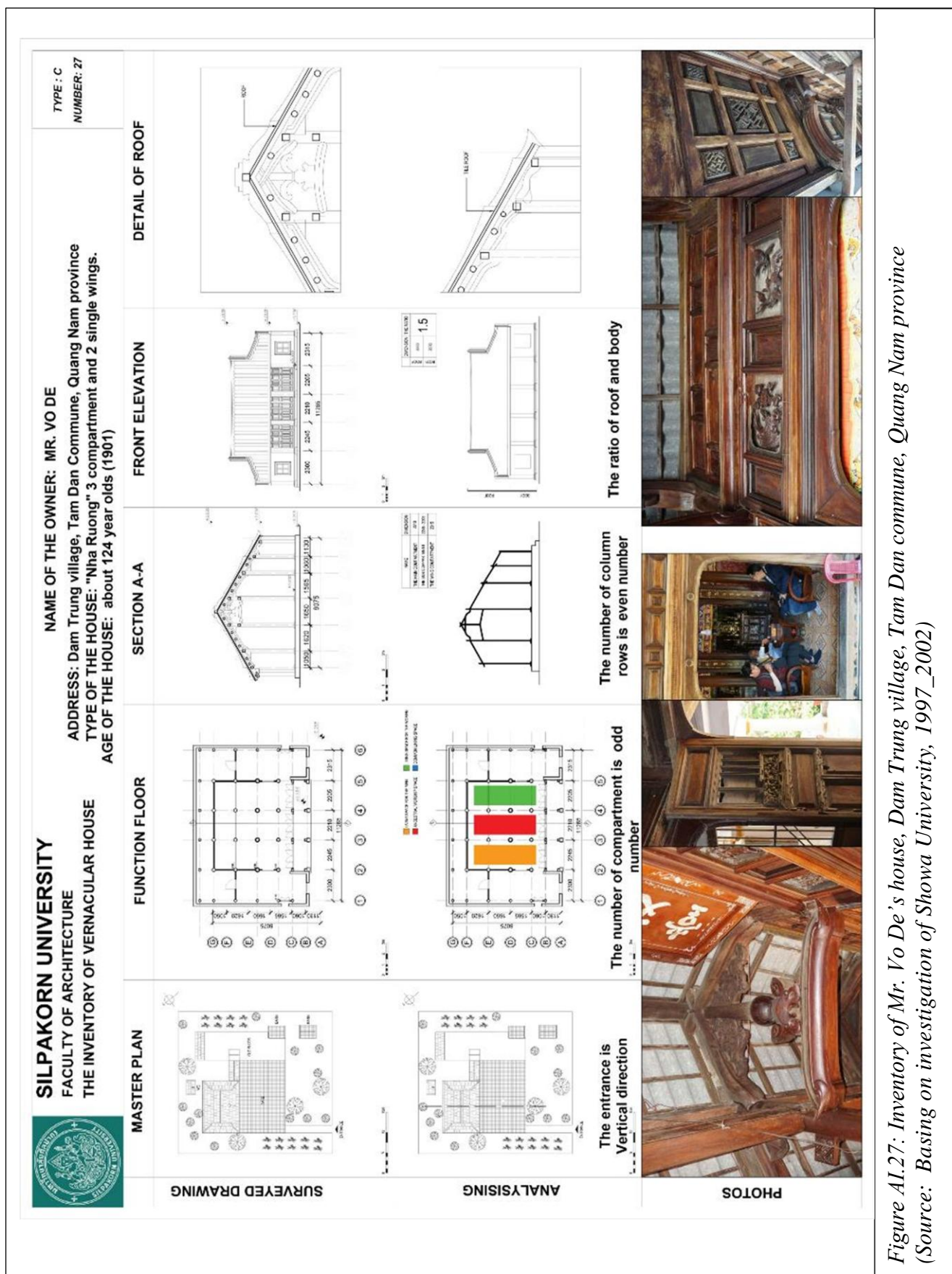


Figure A1.27: Inventory of Mr. Vo De's house, Dam Trung village, Tam Dan commune, Quang Nam province (Source: Basing on investigation of Showa University, 1997_2002)

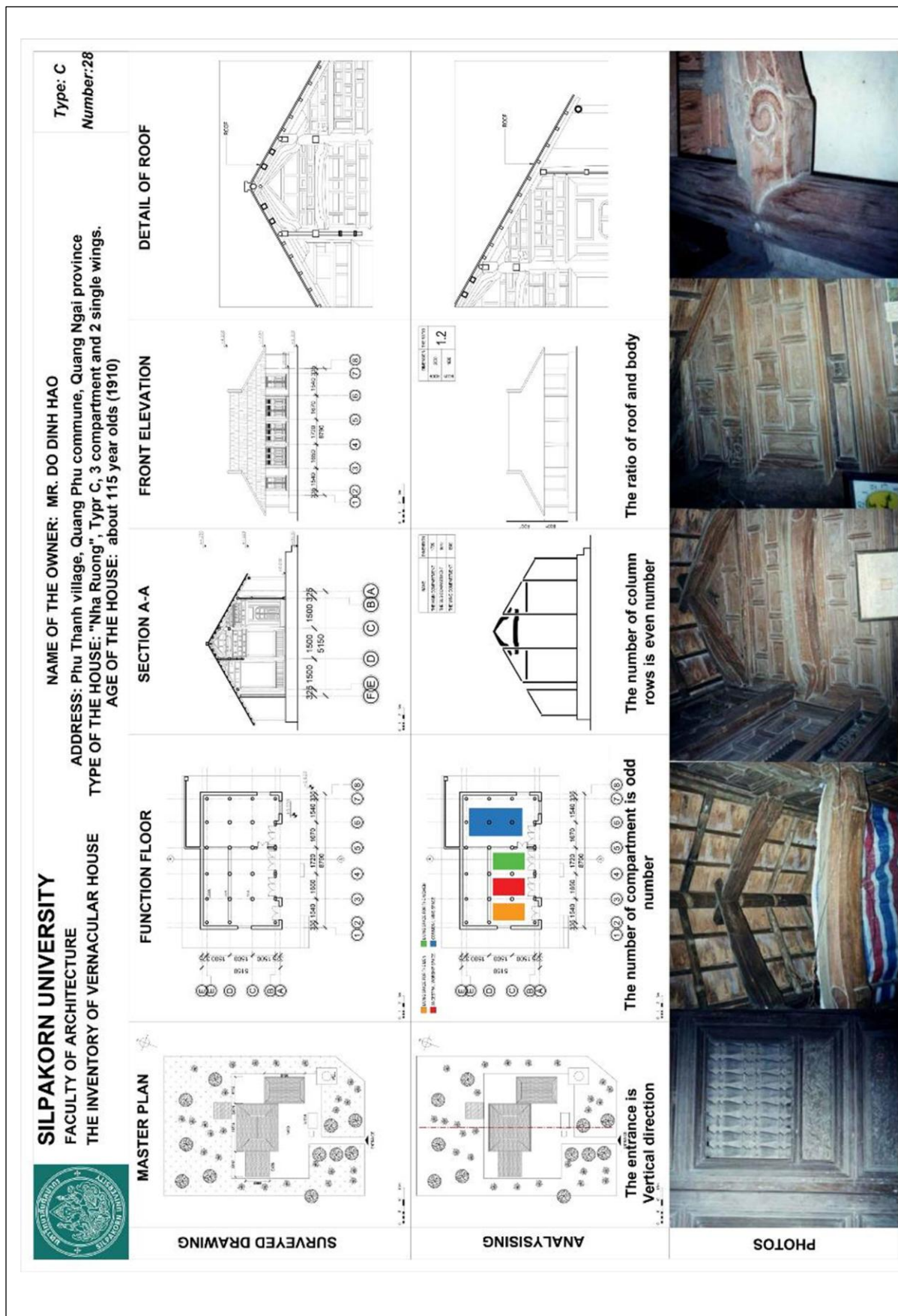


Figure A1.28: Inventory of Mr. Do Van Hao's house, Phu Thanh village, Quang Phu commune, Quang Ngai province (Source: Basing on investigation of Showa University, 1997_2002)

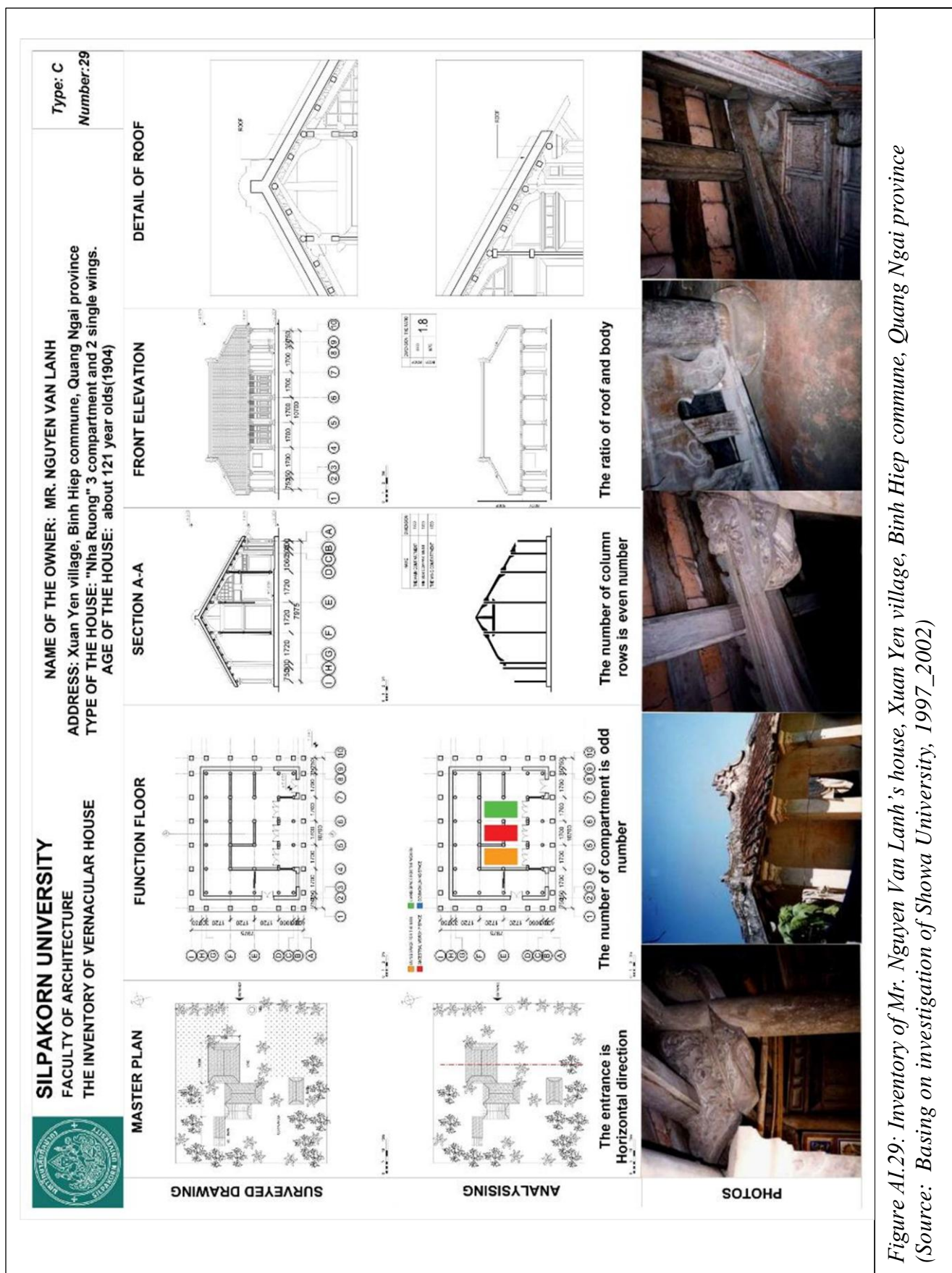


Figure A1.29: Inventory of Mr. Nguyen Van Lanh's house, Xuan Yen village, Binh Hiep commune, Quang Ngai province (Source: Basing on investigation of Showa University, 1997_2002)

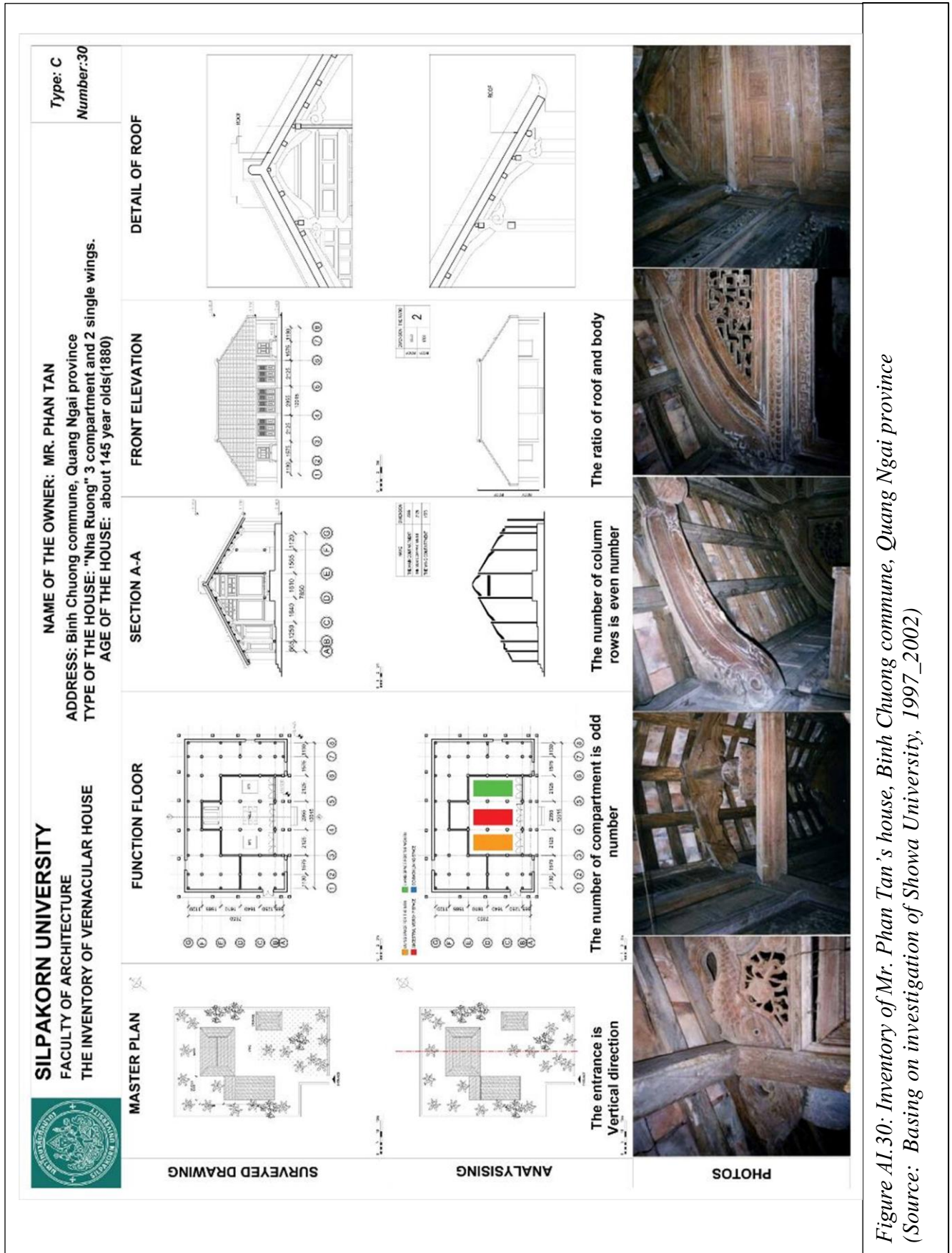


Figure AI.30: Inventory of Mr. Phan Tan's house, Binh Chuong commune, Quang Ngai province (Source: Basing on investigation of Showa University, 1997_2002)

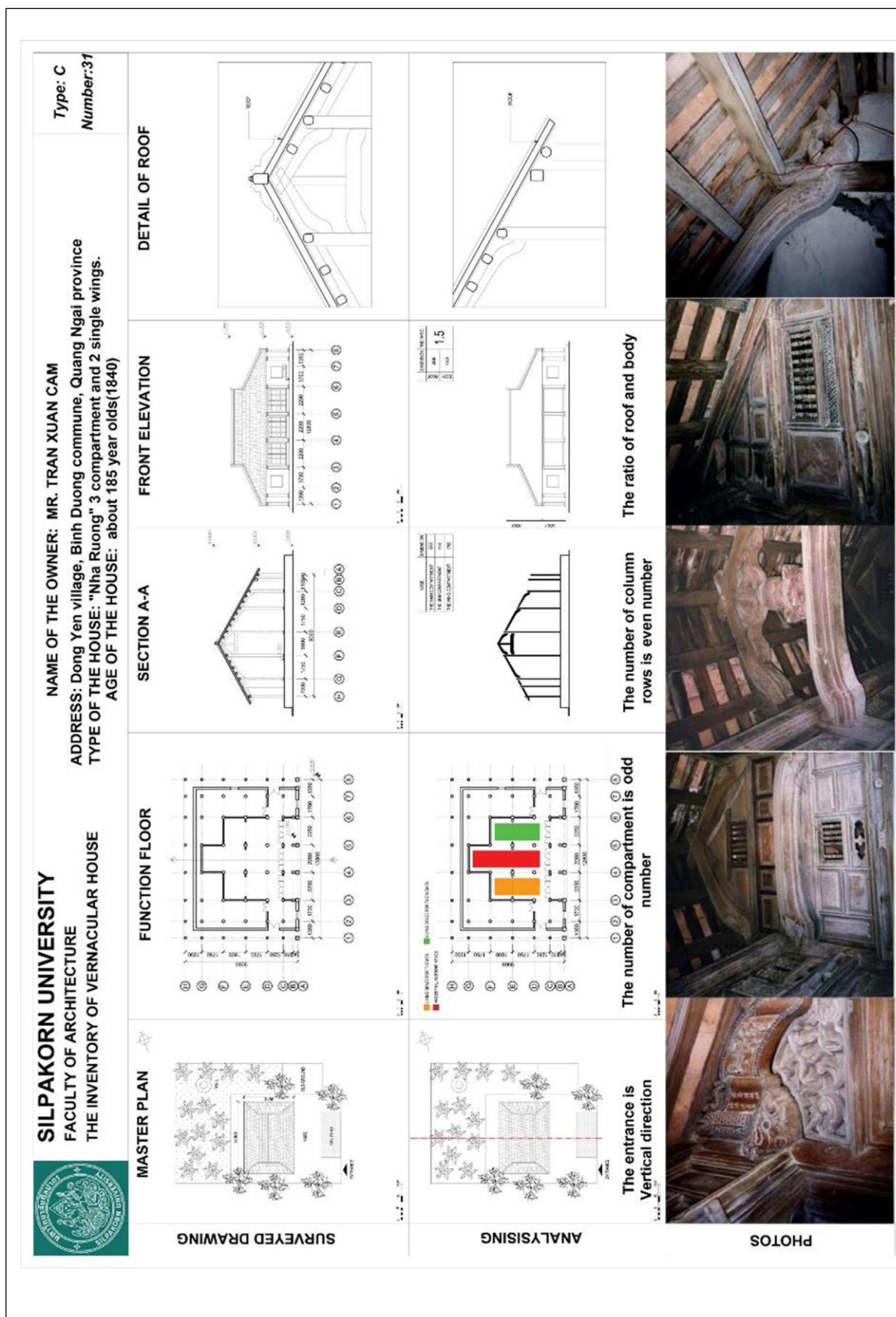


Figure A1.31: Inventory of Mr. Tran Xuan Cam's house, Dong Yen village, Binh Duong commune, Quang Ngai province (Source: Basing on investigation of Showa University, 1997_2002)

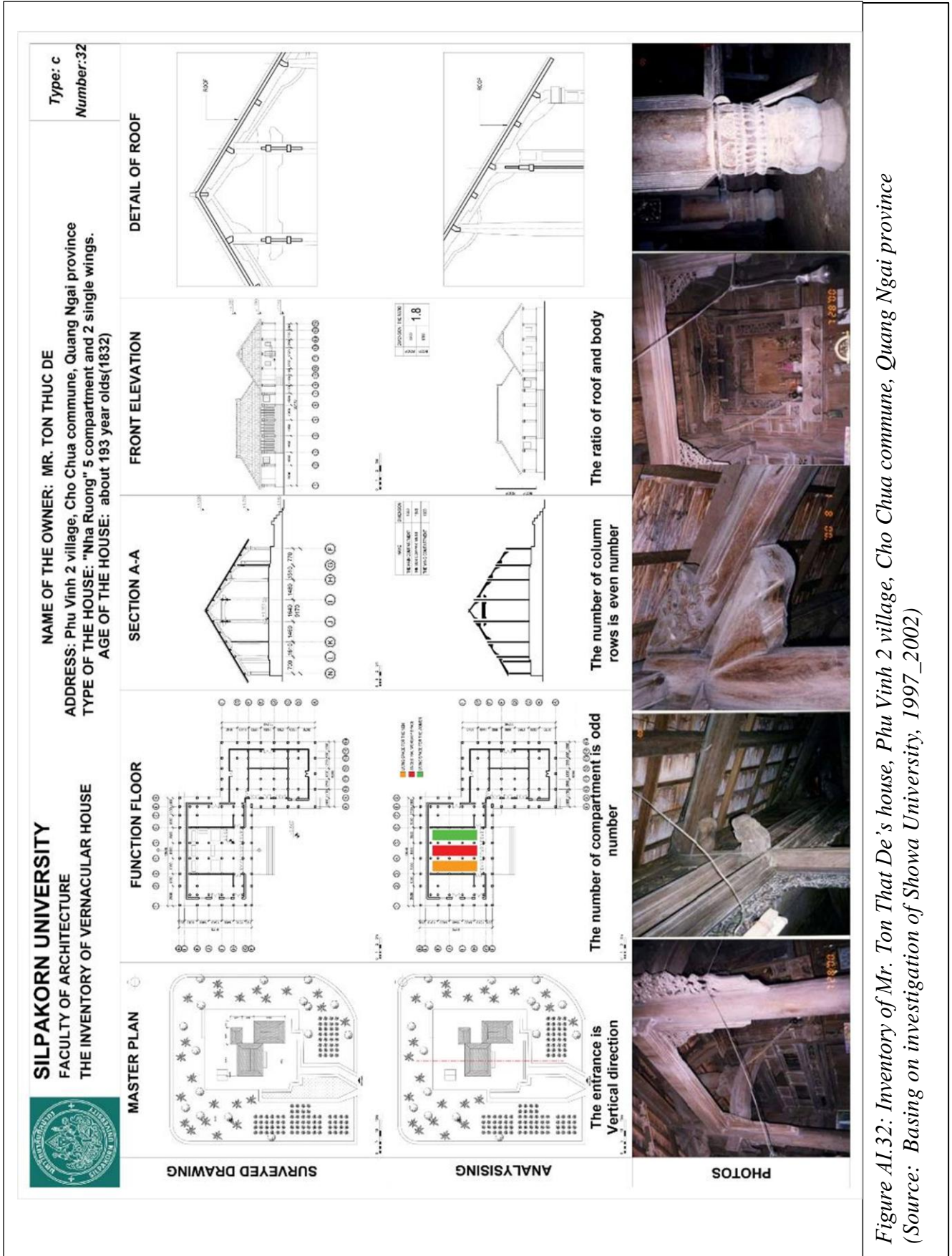


Figure AI.32: Inventory of Mr. Ton That De's house, Phu Vinh 2 village, Cho Chua commune, Quang Ngai province (Source: Basing on investigation of Showa University, 1997_2002)

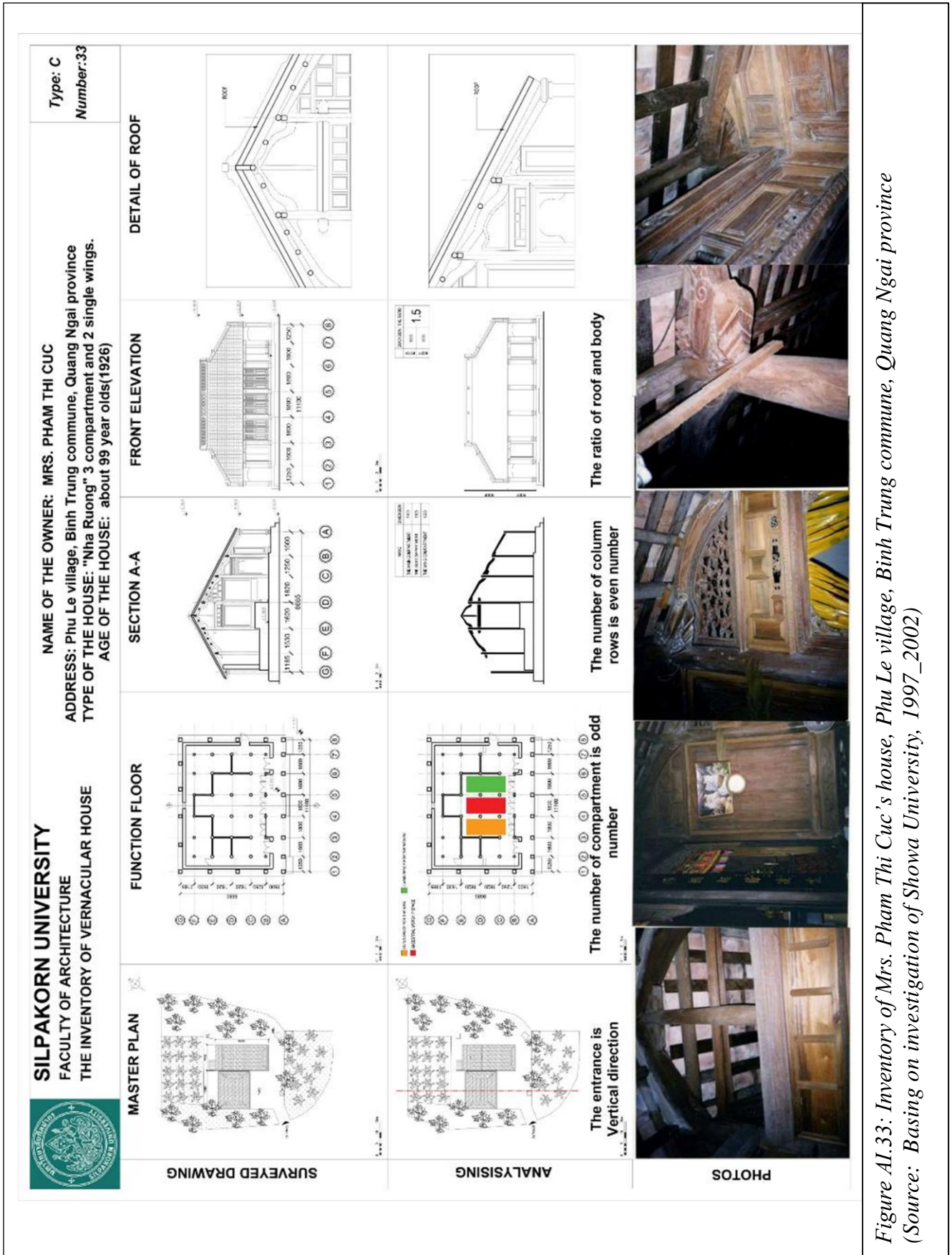


Figure A1.33: Inventory of Mrs. Pham Thi Cuc's house, Phu Le village, Binh Trung commune, Quang Ngai province (Source: Basing on investigation of Showa University, 1997_2002)

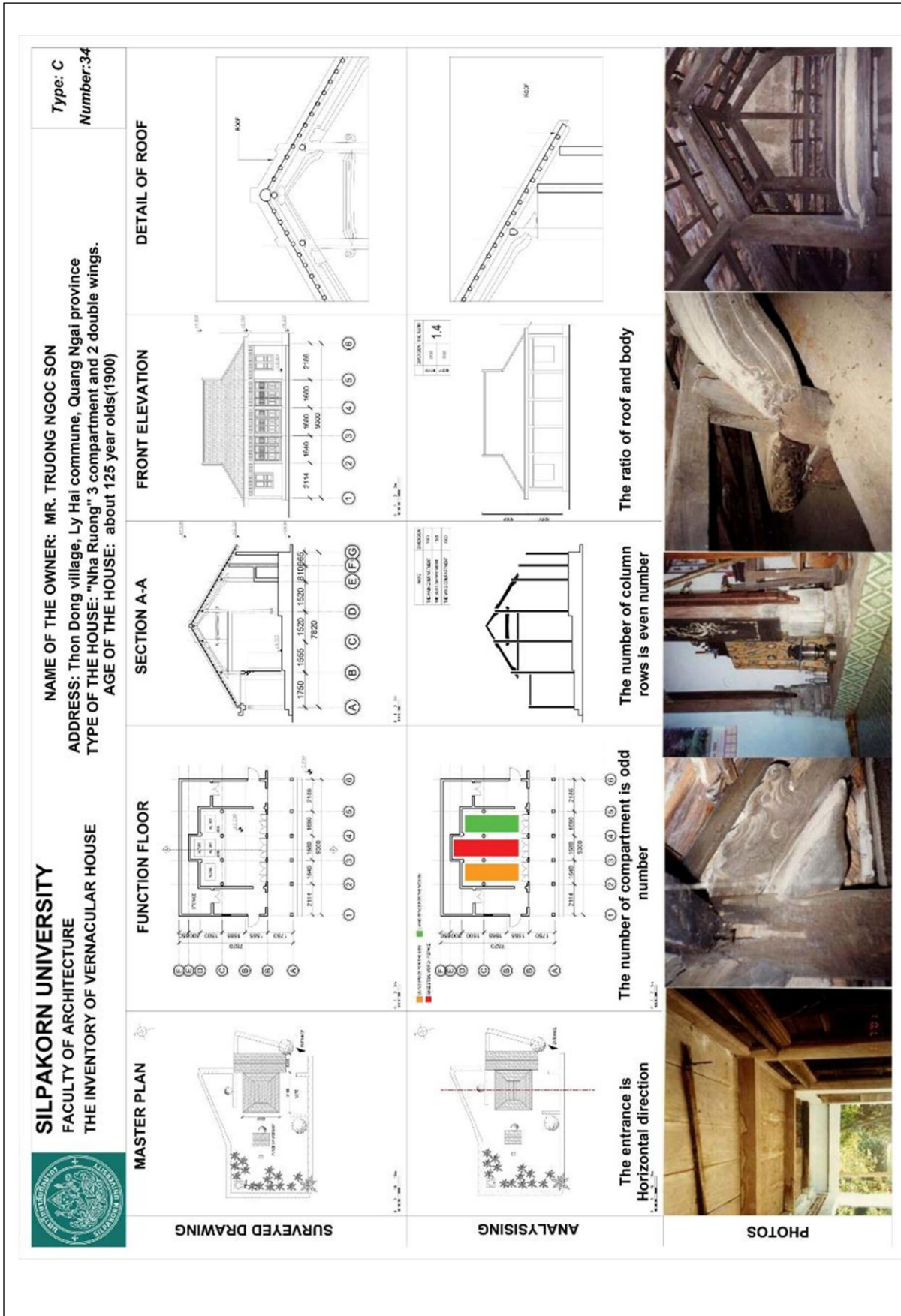


Figure A1.34: Inventory of Mr. Tran Ngoc Son's house, Thon Dong village, Ly Hai commune, Ly Son Island, Quang Ngai province (Source: Basing on investigation of Showa University, 1997_2002)



Figure AI.35: Inventory of Mr. Le Van Ho's house, Thon Tay village, Ly Hai commune, Ly Son Island, Quang Ngai province (Source: Basing on investigation of Author, 2021)

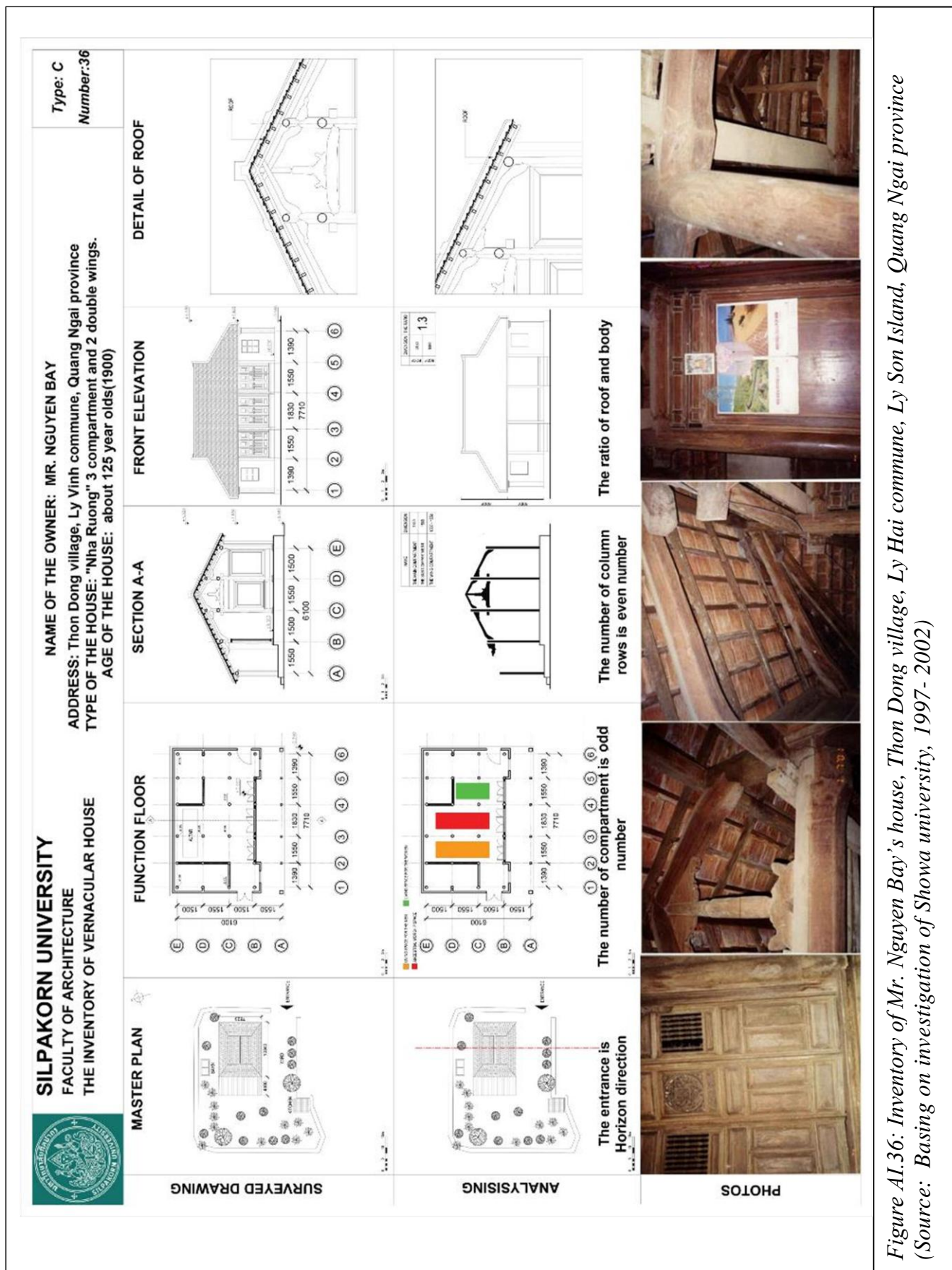


Figure AI.36: Inventory of Mr. Nguyen Bay's house, Thon Dong village, Ly Hai commune, Ly Son Island, Quang Ngai province (Source: Basing on investigation of Showa university, 1997- 2002)

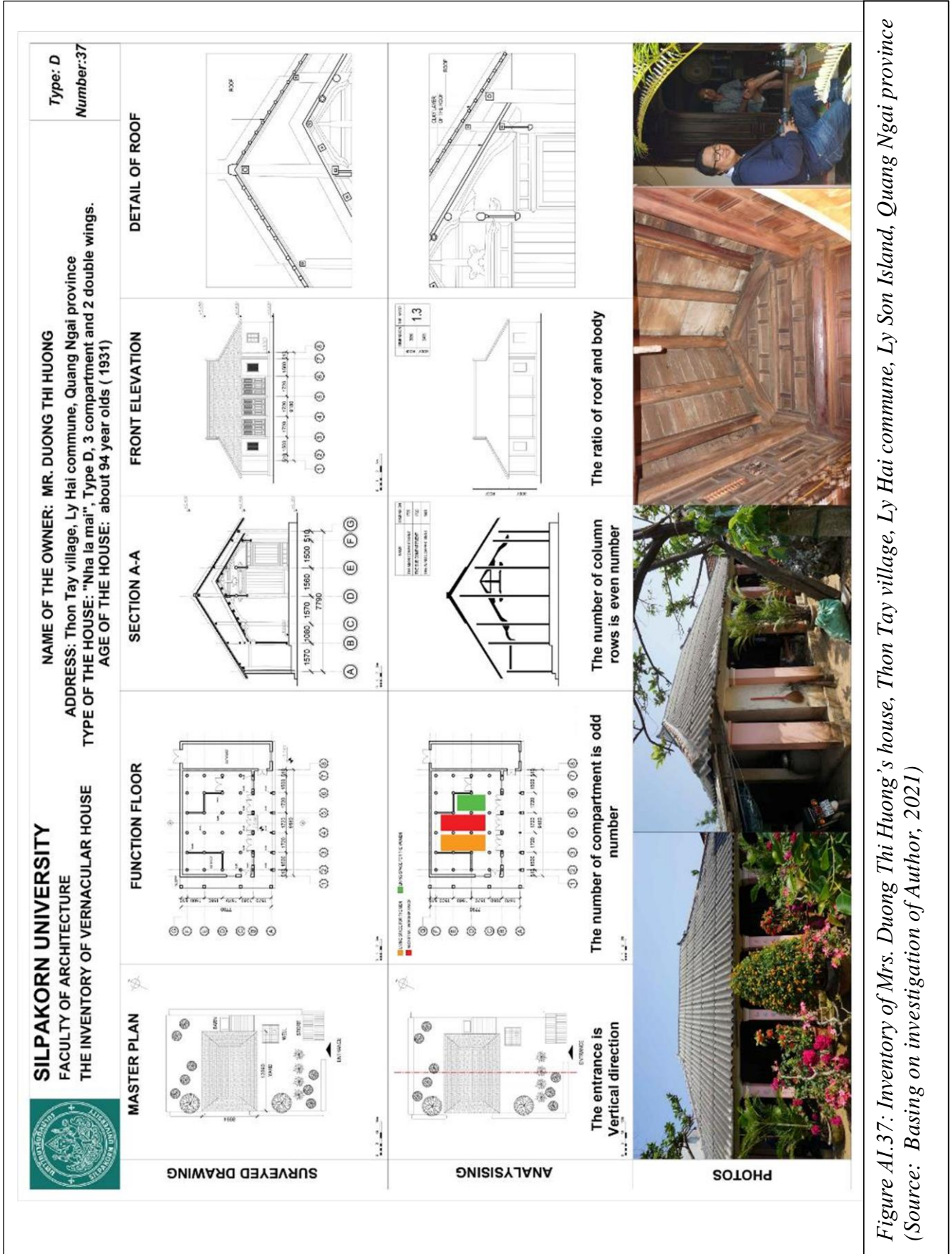


Figure A1.37: Inventory of Mrs. Duong Thi Huong's house, Thon Tay village, Ly Hai commune, Ly Son Island, Quang Ngai province (Source: Basing on investigation of Author, 2021)

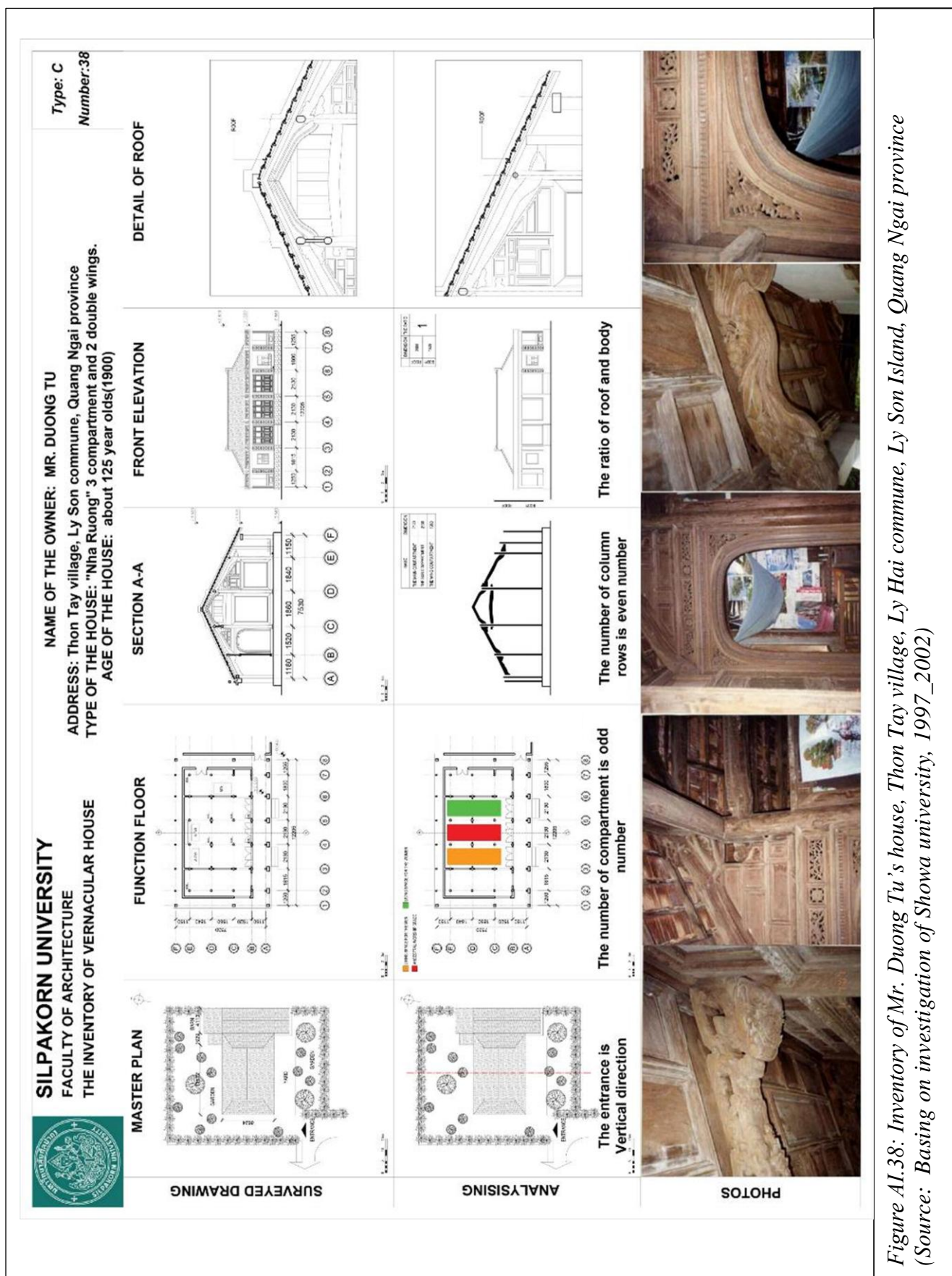


Figure AI.38: Inventory of Mr. Duong Tu's house, Thon Tay village, Ly Son commune, Ly Son Island, Quang Ngai province (Source: Basing on investigation of Showa university, 1997_2002)

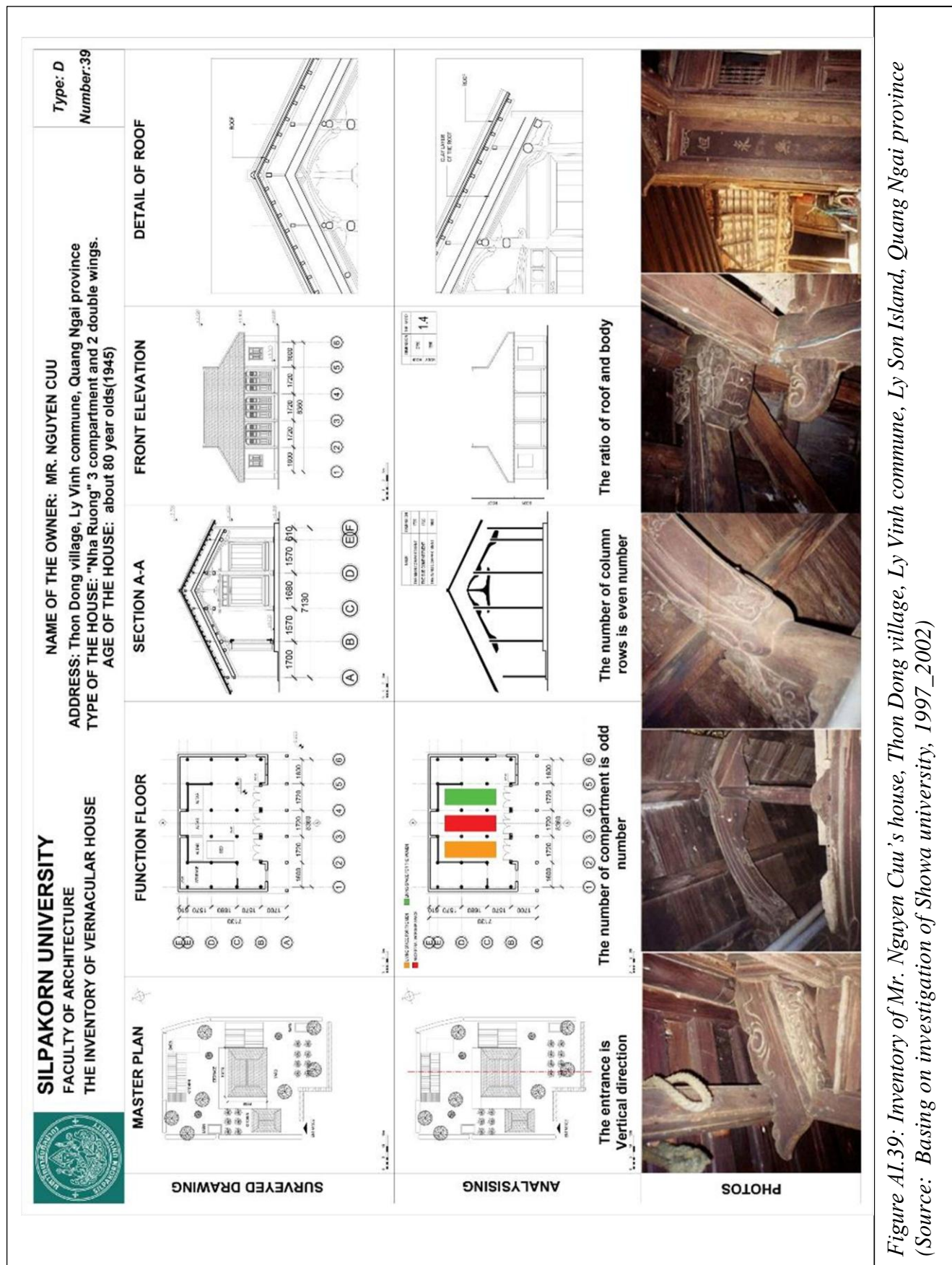


Figure A1.39: Inventory of Mr. Nguyen Cui's house, Thon Dong village, Ly Vinh commune, Ly Son Island, Quang Ngai province (Source: Basing on investigation of Showa university, 1997_2002)

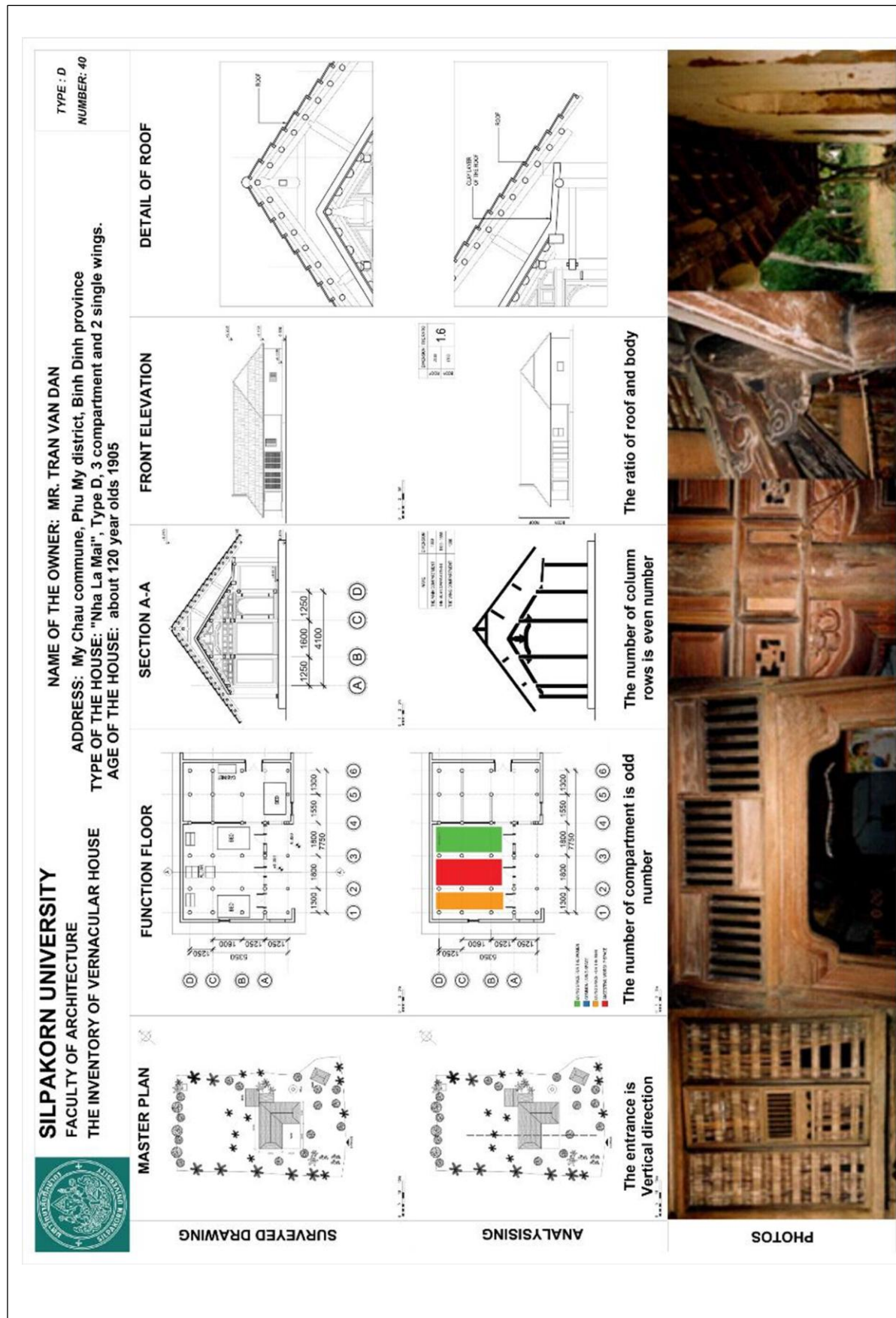


Figure AI.40: Inventory of Mr. Tran Van Dan's house, My Chau commune, Phu My district, Binh Dinh province (Source: Basing on investigation of Showa university, 1997_2002)

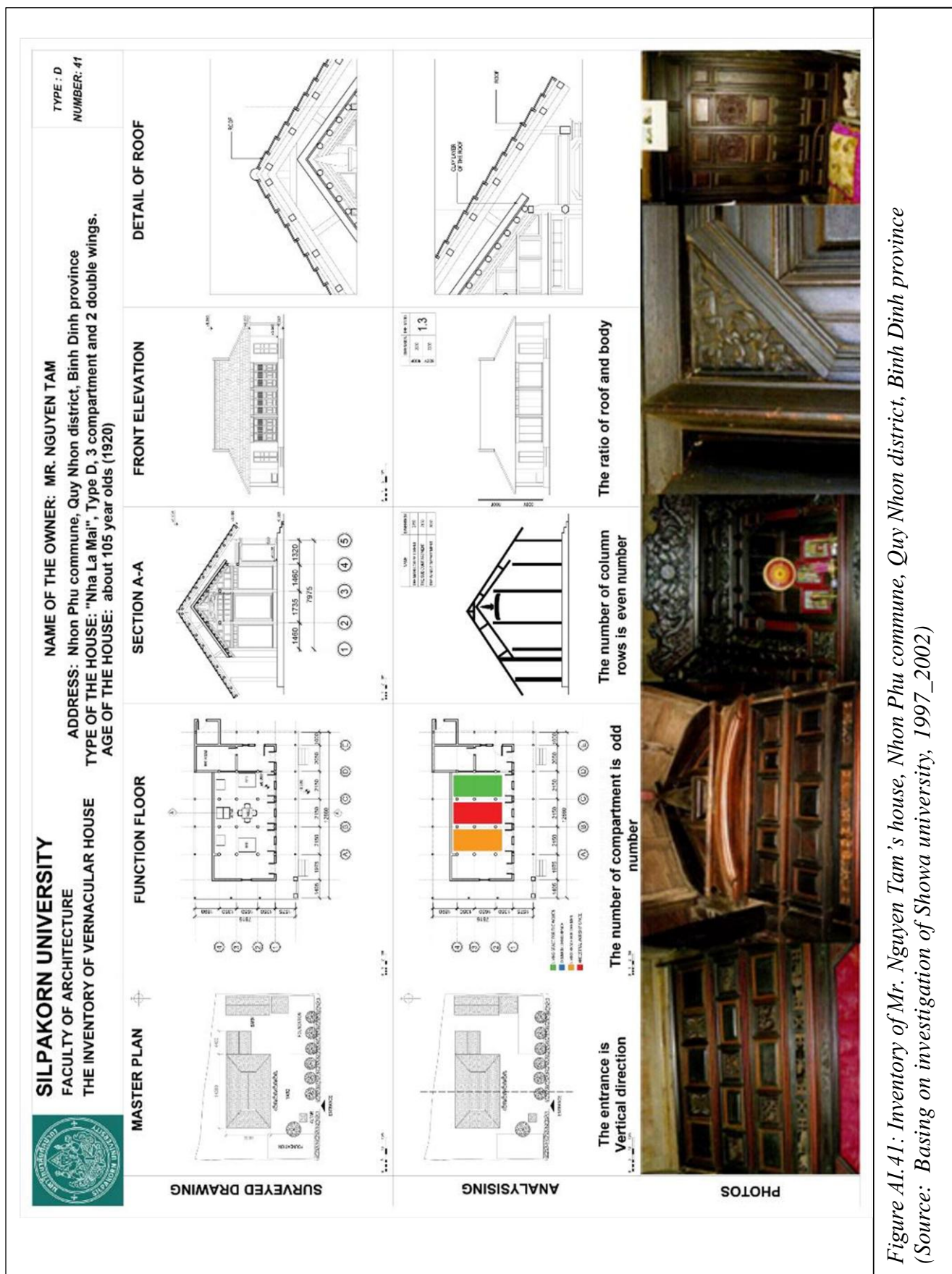


Figure AI.41: Inventory of Mr. Nguyen Tam's house, Nhon Phu commune, Quy Nhon district, Binh Dinh province (Source: Basing on investigation of Showa university, 1997_2002)

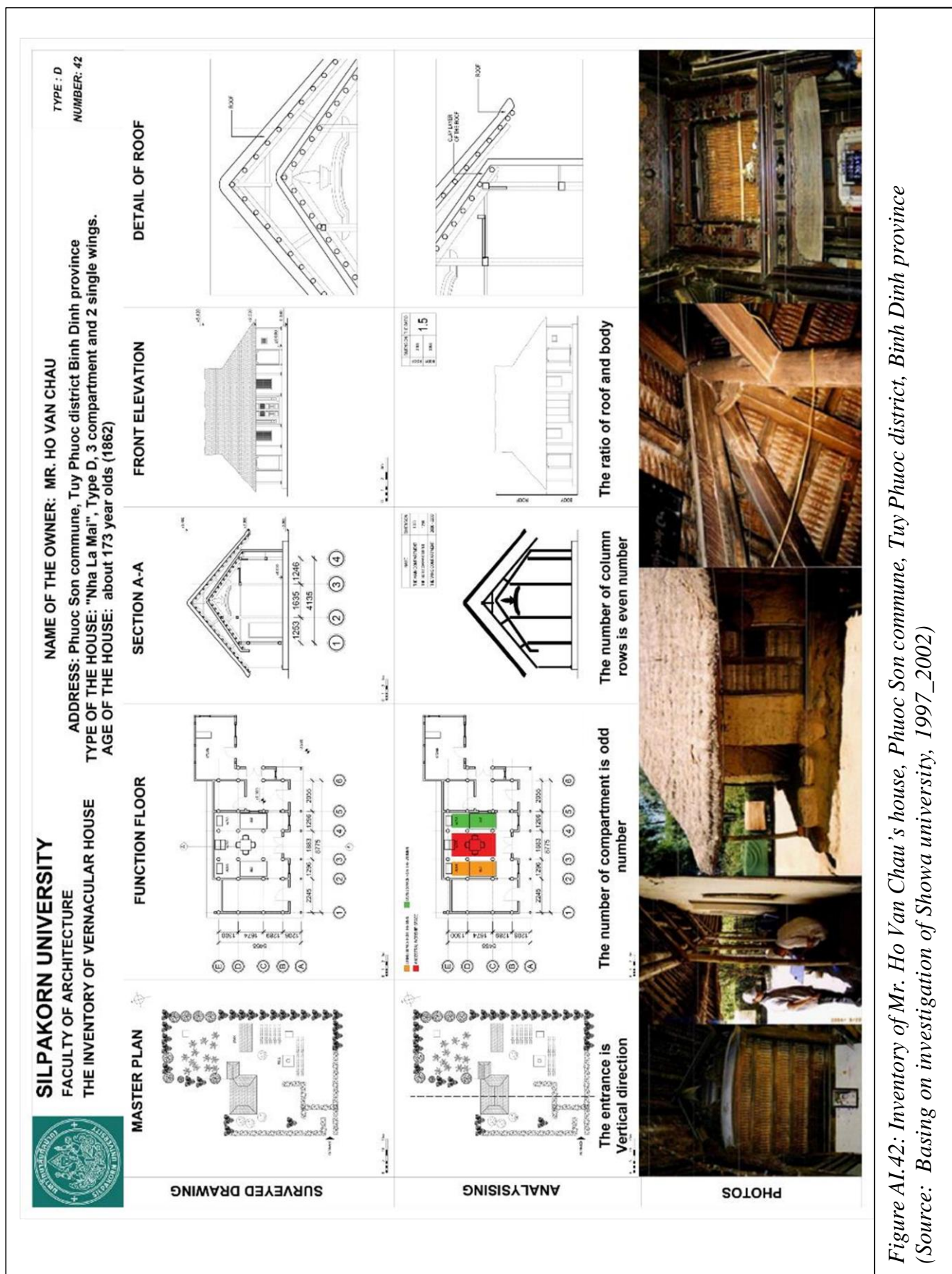


Figure AI.42: Inventory of Mr. Ho Van Chau's house, Phuoc Son commune, Tuy Phuoc district, Binh Dinh province (Source: Basing on investigation of Showa university, 1997_2002)

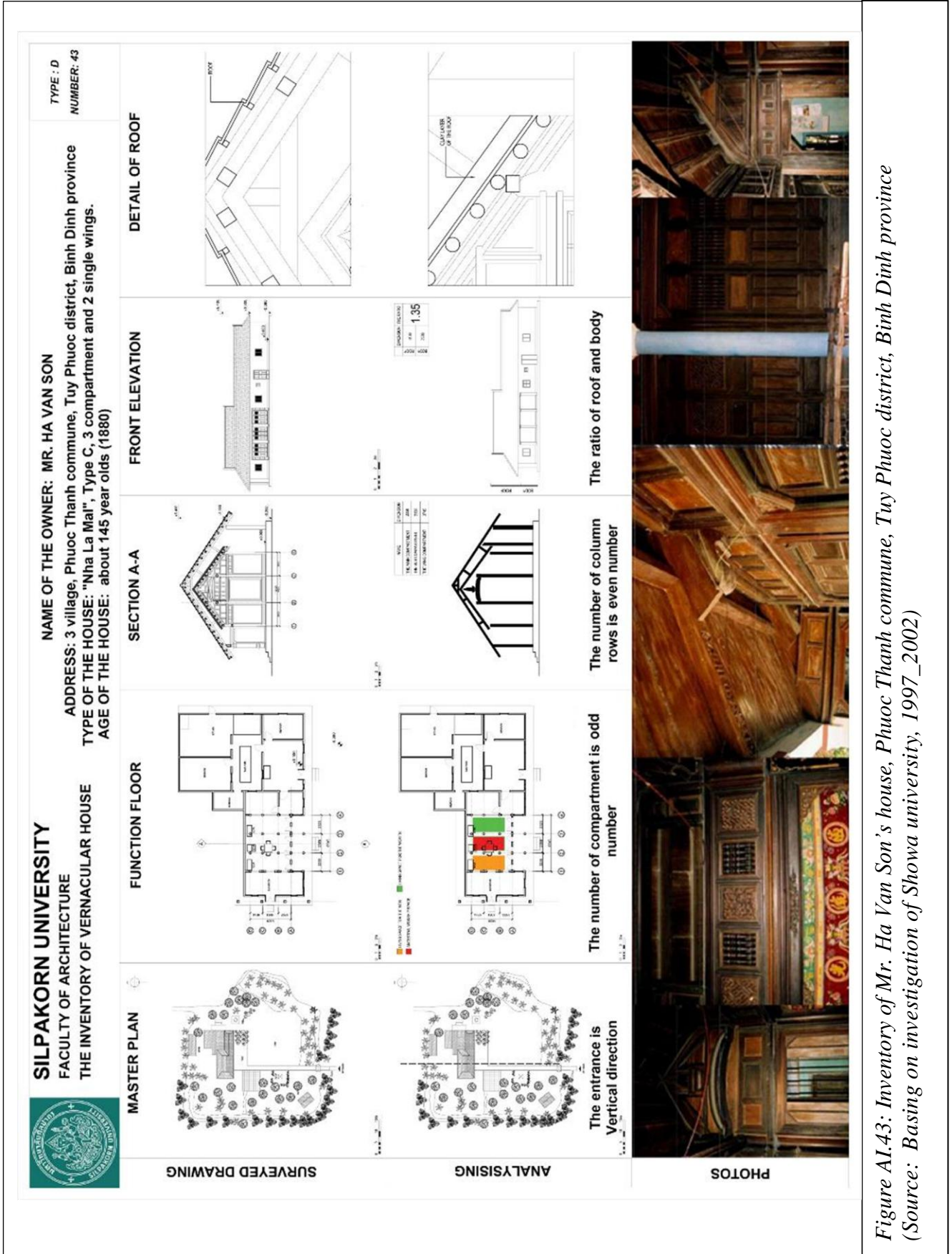


Figure AI.43: Inventory of Mr. Ha Van Son's house, Phuoc Thanh commune, Tuy Phuoc district, Binh Dinh province (Source: Basing on investigation of Showa university, 1997_2002)

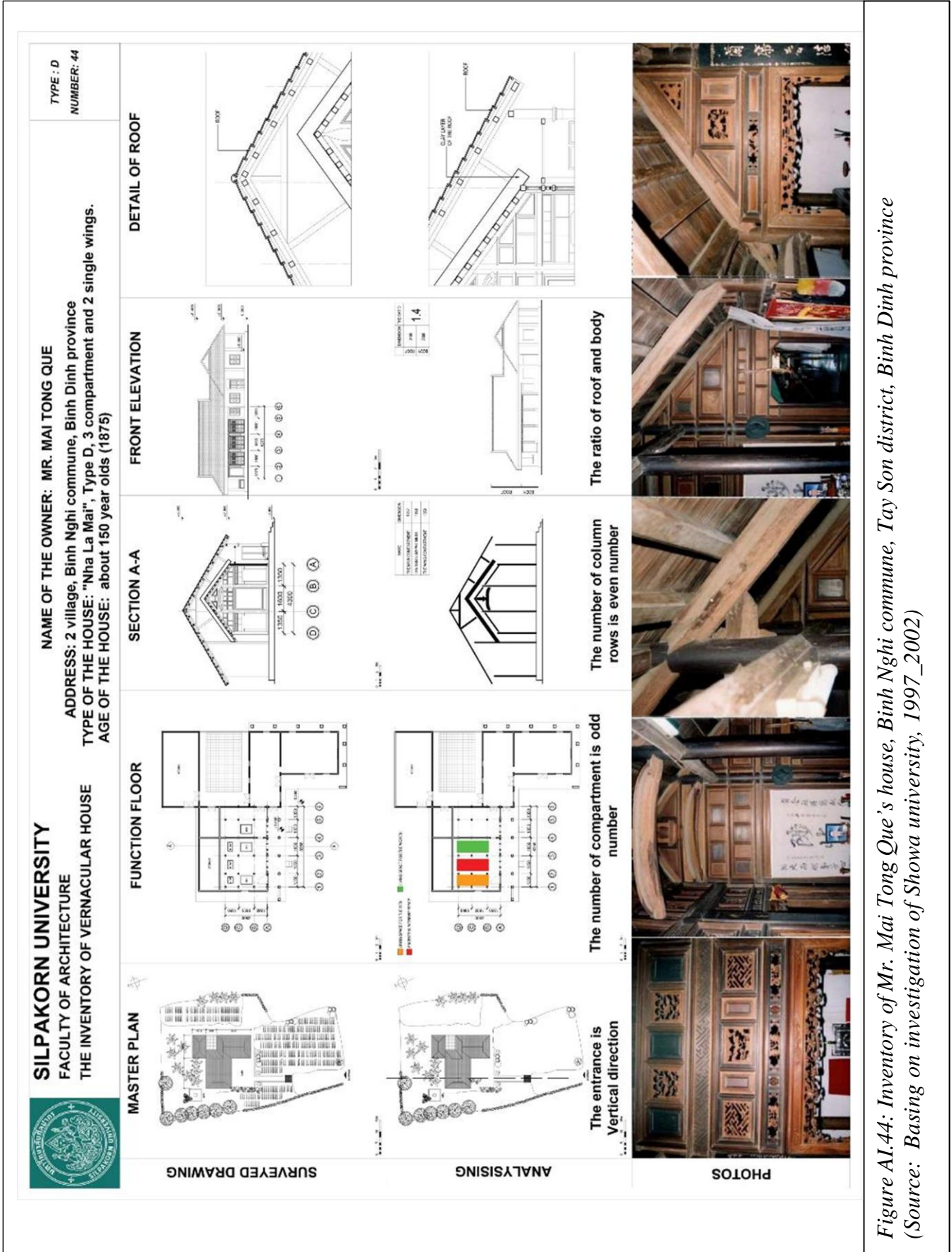


Figure A1.44: Inventory of Mr. Mai Tong Que's house, Binh Nghi commune, Tay Son district, Binh Dinh province (Source: Basing on investigation of Showa university, 1997_2002)

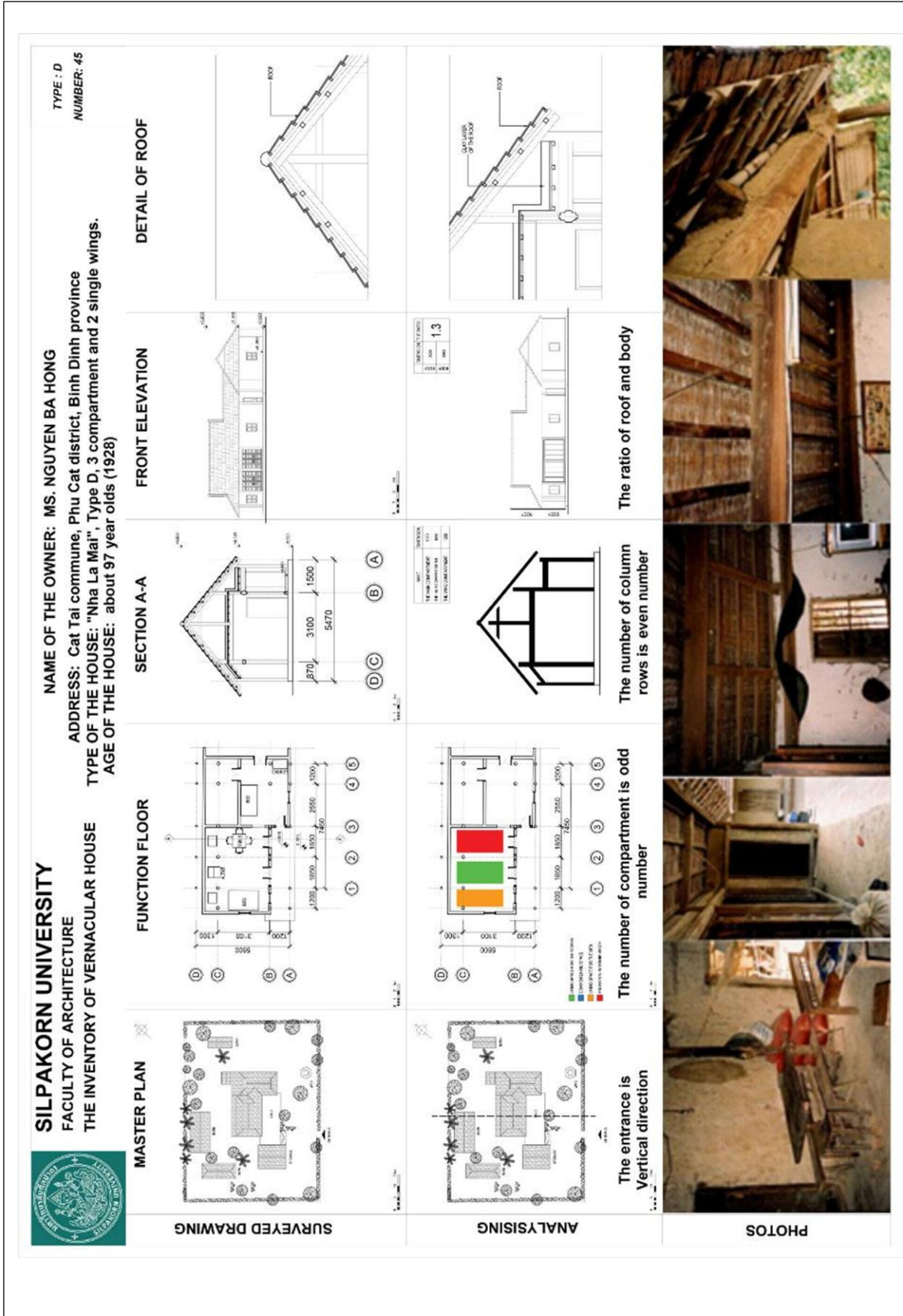


Figure AI.45: Inventory of Mr. Nguyen Ba Hong's house, Cat Tai commune, Phu Cat district, Binh Dinh province (Source: Basing on investigation of Showa university, 1997_2002)

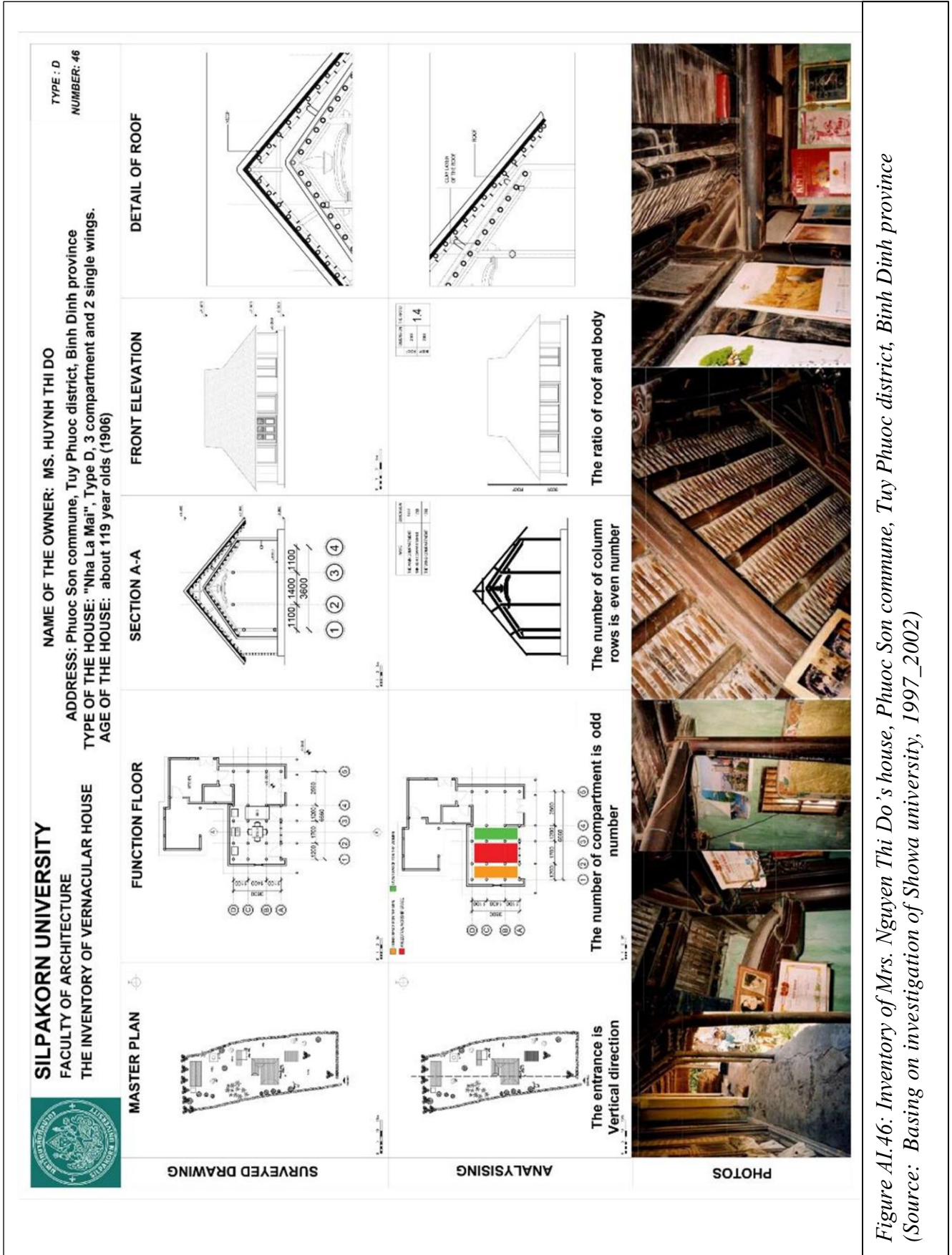


Figure AI.46: Inventory of Mrs. Nguyen Thi Do 's house, Phuoc Son commune, Tuy Phuoc district, Binh Dinh province (Source: Basing on investigation of Showa university, 1997_2002)

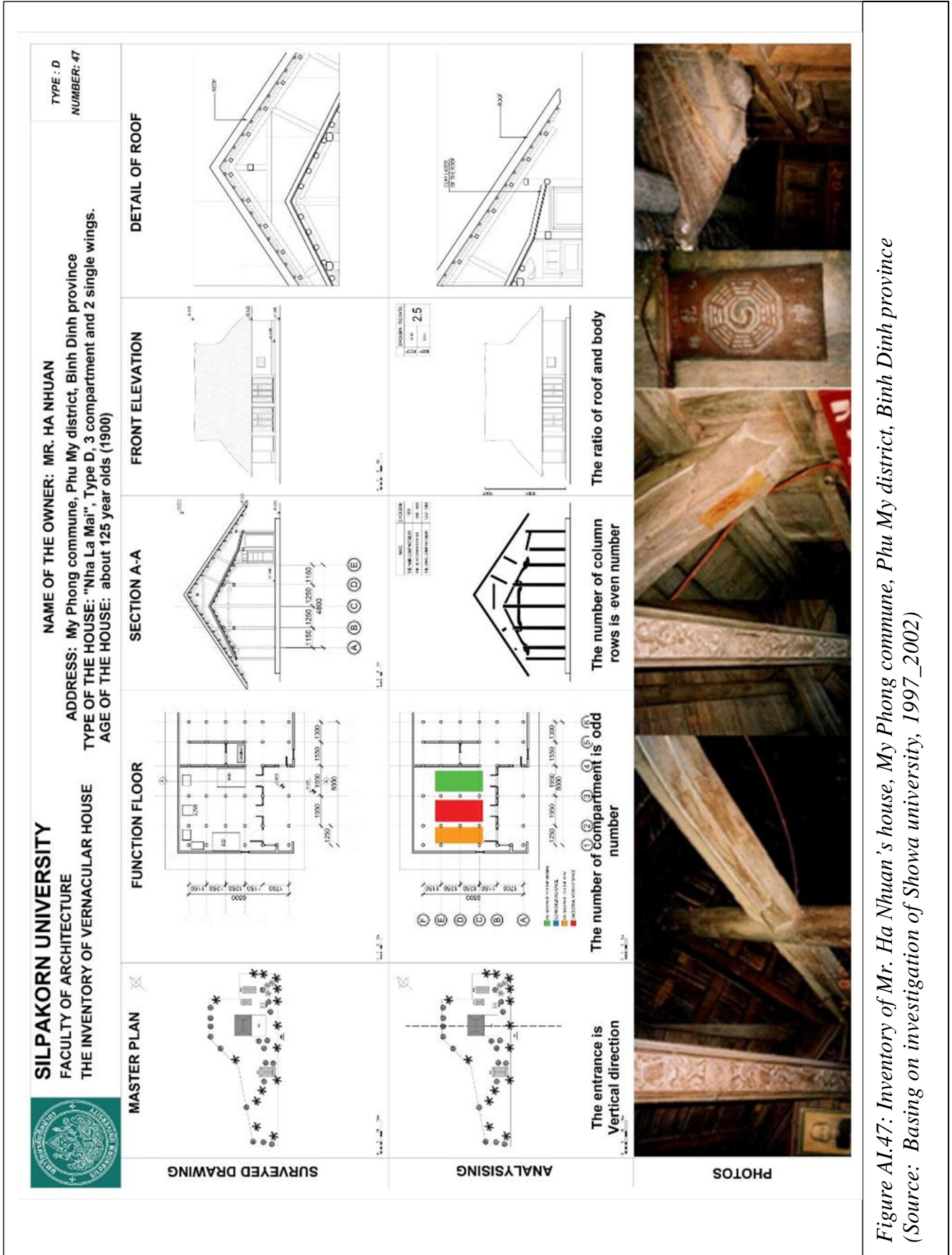


Figure AI.47: Inventory of Mr. Ha Nhuan's house, My Phong commune, Phu My district, Binh Dinh province (Source: Basing on investigation of Showa university, 1997_2002)

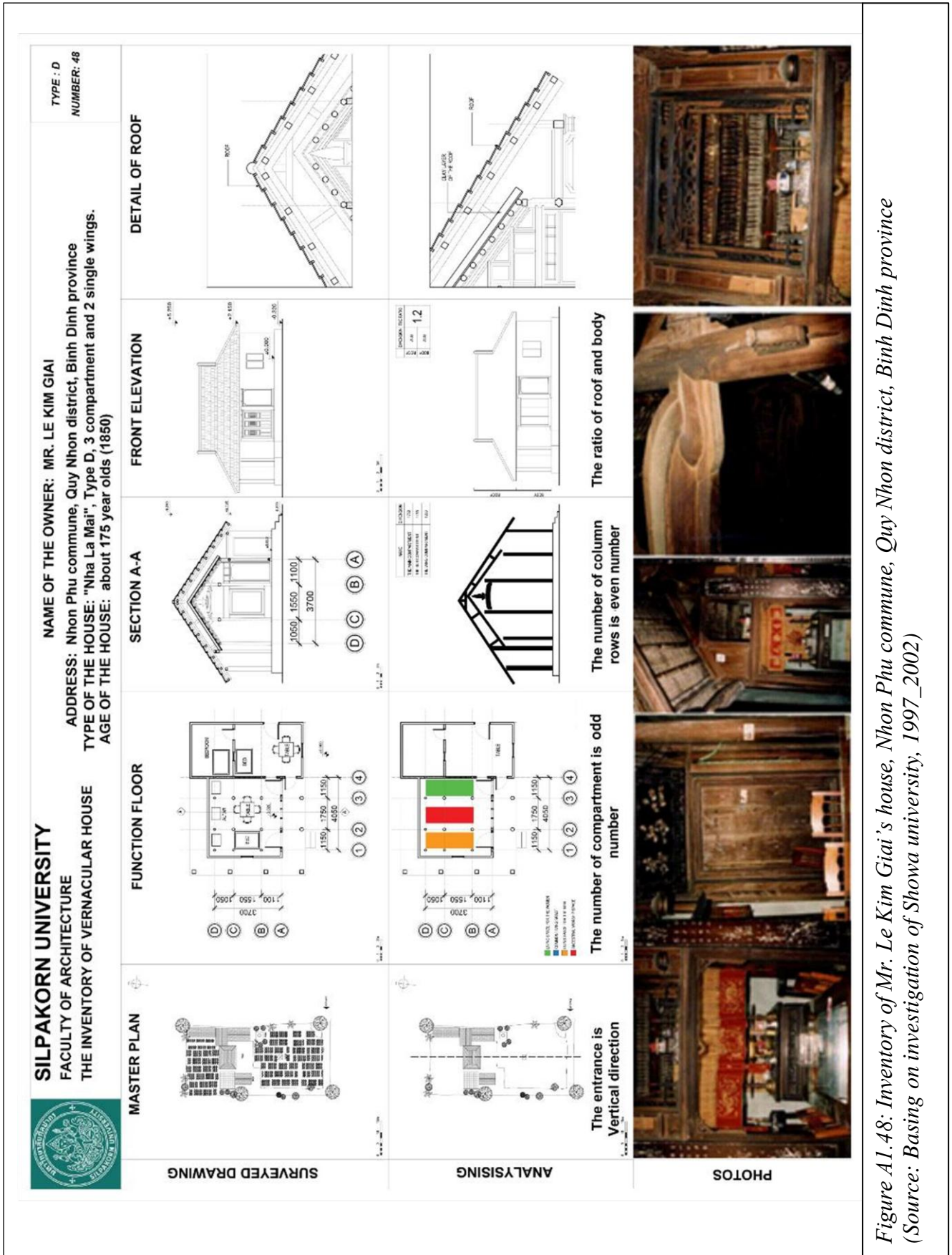


Figure A1.48: Inventory of Mr. Le Kim Gai's house, Nhon Phu commune, Quy Nhon district, Binh Dinh province (Source: Basing on investigation of Showa university, 1997_2002)

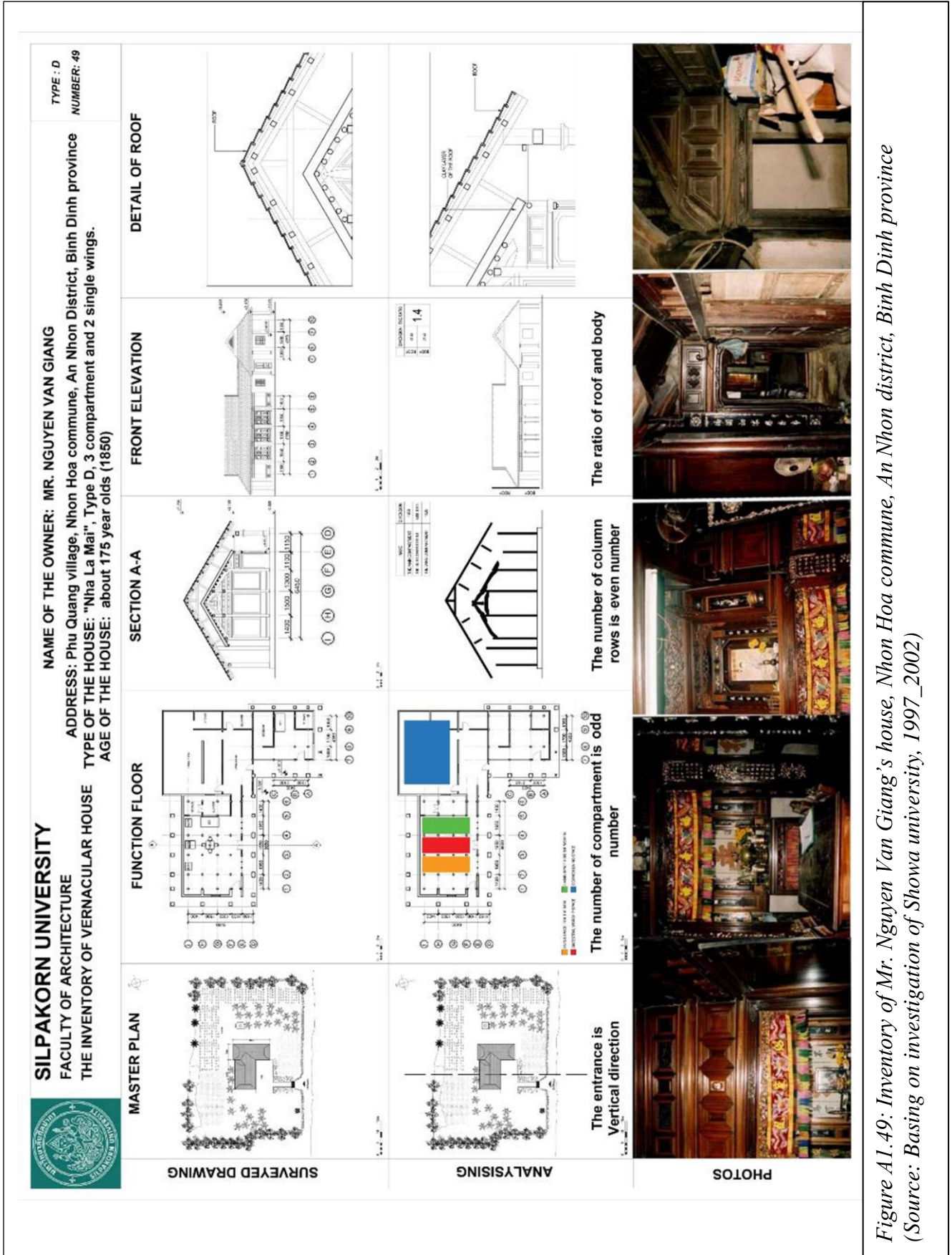


Figure A1.49: Inventory of Mr. Nguyen Van Giang's house, Nhon Hoa commune, An Nhon district, Binh Dinh province (Source: Basing on investigation of Showa university, 1997_2002)

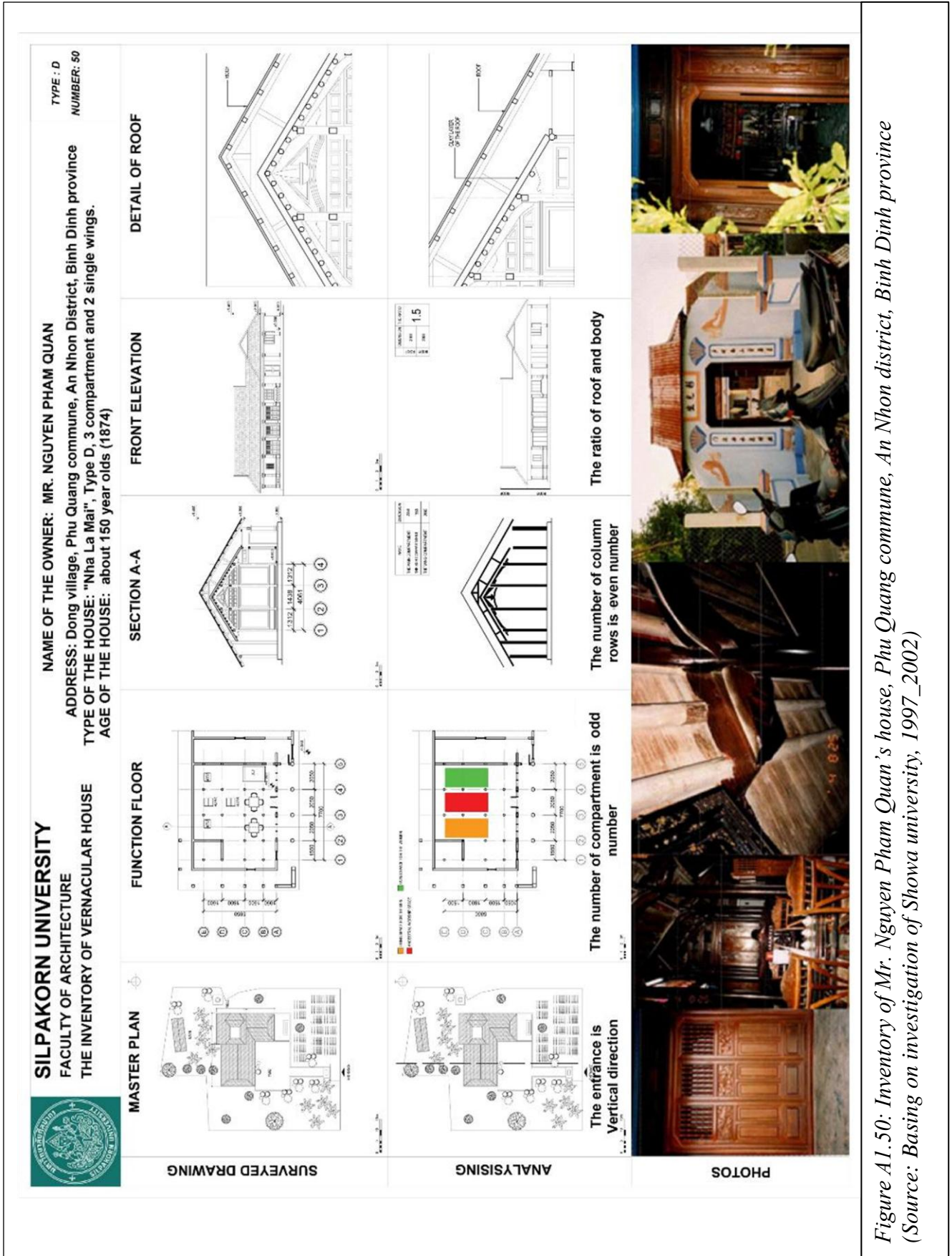


Figure A1.50: Inventory of Mr. Nguyen Pham Quan's house, Phu Quang commune, An Nhon district, Binh Dinh province (Source: Basing on investigation of Showa university, 1997_2002)

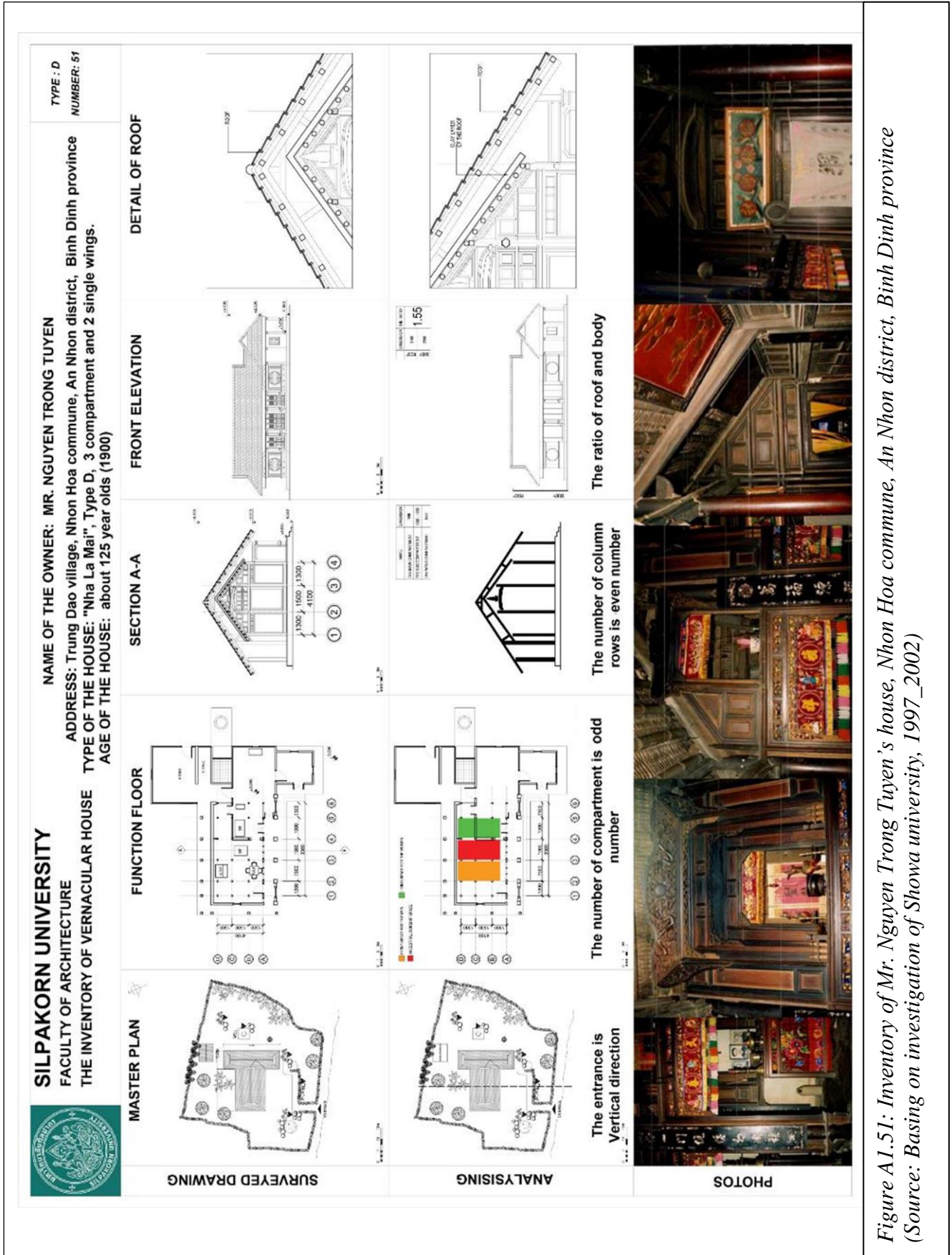


Figure A1.51: Inventory of Mr. Nguyen Trong Tuyen's house, Nhon Hoa commune, An Nhon district, Binh Dinh province (Source: Basing on investigation of Showa university, 1997_2002)

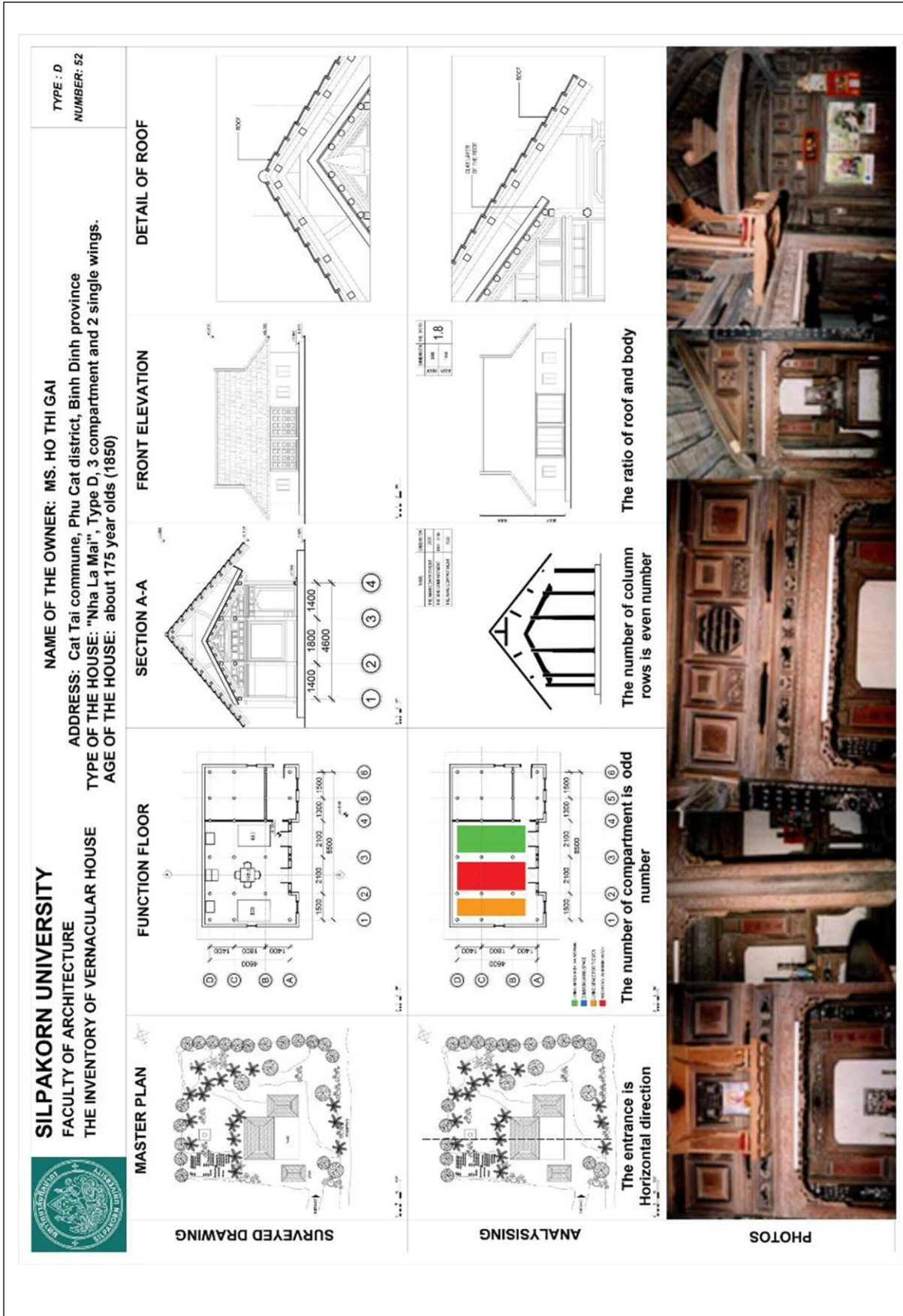


Figure A1.52: Inventory of Mrs. Ho Thi Gai's house, Cat Tai commune, Phu Cat district, Binh Dinh province (Source: Basing on investigation of Showa university, 1997_2002)

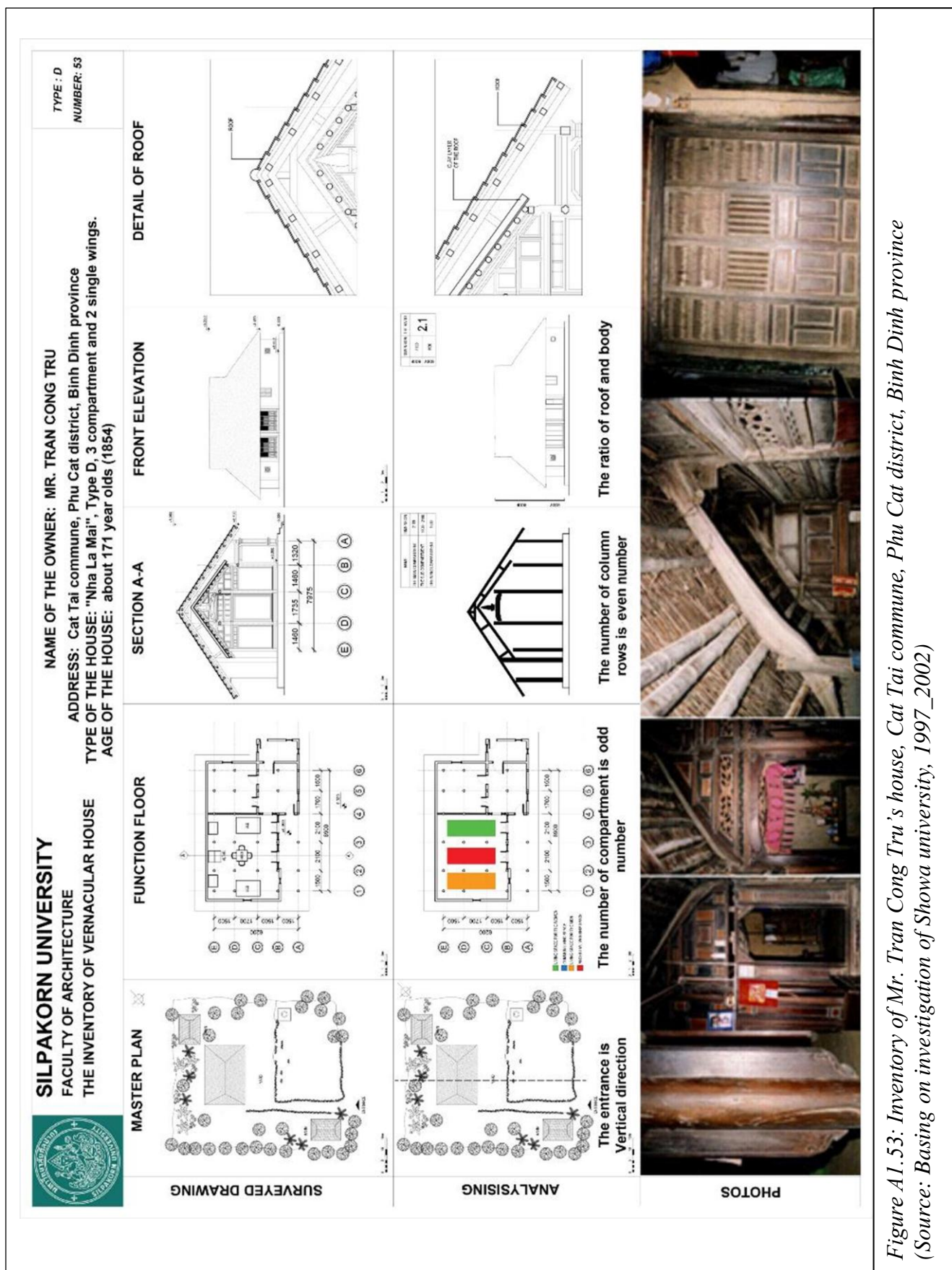


Figure A1.53: Inventory of Mr. Tran Cong Tru's house, Cat Tai commune, Phu Cat district, Binh Dinh province (Source: Basing on investigation of Showa university, 1997_2002)

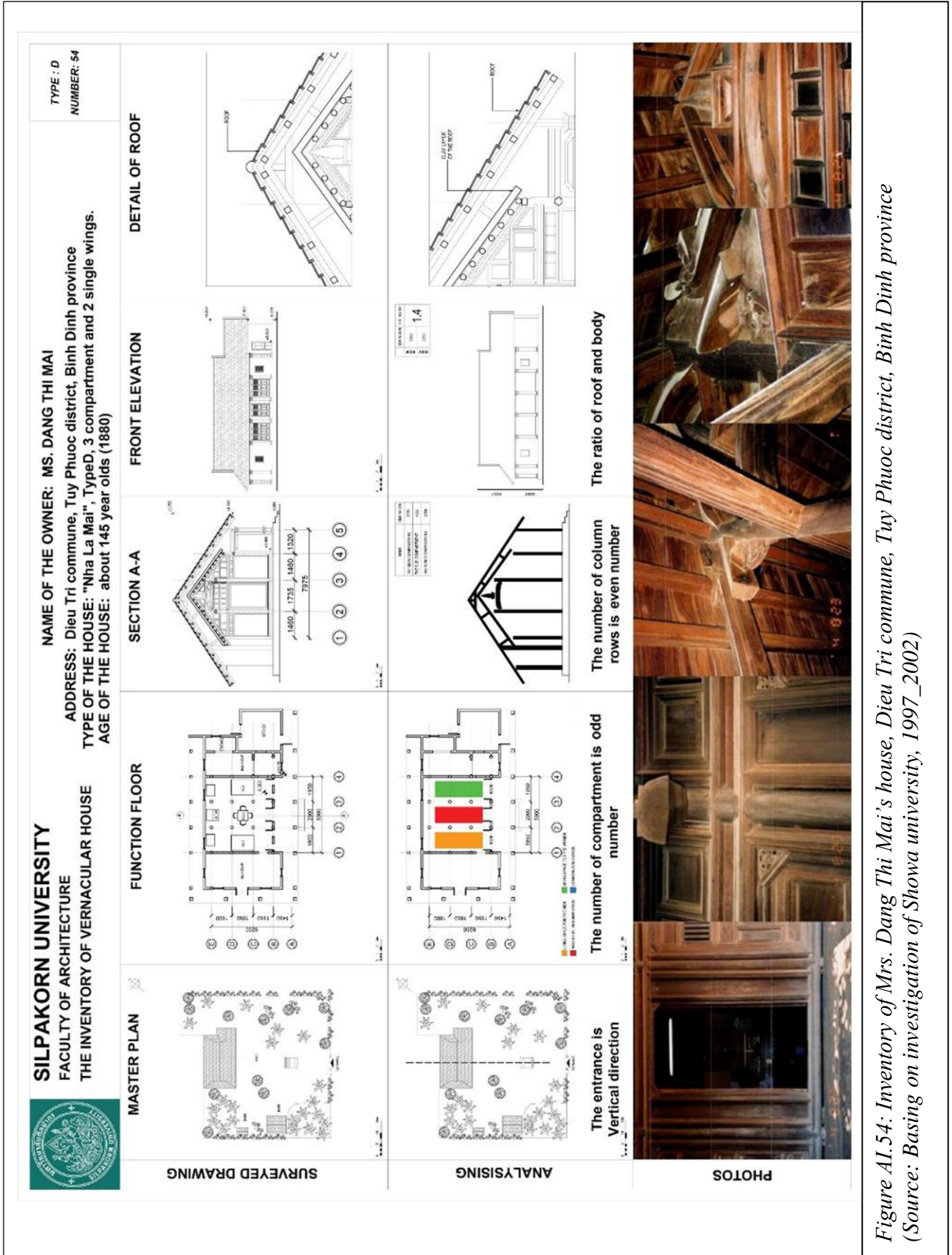


Figure AI.54: Inventory of Mrs. Dang Thi Mai's house, Dieu Tri commune, Tuy Phuoc district, Binh Dinh province (Source: Basing on investigation of Showa university, 1997_2002)

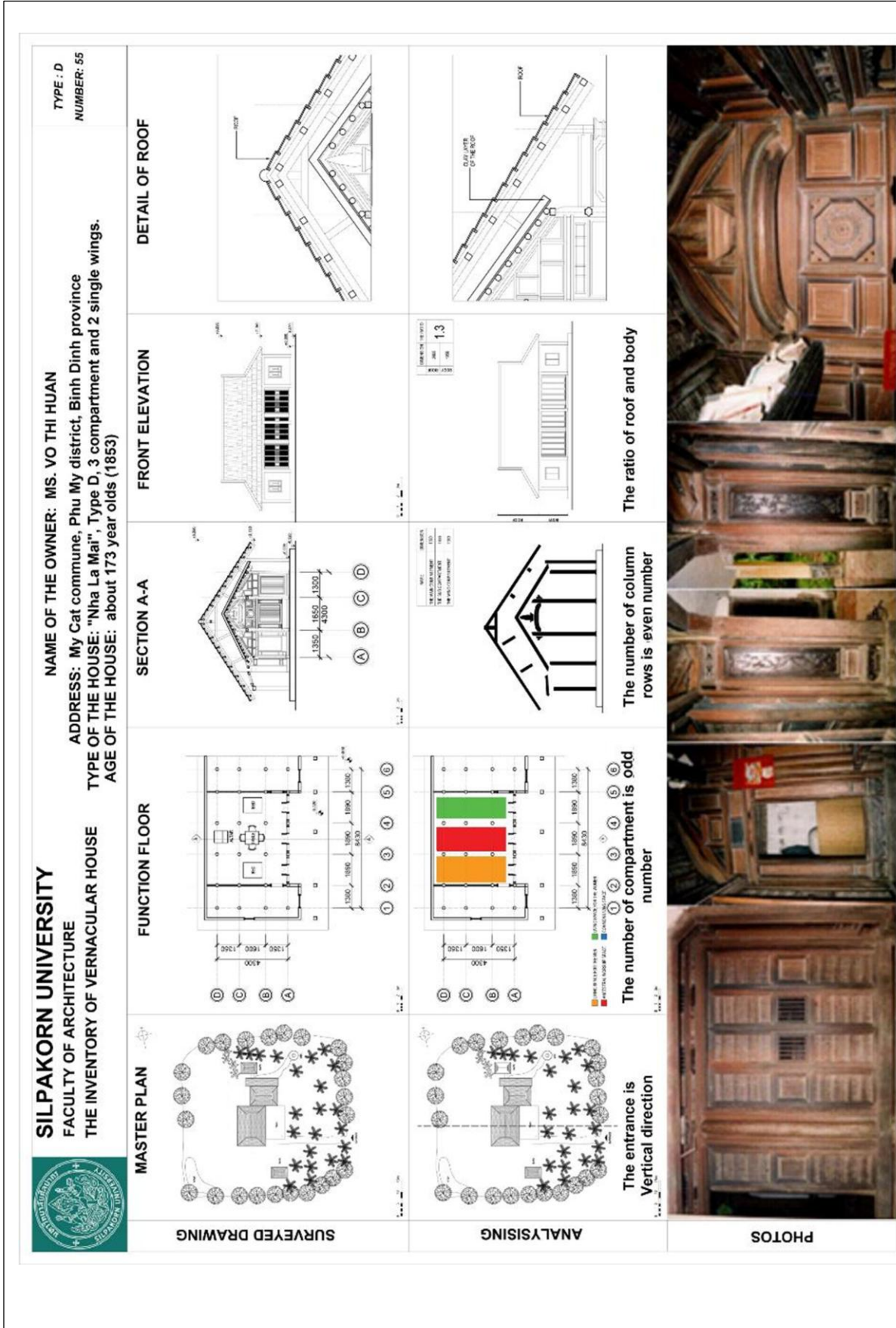


Figure AI.55: Inventory of Mrs. Vo Thi Huan's house, My Cat commune, Phu My district, Binh Dinh province (Source: Basing on investigation of Showa university, 1997_2002)

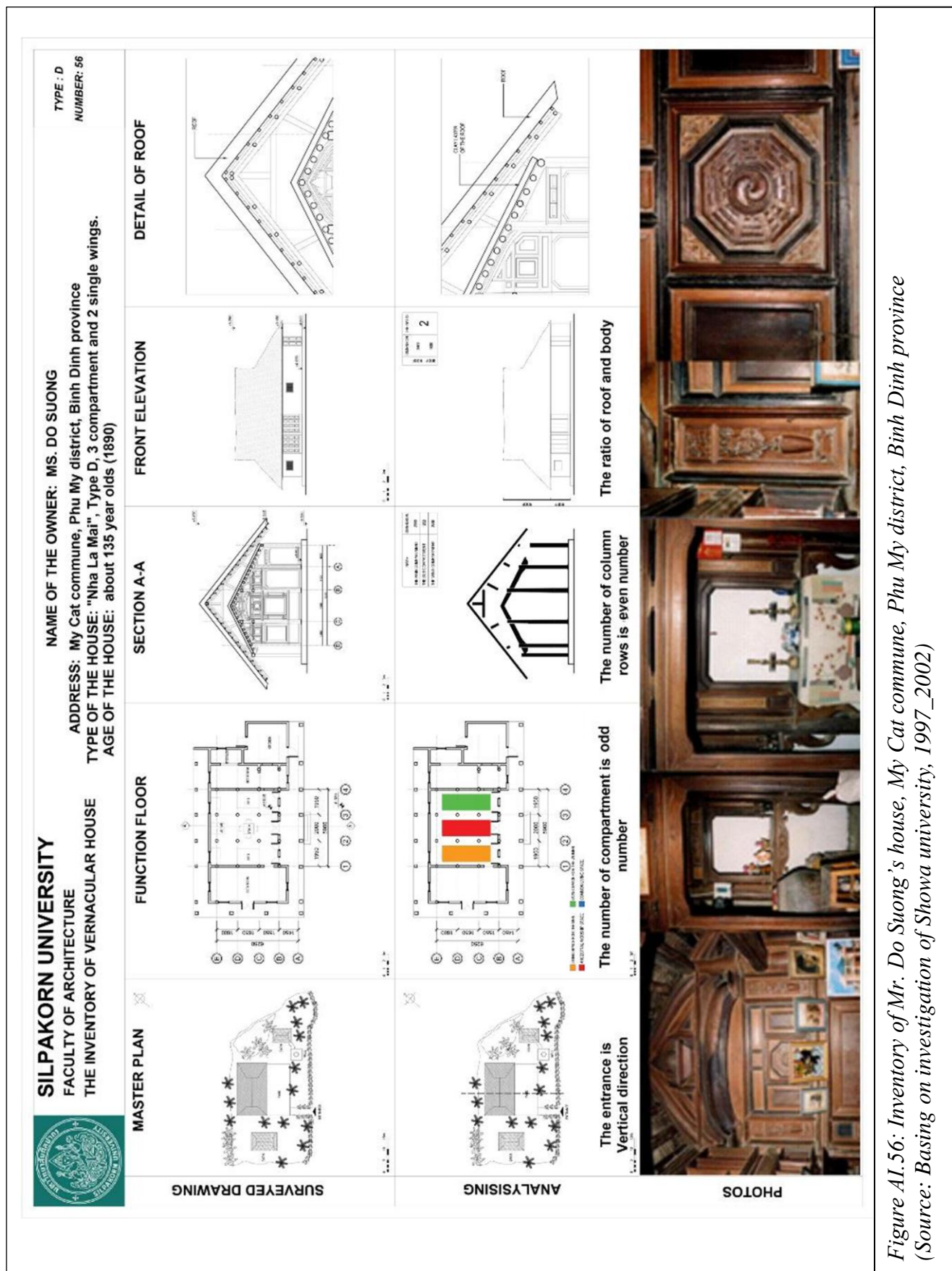


Figure AI.56: Inventory of Mr. Do Suong's house, My Cat commune, Phu My district, Binh Dinh province (Source: Basing on investigation of Showa university, 1997_2002)

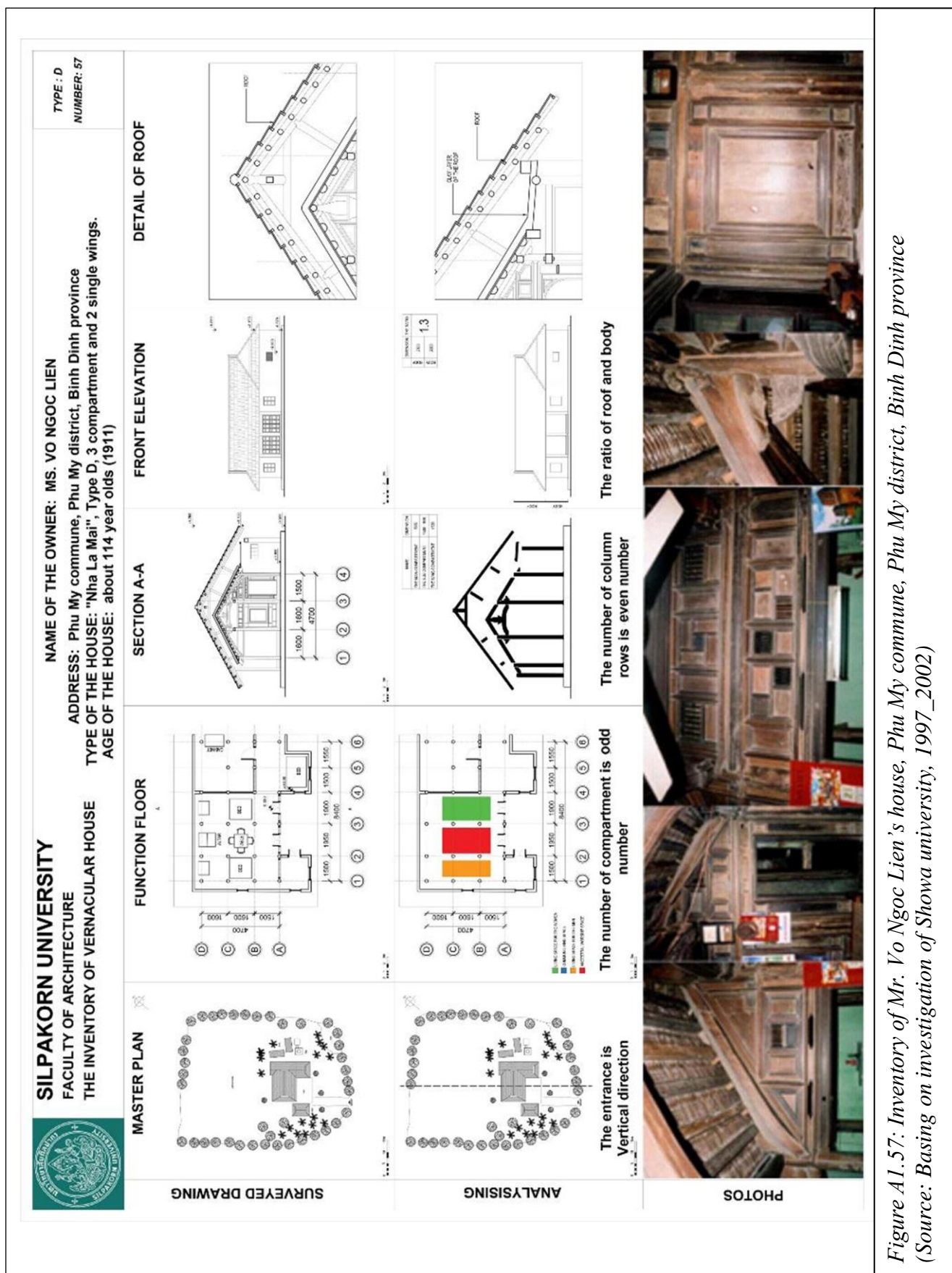


Figure A1.57: Inventory of Mr. Vo Ngoc Lien's house, Phu My commune, Phu My district, Binh Dinh province (Source: Basing on investigation of Showa university, 1997_2002)

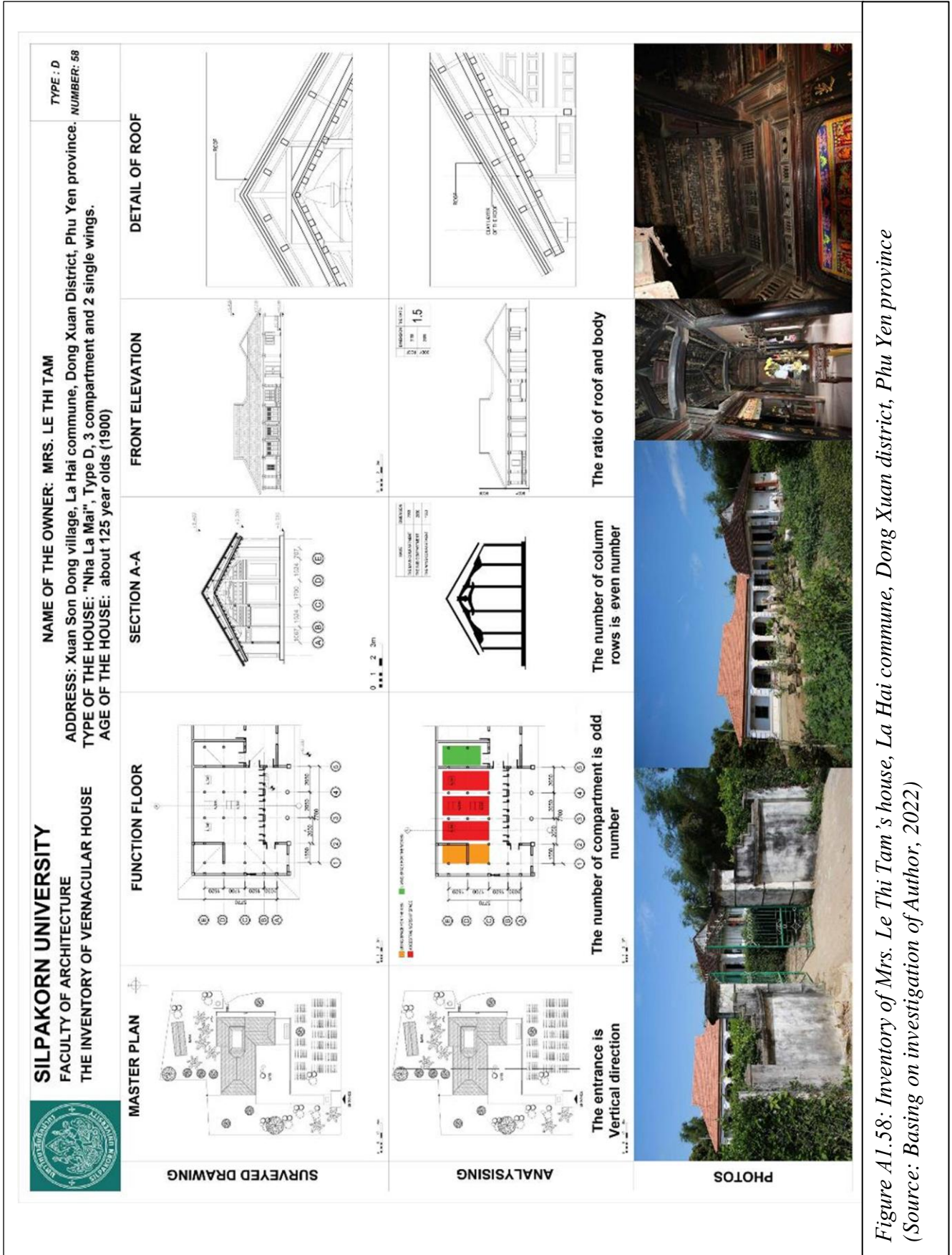


Figure A1.58: Inventory of Mrs. Le Thi Tam's house, La Hai commune, Dong Xuan district, Phu Yen province (Source: Basing on investigation of Author, 2022)

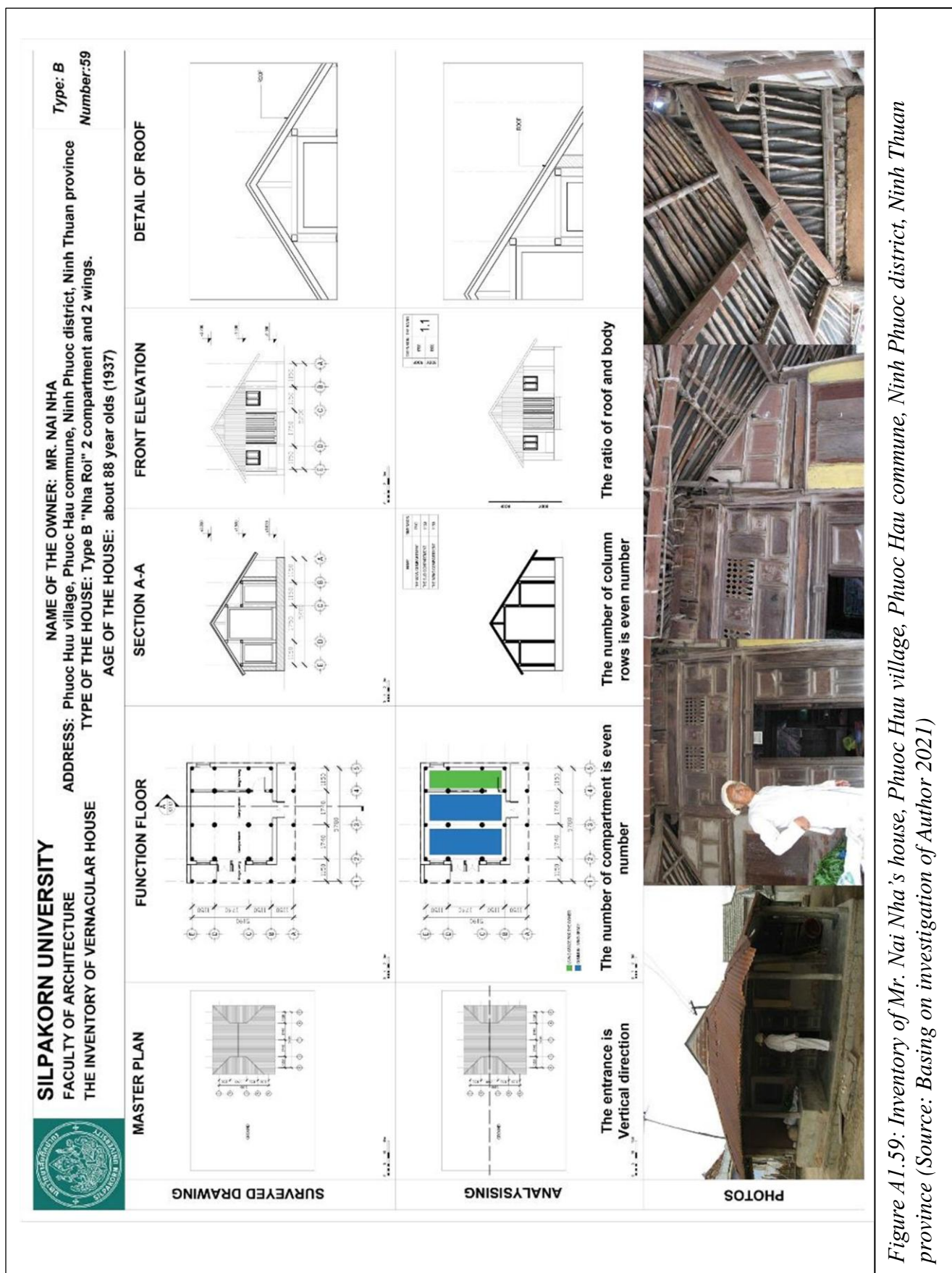


Figure A1.59: Inventory of Mr. Nai Nha's house, Phuoc Huu village, Phuoc Hau commune, Ninh Phuoc district, Ninh Thuan province (Source: Basing on investigation of Author 2021)

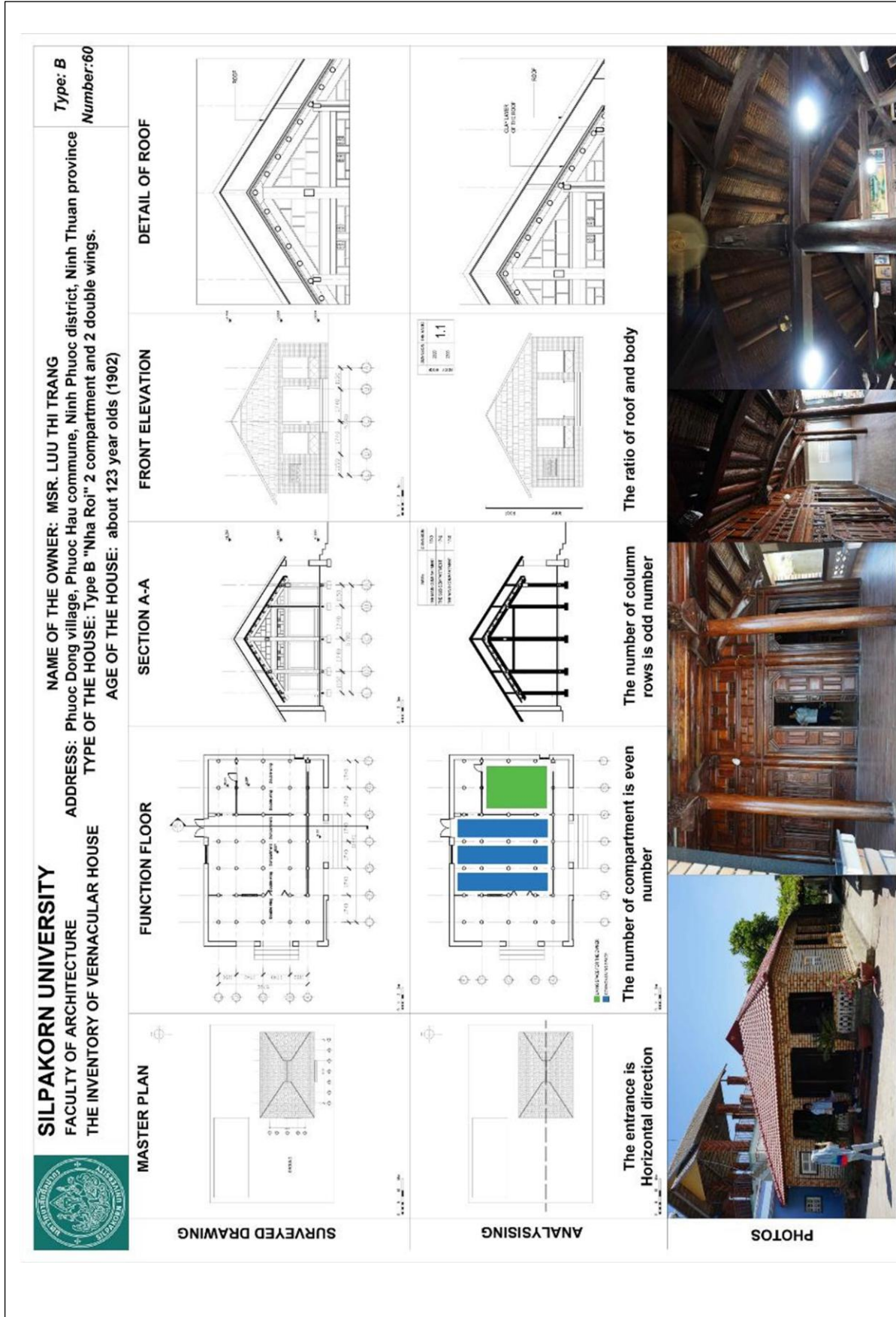


Figure A1.60: Inventory of Mrs. Luu Thi Trang's house, Phuoc Huu village, Phuoc hau commune, Ninh Thuan province (Source: Basing on investigation of Author, 2021)

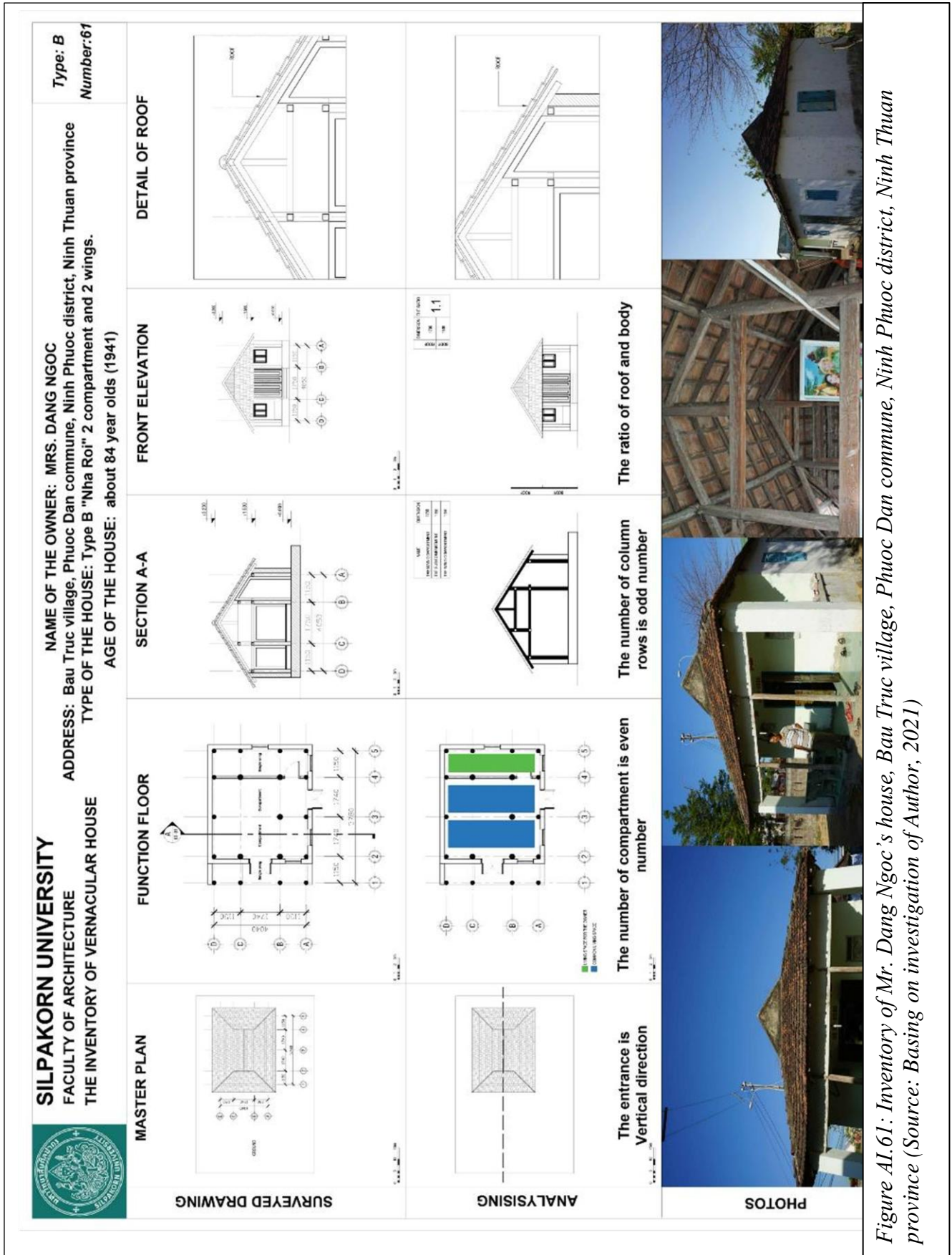


Figure A1.61: Inventory of Mr. Dang Ngoc's house, Bau Truc village, Phuoc Dan commune, Ninh Phuoc district, Ninh Thuan province (Source: Basing on investigation of Author, 2021)

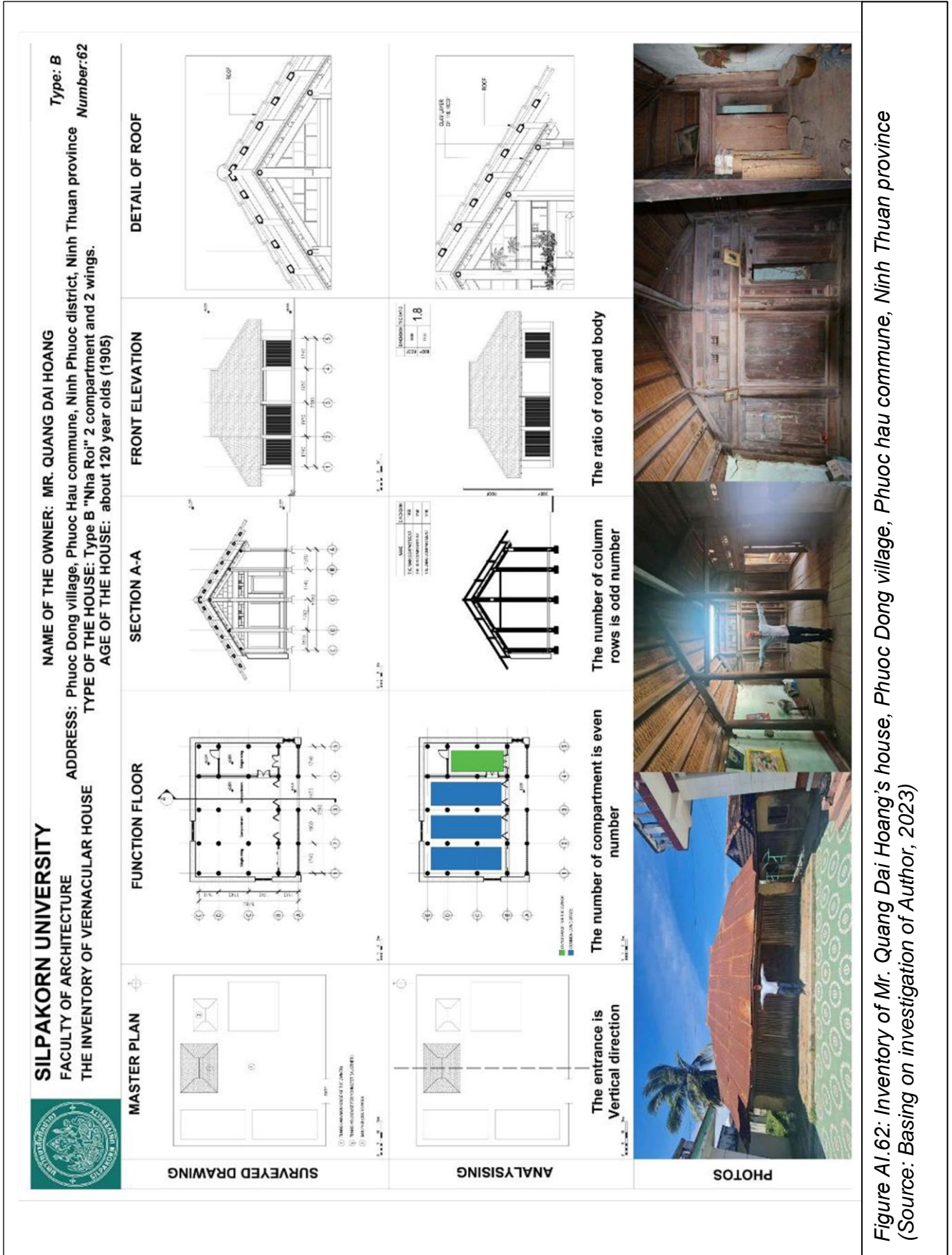


Figure A1.62: Inventory of Mr. Quang Dai Hoang's house, Phuoc Dong village, Phuoc hau commune, Ninh Thuan province (Source: Basing on investigation of Author, 2023)

Appendix AII: The documents of the vernacular house in Northern of Vietnam

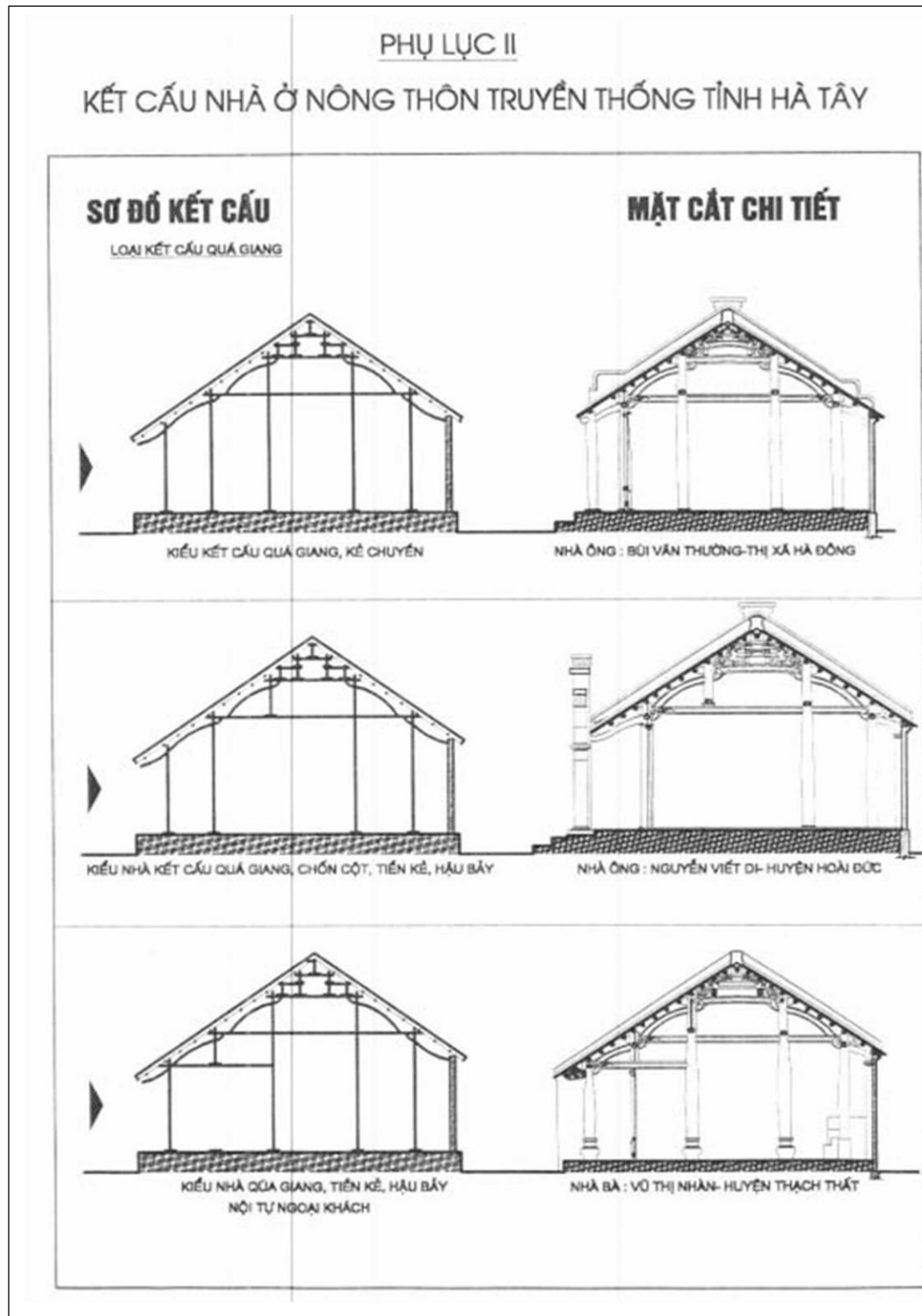


Figure AII.1: The type of wooden frame of the vernacular house in Ha Tay province, Vietnam (Source: Nguyen Ba Dang, the Report of Showa University, volume_0 Ha Tay, 2002, p.24)

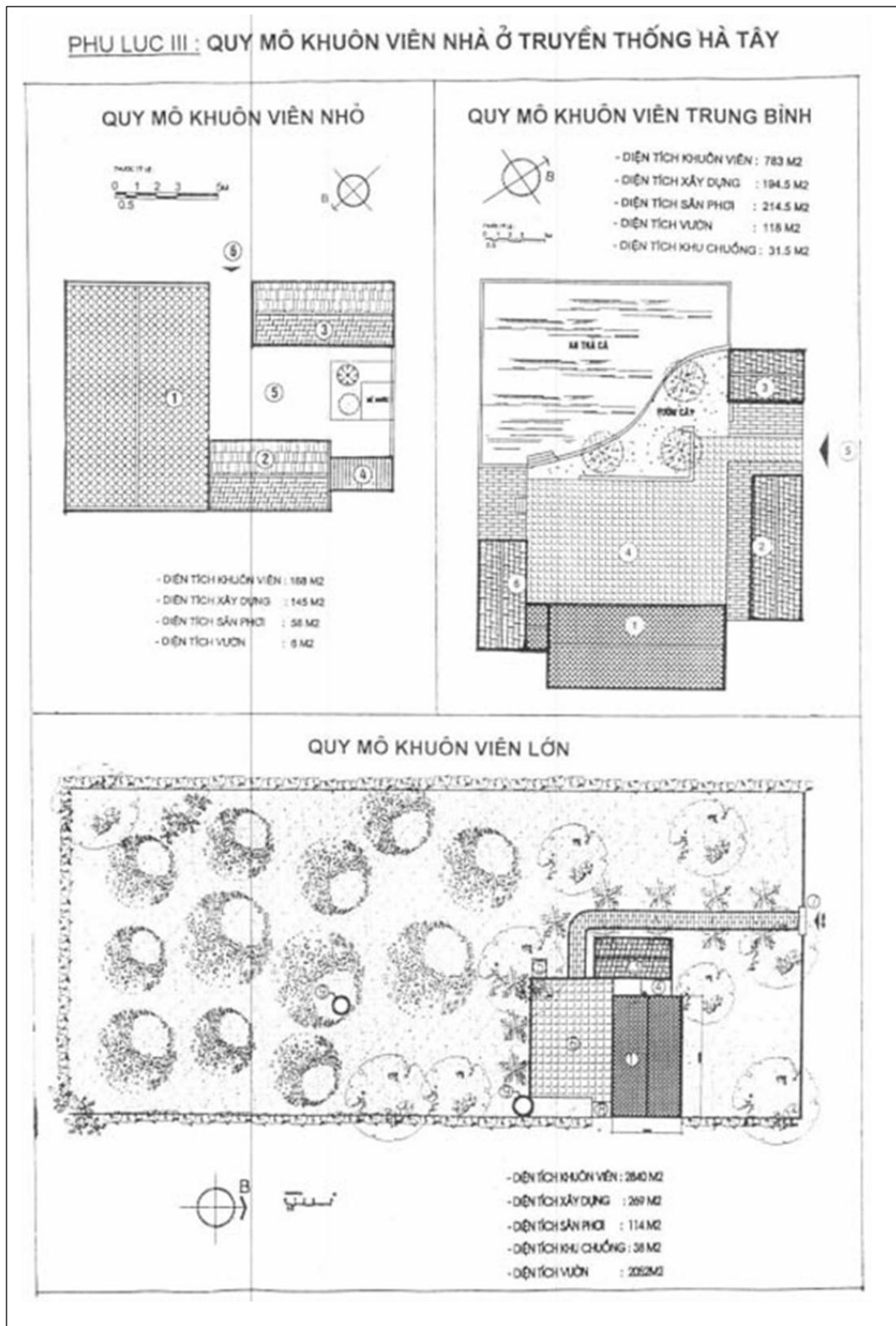


Figure AII.2: the master plan of the vernacular house in Hatay province, Northern of Vietnam (Source: Nguyen Ba Dang, the report of Showa university, volume_0 Ha Tay, Ha Noi 2002, p25)

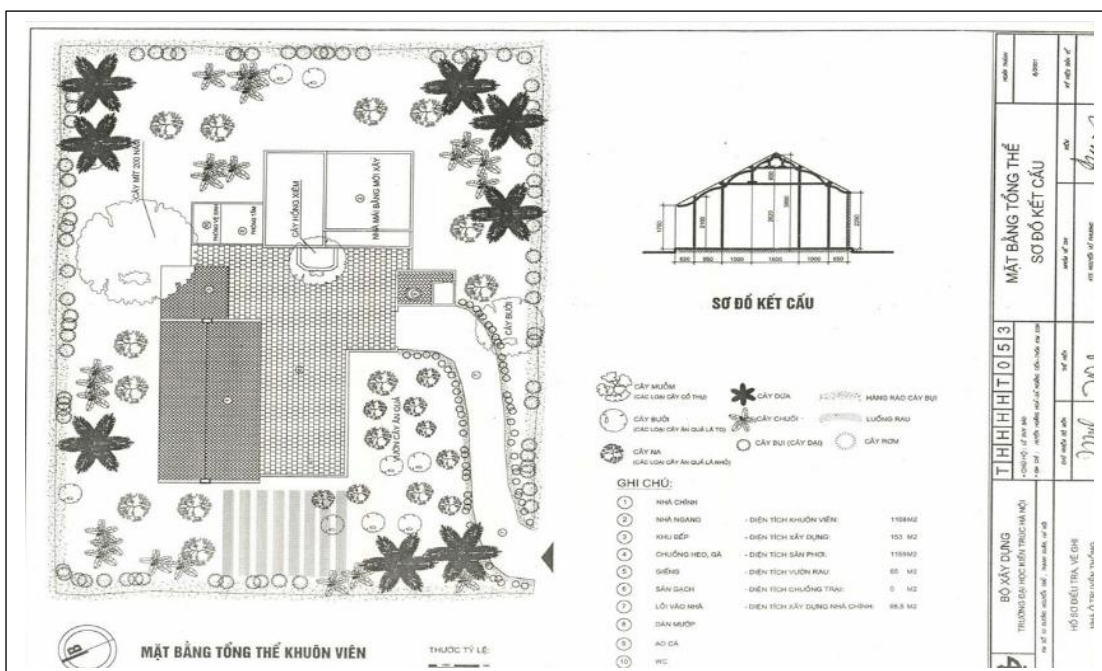


Figure AII.3: The master plan, diagram of wooden frame structure. Le Duy Bao's house, Kim Son village, Hoang Tien commune, Hoang Hoa district, Thanh Hoa province (Source: Trinh Hong Doan, the report of Showa university, volum_2 Thanh Hoa, 2002, p.24)

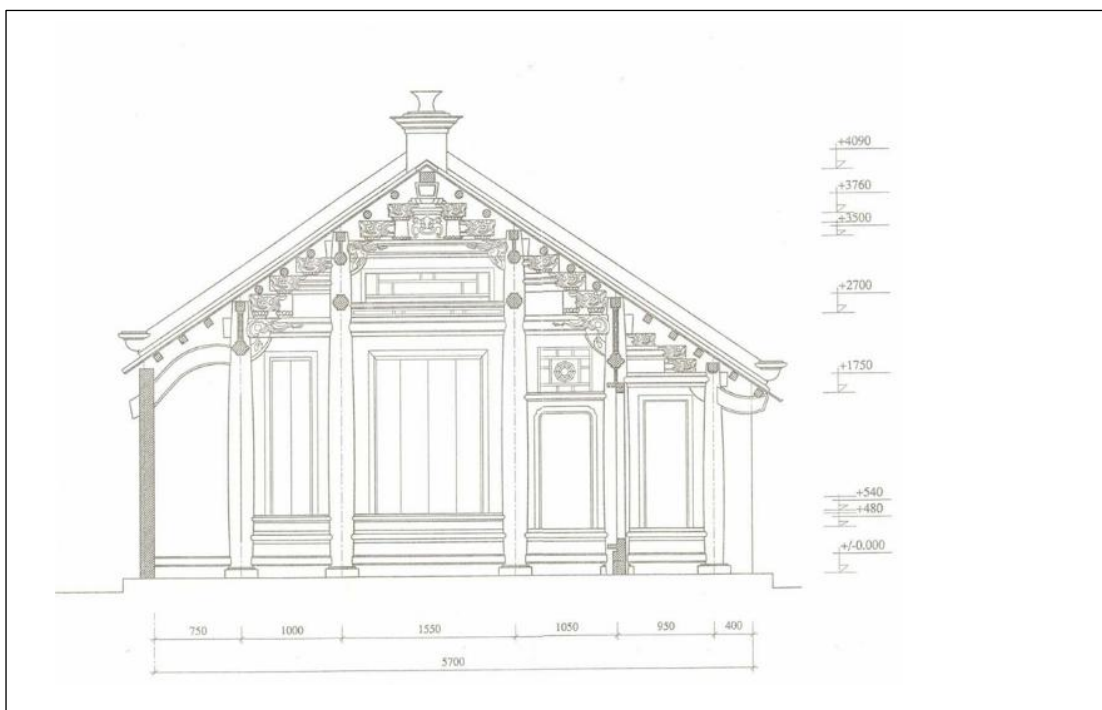


Figure AII.3: The Section A-A; Le Duy Bao' House, Kim Son village, Hoang Tien commune, Hoang Hoa district, Thanh Hoa province, Northern of Vietnam (Source: Trinh Hong Doan, the report of Showa university, volume_2 Thanh Hoa, 2002, p24)



*Figure AII.4 Kim Son commune hall, Thanh Hoa province, Vietnam
(Author, 2019)*



Figure AII.5: the wooden structure frame_ Kim Son commune hall, Kim Son village, Hoang Tien commune, Hoang Hoa district, Thanh Hoa province, Northern of Vietnam, (Source: Author (2019))

Appendix AIII: the images about survey the vernacular house and Cham culture in the middle region of Vietnam

Appendic AIII.1 Survey image of traditional houses in Hue



Figure AIII.1.1: Survey of Luong Thi Hen's house, Phuoc Tich village, Hue city _ 2019



Figure AIII.1.2.: Survey of Phuoc tich heritage village, Phong Dien district, Hue city, (Source: Author (2019)



*Figure AIII.1.3.: Façade of Vuon An Vien house,,Kim Long village, Hue city,
(Source: Author (2019)*



*Figure AIII.1.4.: Survey of Vuon An Vien house,,Kim Long village, Hue city,
(Source: Author (2019)*

AIII.2 Survey image of traditional houses in Ly Son Island, Quang Ngai province



Figure AIII. 2.1 Survey and interview with homeowner Le Van Ho, Ly Hai commune, Ly Son island, Quang Ngai Province, (Source: Author (2021))



Figure AIII. 2.2 Survey Le Van Ho' house, Ly Hai commune, Ly Son island, Quang Ngai Province, (Source: Author (2021))



Figure AIII. 2.3 Survey clayed roof of Dương Thị Hương' house, Ly Hai commune, Ly Son island, Quang Ngai Province, (Source: Author (2021)



Figure AIII. 2.4 interview with Duong Tu, son of homeowner Dương Thị Hương, ly Hai commune, Ly Son island, Quang Ngai Province, (Source: Author (2021)



Figure AIII. 2.5 Gate and Crossing wall of Ly Hai commune hall, Ly Hai commune, Ly Son island, Quang Ngai Province, (Source: Author (2021)



Figure AIII. 2.6 Facade of Ly Hai commune hall, Hai commune, Ly Son island, Quang Ngai Province, (Source: Author (2021)

Appendic AIII.3 Survey images of Cham culture and house in Ninh Thuan province.

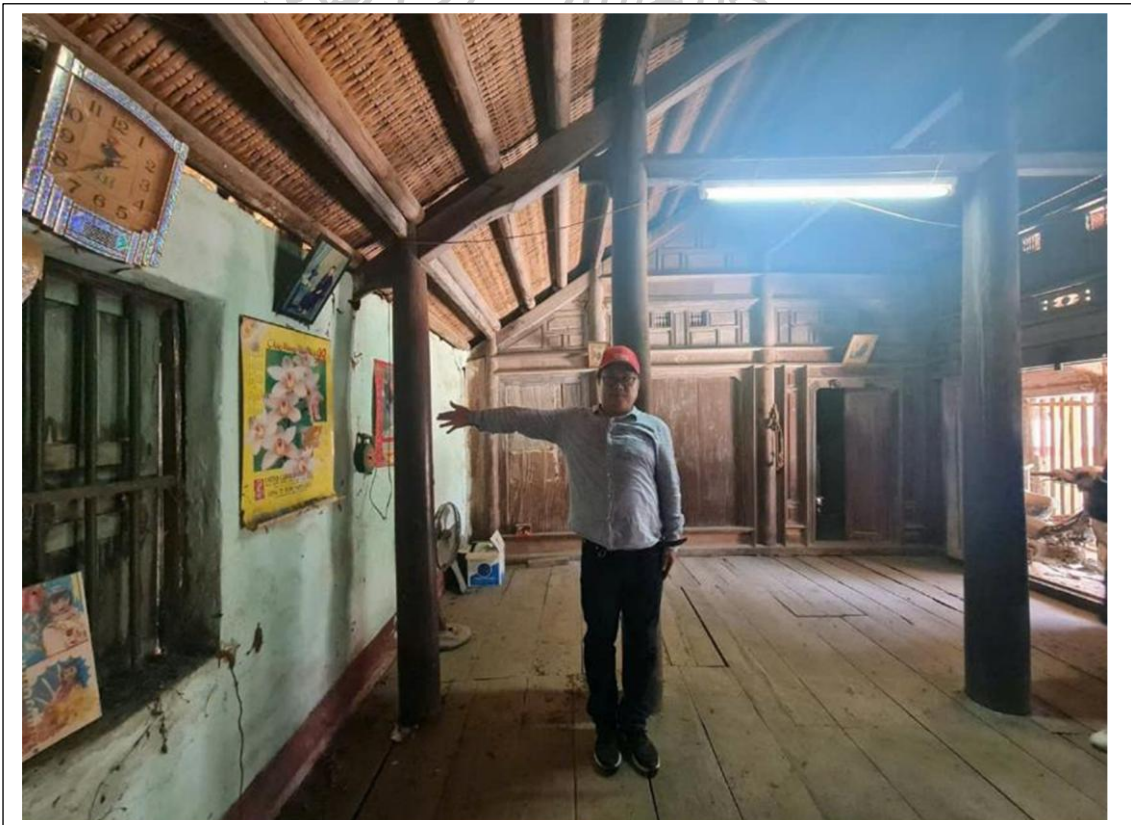


Figure AIII. 3.1. Survey Quang Dai Hoang' house, Phuoc Dong, Phuoc Hau, commune, Ninh Phuoc district, Ninh Thuan Province, (Source: Author 2023)



Figure AIII.3.2. House of Cham in Bau Truc village, Phuoc Dan, commune, Ninh Phuoc district, Ninh Thuan Province, (Source: Author, 2021)



Figure AIII. 3.3 Survey Bau Truc village, Phuoc Dan, commune, Ninh Phuoc district, Ninh Thuan Province, (Source: Author, 2021)



Figure AIII. 3.4 Bau Truc pottery village, Phuoc Dan, commune, Ninh Phuoc district, Ninh Thuan Province, (Source: Author, 2021)



Figure AIII. 3.5 Bau Truc pottery village artisans, Bau Truc village, Phuoc Dan, commune, Ninh Phuoc district, Ninh Thuan Province. (Source : Author. 2021)



Figure AIII. 3.6. The gate of My Nghiep weaving village, Phuoc Dan, commune, Ninh Phuoc district, Ninh Thuan Province, (Source: Author, 2023)



Figure AIII. 3.7. Survey My Nghiep weaving village, Phuoc Dan, commune, Ninh Phuoc district, Ninh Thuan Province, (Source: Author, 2023)



Figure AIII. 3.10 Interview with Nai Nha' carpenter, Phuoc Huu village, Phuoc Hau commune, Ninh Phuoc district, Ninh Thuan Province, (Source: Author,



Figure AIII. 3.11 Interview with Bui Khanh ' carpenter, Hau Sanh village, Phuoc Huu commune, Ninh Phuoc district, Ninh Thuan Province, (Source: Author, 2022)



Figure AIII. 3.12. Cham people's costumes in Cham Cultural Research Center, 28 To Hieu Street, Phan Rang Thap Cham city, Ninh Thuan Province, (Source:



Figure AIII. 3.13. Traditional Cham musical instruments in Cham Cultural Research Center, 28 To Hieu Street, Phan Rang Thap Cham city, Ninh Thuan Province, (Source: Author, 2023)



Figure AIII. 3.14 Cham King Costume Parade, Huu Duc village, Phuoc Huu commune, Ninh Phuoc district, Ninh Thuan Province, (Source: Author, 2023)

Cham King Costume Parade



Figure AIII. 3.15 Kate 2023 Festival at Po Klong Garai Temple, Phan Rang Thap Cham city, Ninh Thuan Province, (Source: Author, 2023)



Figure AIII. 3.16 The Kuk Vanh' family ancestral Temple, Phuoc Huu commune, Ninh Phuoc district, Ninh Thuan Province, (Kuk is a place to keep the ashes of the deceased. The kuk opens its doors to receive ashes once every 20 years.) (Source: Author, 2021)



Figure AIII. 3.17 Po Ina Nagar Temple, Phu Huu commune, Ninh Phuoc district, Ninh Thuan Province, (Source: Author, 2023)



Figure AIII. 3.18 Po Rome Temple, Hau Sanh commune, Ninh Phuoc district, Ninh Thuan Province, (Source: Author, 2023)

✓ 402 1:01 2



Figure AIII. 3.19 Po Klong Garai temple, Phan trang Thap Cham city, Ninh Thuan Province, (Source: Author, 2023)

Appendix AIV: Table of Key Terminologies

Stt	Terminology	Explain
1	Kingdom of Dai Viet	<p><i>Dai Viet</i> (Chinese: 大越) or <i>Dai Viet Quoc</i> (Chinese: 大越國) was the national name of Vietnam during two periods from 1054 to 1400 and from 1428 to 1804 AD. This name dates back officially to the reign of King Ly Thanh Tong (1054-1072). Before that, starting from the reign of King Dinh Bo Linh, the national name was Dai Co Viet (大瞿越), which included the word "Dai" (大) meaning "big" and the word "Co" (瞿) also meaning "big."</p> <p>In 1400, after replacing the Tran Dynasty (1226-1400), Ho Quy Ly, the founder of the Ho Dynasty (1400-1407), changed the country's name to Dai Ngu (大虞). In 1407, the Ming Dynasty invaded <i>Dai Ngu</i> and ruled until 1427. In 1428, after gaining independence, King Le Loi restored the name <i>Dai Viet</i> as the national name.</p>
2	Kingdom of Cham-Pa	<p><i>Cham-Pa</i> (Chinese: 占婆) was an ancient country that existed independently from 192 AD to 1832 AD. Cham-Pa's territory, at its most expanded, corresponded to present-day Middle Region of Vietnam, stretching from the <i>Hoanh Son</i> Mountain range in <i>Quang Binh</i> in the north to <i>Binh Thuan</i> in the south, and from the East Sea to the western mountains of present-day Laos.</p> <p><i>Cham-Pa</i> was most prosperous in the 9th and 10th centuries but gradually weakened under the pressure of the Dai Viet dynasties from the north and wars with the <i>Khmer</i> Empire. In 1471 AD, <i>Cham-Pa</i> suffered a heavy defeat against <i>Dai Viet</i> and lost most of its northern territory to <i>Dai Viet</i>. The remaining territory of <i>Cham-Pa</i> was divided into small states and continued to be gradually annexed by the Lords Nguyen. In 1832, the entire kingdom was officially annexed into Vietnam under the reign of King Minh Mang (1820-1841).</p>

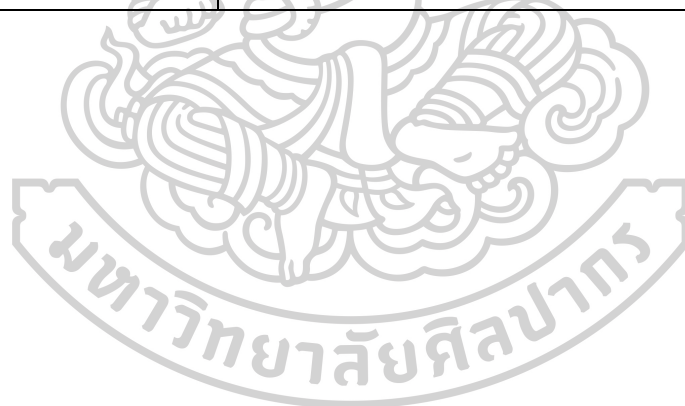
3	Dang Ngoai	<p><i>Dang Ngoai</i> (Nom: 唐外) or <i>Bac Ha</i> (北河), wellknown as Tonkin, known in contemporary Western documents as Tonkin, refers to the territory of <i>Dai Viet</i> controlled by Lord Trinh. This area extended from the <i>Gianh</i> River (in present-day <i>Quang Binh</i> province) northward. The capital of <i>Dang Ngoai</i> was <i>Dong Kinh</i>.</p>
4	Dang Trong	<p><i>Dang Trong</i> (Nom: 唐冲), or <i>Nam Ha</i> (Chinese: 南河), wellknown as Cochinchina, is the name of the <i>Dai Viet</i> territory controlled by Lords Nguyen, extending from the <i>Gianh</i> River (in present-day <i>Quang Binh</i>) to the south.</p> <p>Starting in 1600 AD, when he returned from the north to <i>Thuan Hoa</i>, Nguyen Hoang built an independent power base, which led to a civil war that divided the two regions in 1627 AD. Subsequent Lords Nguyen were in a confrontational position with the forces of Lords Trinh until the Tay Son army overthrew both lords and unified the two regions.</p>
5	Lords Trinh	<p>Lord Trinh (Chinese: 鄭王/1545 - 1787) was a feudal royal family that wielded territorial power over <i>Dang Ngoai</i> during the Le Trung Hung period (1533-1789).</p> <p>Officially, Lords Trinh served the Le Dynasty, but in reality, the Le monarch had little actual authority, with rule primarily exercised by Lord Trinh.</p> <p>During this period, the royal administration operated under a dual system of governance. In total, there were 11 generations of Lords Trinh who ruled <i>Dang Ngoai</i> for more than 2 centuries.</p>
6	Lords Nguyen	<p>Lords Nguyen (Chinese: 阮王/1558-1777, 1780-1802) refers to the leader and ruler of <i>Dang Trong</i>, in opposition to the <i>Dang Ngoai</i> region governed by the Lords Trinh during the Trinh-Nguyen split, a pivotal period in Vietnamese history.</p> <p>The Lords Nguyen emerged during the Later Le</p>

		<p>Dynasty's Le Trung Renaissance period, beginning in the mid-16th century. They ruled until their defeat by the Tay Son Dynasty in 1777 AD. However, Nguyen Phuc Anh, a direct descendant of the Lords Nguyen, managed to evade pursuit by the Tay Son army. He later proclaimed himself king and in 1802 overthrew the Tay Son Dynasty, establishing the Nguyen Dynasty (1802-1945).</p>
7	Truong Son Mountain	<p>The <i>Truong Son</i> Mountain range is the main mountain range in the Indochina peninsula. It is about 1,100 kilometers long and serves as the watershed for the <i>Mekong</i> River and the river systems flowing into the East Sea. Running parallel to the coast, the range forms a gentle arc in the northwest-southeast direction and acts as a natural boundary between Vietnam and Laos.</p>
8	Gianh River	<p>The <i>Gianh</i> River is a river in <i>Quang Binh</i> province, originating from the <i>Co-Pi</i> mountainside area of the <i>Truong Son</i> range, at an elevation of 2,017 meters. It flows through <i>Minh Hoa</i>, <i>Tuyen Hoa</i>, <i>Bo Trach</i>, and <i>Quang Trach</i> districts before emptying into the East Sea at the <i>Gianh</i> River Estuary.</p>
9	Dong Son Culture	<p>The <i>Dong Son</i> Culture is an ancient culture that appeared around 800 BC and existed in several provinces in Northern and North Middle Region of Vietnam (<i>Phu Tho</i>, <i>Yen Bai</i>, <i>Hoa Binh</i>, <i>Hanoi</i>, <i>Nam Dinh</i>, <i>Ninh Binh</i>, <i>Ha Nam</i>, <i>Thanh Hoa</i>, <i>Nghe An</i>, <i>Ha Tinh</i> Provinces). The center of this culture was the <i>Ma</i> River area and the three large rivers of the Northern Delta (<i>Hong</i> River, <i>Ma</i> River, and <i>Lam</i> River) during the Bronze Age and Early Iron Age.</p> <p>This culture was named after the locality where its first traces were discovered, near the <i>Ma</i> River in <i>Thanh Hoa</i> province. Many vestiges typical of <i>Dong Son</i> Culture have also been found in neighboring regions of Vietnam, such as <i>Yunnan</i>, <i>Guangxi</i>, and <i>Hainan</i> in China, as well as</p>

		in Laos and Thailand.
10	Sa Huynh Culture	<p>The <i>Sa Huynh</i> Culture is an archaeological culture dating from around 1000 BC to the end of the 2nd century.</p> <p><i>Sa Huynh</i> Culture is one of the three ancient cradles of civilization in Vietnam, along with <i>Dong Son</i> Culture and <i>Dong Nai</i> Culture, forming the cultural triangle of Vietnam during the Iron Age.</p>
11	Vietnamese	<p>The <i>Vietnamese</i> or <i>Kinh</i> People are an ethnic group that originated in the geographical area of present-day northern Vietnam and southern China. They are the main ethnic group in Vietnam, accounting for about 86.2% of the population, and are officially called the <i>Kinh</i> ethnic group to distinguish them from other ethnic minorities in the country.</p> <p>The main language of the <i>Kinh</i> People is Vietnamese, which belongs to the Viet branch of the Austroasiatic language family. Vietnamese people live throughout Vietnam and in various other countries, with the largest overseas Vietnamese community residing in the United States.</p>
12	Chams	<p>The <i>Chams</i> People, also known as <i>Cham-Pa</i> people or <i>Hoi</i> people, are an ethnic group belonging to the Austronesian family, originating from Southeast Asia. They currently reside mainly in Cambodia, Vietnam, Malaysia, Thailand, and the USA.</p> <p>From the 2nd century to the mid-15th century, the <i>Cham</i> People inhabited the kingdom of <i>Cham-Pa</i>, a contiguous territory of independent states in central and southern Vietnam, where they spoke the <i>Cham</i> language. The <i>Chams</i>, along with the Malays, were the only major Austronesian peoples to settle in mainland Southeast Asia during the Iron Age among the Austroasiatic populations.</p>
13	Northern	Northern Vietnam refers to the geographical

	Region	<p>region in the north of Vietnam. However, depending on historical contexts and usage, this concept is sometimes informally used to refer to different political territories.</p> <p>Geopolitically, it historically extended north of the <i>Gianh</i> River (now in <i>Quang Binh</i> province). Administratively, it was synonymous with Tonkin or <i>Bac Thanh</i> during the Nguyen Dynasty (1802-1945) and was one of the three main regions (alongside Central and South) of Vietnam during the French colonial period (see Figure 2).</p>
14	Middle Region	<p>Middle Region of Vietnam is one of the three geographical regions of Vietnam. Currently, it is the largest region among the three, covering 151,234 km².</p> <p>Located in a transitional position between the North and the South, the Middle Region has witnessed significant historical events. Apart from the territories of <i>Thanh – Nghe</i> areas, it saw the Vietnamese southward migration into lands once belonging to the ancient <i>Cham-Pa</i> kingdom. Military conflicts and boundary divisions within Vietnam during historical periods such as the <i>Trinh - Nguyen</i> rivalry and the Vietnam War also occurred in the Middle Region (see Figure 2, 7, 8, 9).</p>
15	Nha Ke-Bay (Type A)	<p>The name <i>Nha Ke-Bay</i> house originates from its unique truss design where the primary components supporting the roof structure mainly consist of the locally known “<i>Ke</i>” curve-shaped diagonal beam and the “<i>Bay</i>” pried part of the diagonal beam. This type of house is plentiful in the northern region of Vietnam.</p> <p>The roof slope is not directly determined by their slope but must pass through a roof slope-adjusted part locally called “<i>Banh Dong</i>” which fills the gap between the curve-shaped diagonal beam and the rafters that indicate the roof slope. The central compartment is reserved for the ancestral altar, with no space for wings on the left</p>

		and right sides of the house. The entrance is always across the top ridge beam, providing access to the altar.
16	Nha Roi (Type B)	The <i>Nha Roi</i> house is based primarily on one main column, this type of house is plentiful in the Middle Region of Vietnam, especially from <i>Quang Tri</i> to <i>Thua Thien Hue</i> , and <i>Ninh Thuan</i> provinces.
17	Nha Ruong (Type C)	The <i>Nha Ruong</i> house is a much bigger type of vernacular house based primarily on two main columns, a complex structure, that is much more valuable.
18	Nha La Mai (Type D)	The <i>Nha La Mai</i> house is a kind of <i>Nha Ruong</i> (Type C) or <i>Nha Roi</i> (Type B) thatch reeds house, but the roof has two layers, consisting of a first clay roof to dry and a second roof covered with rudimentary woven blankets very carefully, the distance between the two roof layers reaches a minimum on the roof (40 cm – 60 cm).



VITA

NAME SON DINH CAO

INSTITUTIONS ATTENDED 2019 starting the Ph.D.program in History of Architecture, Silpakorn University.
2006 March at Ho Chi Minh City Univesity of Architecture
2000 B.Arch at Ho Chi Minh City Univesity of Architecture

PUBLICATION Dinh Son Cao, Vinh An Le, Pratima Nimsamer (2024). Acculturation Phenomenon in Vernacular Architecture between Vietnamese and Chams in the Kingdom of Cochin-China (16th–18th)–Southeast Asia, Volume 19(9), International Journal of architectural Heritage (ISSN 15583058).
<https://doi.org/10.1080/15583058.2024.2370402>.

