

A Study on the Relationships between People's Behaviors  
and Spatial Elements in Urban Public Spaces: Case studies  
in Japan, the United States of America, and China

都市公共空間における空間要素と利用者の行動との関係性に関する  
研究 -日本, アメリカおよび中国におけるケーススタディ-

July 2021

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Graduate School of Horticulture

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(千葉大学審査学位論文)

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In partial fulfillment of the requirement for the  
Degree of Ph.D. in Agriculture.

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This thesis is dedicated to my parents,

Mobin Mao and Hantao Zhang,

For their love and values.

## **Abstract**

Public space in the urban area plays a vital role in people's life. The physical environment in public space is designed and categorized as spatial elements. People could have different ways to use the place and have different perceptions and reactions to the site. Spatial elements could be designed by different designers located in countries with unique cultural backgrounds.

This thesis conducted researches in Japan, The United States of America, and China. They focus on spatial elements in three types of urban public spaces: public facilities, commercial areas, and sites close to water. Spatial elements proposed by William H. Whyte have been investigated. They are relationship to the streets, Sitting space, the sun, food, water, trees, and triangulation. The study's research method is direct observation, including mapping, counting, taking photos, and video recording. Quantitative data have been collected in three countries and statically analyzed. The results show that spatial elements in each country have similar functions and, at the same time, also vary with local cultural backgrounds. Furthermore, the way people utilize urban public space could also be influenced by public space management and the country's culture.

**Keywords:** Urban Public Space, Spatial Element, Environmental Behavior, Japan, United States, China

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# Table of Contents

|  |       |
|--|-------|
| Acknowledgements.....  | XI    |
| Table of Contents.....                                       | XIII  |
| List of Figures .....  | XVIII |
| List of Tables .....   | XXVII |
| Chapter 1: Introduction .....                                | 1     |
| 1.1 Background to the study .....                            | 2     |
| 1.2 Research flow.....                                       | 4     |
| Chapter 2: Literature Review.....                            | 6     |
| 2.1 Public space design elements.....                        | 7     |
| 2.2 Studies in the city and public space .....               | 9     |
| 2.2.1 William H. Whyte’s elements in open public space ..... | 9     |
| 2.2.2 Kevin A. Lynch’s image of the city .....               | 14    |
| 2.2.3 Jan Gehl’s perspectives on the city .....              | 16    |
| 2.3 More recent studies .....                                | 20    |
| 2.4 Elements selected for this study.....                    | 25    |
| 2.5 Originality of this study .....                          | 27    |
| Chapter 3: Methodology.....                                  | 29    |
| 3.1 Research Goals .....                                     | 30    |
| 3.2 Case Study as a Research Approach.....                   | 30    |
| 3.3 Neighborhood and Site Analysis.....                      | 33    |
| 3.4 Methods for Urban Public Study .....                     | 35    |

|   |     |
|---|-----|
| 3.4.1 Observation.....                                      | 35  |
| 3.4.2 Interviews and questionnaires.....                    | 37  |
| 3.4.3 Methods have been selected .....                      | 38  |
| 3.5 Data Analysis.....                                      | 39  |
| Chapter 4: Cases in Japan.....                              | 40  |
| 4.1 Regional analysis and site selection.....               | 41  |
| 4.2 Ueno Park.....  | 43  |
| 4.2.1 Neighborhood analysis .....                           | 46  |
| 4.2.2 Observation in Ueno Park.....                         | 46  |
| 4.2.3 Results.....  | 47  |
| 4.3 Tokyo Dome City .....                                   | 68  |
| 4.3.1 Neighborhood analysis .....                           | 70  |
| 4.3.2 Observation in Tokyo Dome City .....                  | 71  |
| 4.3.3 Results.....  | 72  |
| 4.4 Harumibashi Park and Toyosu Park .....                  | 85  |
| 4.4.1 Neighborhood analysis .....                           | 86  |
| 4.4.2 Observation in Harumibashi Park and Toyosu Park ..... | 87  |
| 4.4.3 Results.....  | 89  |
| 4.5 Chapter Conclusion.....                                 | 100 |
| Chapter 5: Cases in the United States .....                 | 103 |
| 5.1 Regional analysis and site selection.....               | 104 |
| 5.2 Observation in Boston.....                              | 107 |
| 5.3 Boston City Hall Plaza.....                             | 109 |
| 5.3.1 Neighborhood analysis .....                           | 111 |

|  |     |
|--|-----|
| 5.3.2 Observation and Spatial analysis .....       | 112 |
| 5.3.3 Results.....                                 | 114 |
| 5.4 Faneuil Hall Marketplace.....                  | 118 |
| 5.4.1 Neighborhood analysis .....                  | 120 |
| 5.4.2 Observation and Spatial analysis .....       | 121 |
| 5.4.3 Results.....                                 | 122 |
| 5.5 Columbus Waterfront Park.....                  | 127 |
| 5.5.1 Neighborhood analysis .....                  | 129 |
| 5.5.2 Observation and Spatial analysis .....       | 129 |
| 5.5.3 Results.....                                 | 131 |
| 5.6 Chapter Conclusion.....                        | 136 |
| Chapter 6: Cases in China.....                     | 138 |
| 6.1 Regional analysis and site selection.....      | 139 |
| 6.2 Observation in Chongqing .....                 | 143 |
| 6.3 Chongqing People’s Square.....                 | 143 |
| 6.3.1 Neighborhood analysis .....                  | 145 |
| 6.3.2 Observation and Spatial analysis .....       | 146 |
| 6.3.3 Results.....                                 | 147 |
| 6.4 Guanyinqiao Commercial Pedestrian Streets..... | 155 |
| 6.4.1 Neighborhood analysis .....                  | 157 |
| 6.4.2 Observation and Spatial analysis .....       | 158 |
| 6.4.3 Results.....                                 | 159 |
| 6.5 Chaotianmen Square.....                        | 169 |
| 6.5.1 Neighborhood analysis .....                  | 171 |

|  |     |
|--|-----|
| 6.5.2 Observation and Spatial analysis .....           | 172 |
| 6.5.3 Results.....                                     | 175 |
| 6.6 Chapter Conclusion.....                            | 181 |
| Chapter 7: Reflecting on Spatial Elements .....        | 185 |
| 7.1 Food and Sitting Space.....                        | 186 |
| 7.2 Water and Sitting Space.....                       | 191 |
| 7.3 Tree, Sun, and Sitting Space.....                  | 195 |
| 7.4 Triangulation and Sitting Space.....               | 197 |
| 7.5 Other Factors.....                                 | 206 |
| Chapter 8: Thesis Discussions and Conclusions .....    | 213 |
| 8.1 Conclusions about Spatial Elements.....            | 214 |
| 8.1.1 Sitting Space.....                               | 217 |
| 8.1.2 Food and Sitting Space.....                      | 218 |
| 8.1.3 Water, Sitting Space, and Triangulation .....    | 219 |
| 8.1.4 Tree, Sun, and Sitting Space.....                | 220 |
| 8.1.5 Triangulation and Sitting Space.....             | 221 |
| 8.2 Reflecting on Contemporary Urban Public Space..... | 222 |
| 8.3 Recommendations .....                              | 227 |
| 8.3.1 General Recommendations.....                     | 227 |
| 8.3.2 Recommendations for Japan .....                  | 227 |
| 8.3.3 Recommendations for the United States .....      | 228 |
| 8.3.4 Recommendations for China .....                  | 228 |
| 8.4 Limitations .....                                  | 229 |
| 8.5 Future Research and Applications .....             | 230 |

|   |     |
|---|-----|
| Appendix .....                            | 233 |
| AN EXAMPLE OF BEHAVIOR MAPPING FORM ..... | 233 |
| References .....                          | 234 |

## List of Figures

|  |    |
|--|----|
| Fig.1.1 Research flow.....   | 4  |
| Fig.2-1-1 Project for Public Spaces' Great Place Diagram.....                      | 7  |
| Fig.2-1-2 Public Space Design Structure.....                                       | 8  |
| Fig.2-3-1 Contribution of This Dissertation.....                                   | 25 |
| Fig.2-4-1 Spatial Element in Cultural Frame.....                                   | 26 |
| Fig.4-1-1 Twenty-three Special Wards Area in Tokyo.....                            | 41 |
| Fig.4-1-2 Three Selected Sites in Tokyo.....                                       | 42 |
| Fig.4-2-1 Ueno Park Neighborhood Analysis.....                                     | 45 |
| Fig.4-2-2 Site Analysis of Study Area A.....                                       | 49 |
| Fig.4-2-3 Site Analysis of Study Area B.....                                       | 51 |
| Fig.4-2-4 Correlation of Density of Man with Canopy Coverage.....                  | 53 |
| Fig.4-2-5 Correlation of Density of Woman with Canopy Coverage.....                | 54 |
| Fig.4-2-6 Correlation of Percent of Man with Space Size.....                       | 55 |
| Fig.4-2-7 Correlation of Percent of Woman with Space Size.....                     | 55 |
| Fig.4-2-8 Average Number of People Change with Time in B4.....                     | 56 |
| Fig.4-2-9 Average Number of People Change with Time in B5.....                     | 56 |
| Fig.4-2-10 The Average Number of People in Study Area B.....                       | 57 |
| Fig.4-2-11 People's Number Change with Time in B9.....                             | 58 |
| Fig.4-2-12 Distribution of People of Different time-Area A.....                    | 59 |
| Fig.4-2-13 Distribution of People of Different time-Area B.....                    | 59 |
| Fig.4-2-14 Distribution of People of Different time-Area A<br>Average-Weekday..... | 60 |

|   |    |
|---|----|
| Fig.4-2-15 Distribution of People of Different time-Area B<br>Average-Weekday ..... | 60 |
| Fig.4-2-16 Distribution of People of Different time-Area A Average<br>Weekend.....  | 61 |
| Fig.4-2-17 Distribution of People of Different time-Area B-Average<br>Weekend.....  | 61 |
| Fig.4-2-18 B7 in Study Area B .....   | 63 |
| Fig.4-2-19 Photo of A1, A8, A9, B13, B9, B13 .....                                  | 64 |
| Fig.4-2-20 Street Performance in Ueno Park .....                                    | 66 |
| Fig.4-2-21 People Stand on Stairs.....  | 66 |
| Fig.4-2-22 Teenagers Playing skateboard.....  | 67 |
| Fig.4-2-23 Homeless People Get Food from Volunteers .....                           | 67 |
| Fig.4-3-1 Neighborhood analysis around Tokyo Dome.....                              | 70 |
| Fig.4-3-2 Spatial Analysis and Selected Benches.....                                | 72 |
| Fig.4-3-3 Seat Preferences, Facilities around Benches, and Segment of<br>Bench..... | 76 |
| Fig.4-3-4 Correlation Analysis .....  | 78 |
| Fig.4-3-5 People Sit on Benches When There is A Baseball Game.....                  | 81 |
| Fig.4-3-6 People Sit on Stairs.....   | 81 |
| Fig.4-3-7 People Sit on Table.....  | 82 |
| Fig.4-3-8 People Sit on Planters.....   | 82 |
| Fig.4-3-9 People Sitting under Shade .....  | 83 |
| Fig.4-4-1 A View from Harumibashi Park .....  | 86 |
| Fig.4-4-2 Neighborhood Analysis of Harumibashi Park .....                           | 87 |

|  |     |
|--|-----|
| Fig.4-4-3 Area Conducted Behavior Mapping in Harumibashi Park ....       | 88  |
| Fig.4-4-4 Number of People Change with Time .....                        | 90  |
| Fig.4-4-5 Categorized Behavior in Percentage .....                       | 91  |
| Fig.4-4-6 Number of Children / Size of Place .....                       | 91  |
| Fig.4-4-7 Warning on Handrail .....                                      | 92  |
| Fig.4-4-8 Food Cars in Toyosu Park.....                                  | 93  |
| Fig.4-4-9 Children Playing on Stairs and Climbing Handrail.....          | 93  |
| Fig.4-4-10 Shop Rent Fishing Equipment .....                             | 94  |
| Fig.4-4-11 Tent on Lawn Area .....                                       | 94  |
| Fig.4-4-12 Mapping of Man and Woman .....                                | 95  |
| Fig.4-4-13 Mapping of Boy and Girl.....                                  | 96  |
| Fig.4-4-14 Children’s Play Ground .....                                  | 97  |
| Fig.4-4-15 People Sit on Stairs.....                                     | 98  |
| Fig.4-4-16 Seats Designed for People to Lie Down.....                    | 99  |
| Fig.4-4-17 Toyosu Garden Club.....                                       | 99  |
| Fig.4-4-18 Park Market at Park’s Trance .....                            | 100 |
| Fig.5-1-1 Boston Regional Data .....                                     | 104 |
| Fig.5-1-2 Main Boston Urban Area .....                                   | 105 |
| Fig.5-1-3 Overview of Boston .....                                       | 106 |
| Fig.5-1-4 Three sites in Boston .....                                    | 107 |
| Fig.5-3-1 Boston City Hall Plaza.....                                    | 110 |
| Fig.5-3-2 Boston City Hall Plaza Neighborhood Analysis .....             | 111 |
| Fig.5-3-3 Boston City Hall Plaza Site Analysis .....                     | 112 |
| Fig.5-3-4 Distribution of People been Observed in Boston City Hall Plaza |     |

|   |     |
|---|-----|
| .....   | 113 |
| Fig.5-3-5 Number of People been Observed in Boston City Hall Plaza at Each Observation Point..... | 114 |
| Fig.5-3-6 Boston City Hall Plaza Age Distribution .....   | 115 |
| Fig.5-3-7 City Hall Plaza People’s Activities .....   | 115 |
| Fig.5-3-8 Few People Sit under Tree Canopy in Boston City Hall Plaza .....                        | 116 |
| Fig.5-3-9 Few People Stay in Boston City Hall Plaza.....  | 116 |
| Fig.5-4-1 Faneuil Hall Market Place Center .....  | 119 |
| Fig.5-4-2 Faneuil Hall Market Place Center Neighborhood Analysis .                                | 120 |
| Fig.5-4-4 Distribution of People been Observed in Market Place .....                              | 123 |
| Fig.5-4-5 Number of People been Observed in Market place at Each Observation Point.....           | 123 |
| Fig.5-4-6 Faneuil Hall Marketplace People’s Activities .....                                      | 124 |
| Fig.5-4-7 Faneuil Hall Marketplace Age Distribution .....   | 124 |
| Fig.5-4-8 Tables and Chairs under Trees in Faneuil Hall Marketplace .....                         | 125 |
| Fig.5-4-9 People Eating in Faneuil Hall Marketplace .....   | 125 |
| Fig.5-4-10 Shops outside Buildings in Faneuil Hall Marketplace .....                              | 126 |
| Fig.5-4-11 Shops on the second floor.....   | 126 |
| Fig.5-5-1 Columbus Waterfront Park .....  | 128 |
| Fig.5-5-2 Columbus Waterfront Park Neighborhood Analysis .....                                    | 129 |
| Fig.5-5-3 Boston Columbus Waterfront Park Site Analysis.....                                      | 130 |
| Fig.5-5-4 Distribution of People been Observed in Boston Columbus                                 |     |

|   |     |
|---|-----|
| Waterfront Park.....  | 131 |
| Fig.5-5-5 Number of People been Observed in Boston Columbus<br>Waterfront Park at Each Observation Point..... | 132 |
| Fig.5-5-6 Columbus Waterfront Park Age Distribution .....   | 132 |
| Fig.5-5-7 Water Front People’s Activities .....   | 133 |
| Fig.5-5-8 Percentage of People are Sitting in Water Front.....  | 134 |
| Fig.5-5-8 The Only Store in Boston Columbus Waterfront Park.....  | 135 |
| Fig.6-1-1 Chongqing Regional Data.....  | 140 |
| Fig.6-1-2 Main Chongqing Urban .....  | 141 |
| Fig.6-1-3 A Overview of Chongqing.....  | 141 |
| Fig.6-1-4 Three Sites in Chongqing .....  | 142 |
| Fig.6-3-1 People’s Square .....   | 144 |
| Fig.6-3-2 People’s Square Neighborhood Analysis .....   | 145 |
| Fig.6-3-3 Chongqing People’s Square Site Analysis.....  | 147 |
| Fig.6-3-4 Number of People been Observed in People’s Square at Each<br>Observation Point.....                 | 148 |
| Fig.6-3-5 People’s Activities in People’s Square .....  | 148 |
| Fig.6-3-6 Distribution of People been Observed in People’s Square....   | 149 |
| Fig.6-3-7 Chongqing People’s Auditorium .....   | 152 |
| Fig.6-3-8 Chinese Traditional Building Style Store in Chongqing<br>People’s Square .....                      | 152 |
| Fig.6-3-9 People Dancing in Chongqing People’s Square.....  | 153 |
| Fig.6-3-10 People Playing Traditional Instruments in Chongqing<br>People’s Square.....                        | 153 |

|   |     |
|---|-----|
| Fig.6-3-11 Foreign Tourists in Chongqing People’s Square .....  | 154 |
| Fig.6-3-12 Chongqing People’s Square Age Distribution .....   | 154 |
| Fig.6-4-1 Guanyinqiao Commercial Pedestrian Streets .....   | 156 |
| Fig.6-4-2 Guanyinqiao Commercial Pedestrian Streets Neighborhood<br>Analysis.....                                 | 157 |
| Fig.6-4-3 Guanyinqiao Commercial Pedestrian Streets Site Analysis   | 159 |
| Fig.6-4-4 Distribution of People been Observed in Guanyinqiao<br>Pedestrian Streets .....                         | 160 |
| Fig.6-4-5 Number of People been Observed in Guanyinqiao Pedestrian<br>Streets at Every Observation Point.....     | 161 |
| Fig.6-4-6 People’s Activities in Guanyinqiao Pedestrian Streets .....   | 161 |
| Fig.6-4-7 Age Distribution in Guanyinqiao Pedestrian Streets.....   | 162 |
| Fig.6-4-8 High Buildings with Glass Walls in Guanyinqiao Commercial<br>Pedestrian Streets .....                   | 162 |
| Fig. 6-4-9 Observation Points in Chongqing Guanyinqiao .....  | 165 |
| Fig. 6-4-10 Dance at the Entrance of the Park.....  | 167 |
| Fig. 6-4-11 Regression of Number of people and Dance/Sing .....   | 168 |
| Fig. 6-4-12 Regression of Number of people and Dance/Sing .....   | 168 |
| Fig.6-5-1 Chaotianmen Square .....  | 170 |
| Fig.6-5-2 Chongqing Chaotianmen Square Neighborhood Analysis ...  | 171 |
| Fig.6-5-3 Chongqing Chaotianmen Square Site Analysis.....   | 173 |
| Fig.6-5-4 Distribution of People been Observed in Chongqing<br>Chaotianmen Square Population at Every point ..... | 174 |
| Fig.6-5-5 Number of people been observed in Chongqing Chaotianmen   |     |

|   |     |
|---|-----|
| Square Population at Every Observation Point .....                                  | 175 |
| Fig.6-5-6 People’s Activities in Chongqing Chaotianmen Square .....                 | 176 |
| Fig.6-5-7 Age Distribution in Chongqing Chaotianmen Square.....                     | 176 |
| Fig.6-5-8 Vendors and Stalls around Chongqing Chaotianmen Square<br>.....           | 179 |
| Fig.6-5-9 Foreign Tourists Disembark from a Cruise Ship.....                        | 180 |
| Fig.7-1-1 Food Vendors and Stalls in Chongqing Chaotianmen Square<br>.....          | 187 |
| Fig.7-1-2 Fruit Selling on Wooden Cart in Chaotianmen .....                         | 187 |
| Fig.7-1-3 Street Food on Selling on Movable Cart in Chaotianmen....                 | 188 |
| Fig.7-1-4 Food Car in Boston Columbus Waterfront Park.....                          | 188 |
| Fig.7-1-5 Food Cars in Toyosu Park.....   | 189 |
| Fig.7-1-6 Food Stand in Chongqing People’s Square .....                             | 190 |
| Fig.7-1-7 Tea Shop in Guanyinqiao Commercial Pedestrian Street....                  | 191 |
| Fig.7-2-1 People Sitting around the Fountain in Ueno Park.....                      | 192 |
| Fig.7-2-2 People Sitting in Front of Music Fountain in Guanyinqiao.                 | 192 |
| Fig.7-2-3 People Sitting in Boston Columbus Waterfront Park.....                    | 193 |
| Fig.7-2-4 People Sitting in Harumibashi Park.....                                   | 193 |
| Fig.7-2-5 Young People Dance in front of The Fountain .....                         | 194 |
| Fig.7-2-6 Small Band Playing and Stalls around Chongqing<br>Chaotianmen Square..... | 194 |
| Fig.7-3-1 High Tree Coverage Area in Ueno Park.....                                 | 195 |
| Fig.7-3-2 Benches under Trees in Boston City Hall Plaza.....                        | 196 |
| Fig.7-3-3 People Sitting under Trees in Chongqing People’s Square ..                | 196 |

|  |     |
|--|-----|
| Fig.7-4-1 Street Performer in Ueno Park .....  | 199 |
| Fig.7-4-2 Street Performer in Boston Faneuil Hall Marketplace .....                  | 200 |
| Fig.7-4-3 Event in Ueno Park .....   | 200 |
| Fig.7-4-4 Event in Guanyinqiao Commercial Pedestrian Street .....                    | 201 |
| Fig.7-4-5 Event in Boston Faneuil Hall Marketplace .....                             | 201 |
| Fig.7-4-6 Sittings Area Create by Events in Guanyinqiao Pedestrian<br>Street.....    | 202 |
| Fig.7-4-7 Morning Sward Dance in Guanyinqiao Pedestrian Street...                    | 203 |
| Fig.7-4-8 Night Square Dance in Guanyinqiao Pedestrian Street .....                  | 204 |
| Fig.7-4-9 Writing Chinese with Water on Ground in Guanyinqiao.....                   | 204 |
| Fig.7-4-10 Playing Chinese Chess in Guanyinqiao Ground in<br>Guanyinqiao.....        | 205 |
| Fig.7-4-11 Playing Cards on Bench in Guanyinqiao .....                               | 205 |
| Fig.7-4-1 Stair in Boston City Hall Plaza .....                                      | 207 |
| Fig.7-5-2 Event in Ueno Park-2 .....   | 207 |
| Fig.7-5-3 People Rest on Grass in Boston Columbus Waterfront Park                    | 208 |
| Fig.7-5-4 People with Their Dogs on Grass in Boston Columbus<br>Waterfront Park..... | 209 |
| Fig.7-5-5 Small Tents in Toyosu Park.....  | 209 |
| Fig.7-5-6 Children Play with Their Parents on Grass in Toyosu Park                   | 210 |
| Fig.7-5-7 Dog Park in Toyosu Park .....  | 210 |
| Fig.7-5-8 Low Bushes in Guanyingqiao Commercial Pedestrian Street<br>.....           | 211 |
| Fig.7-5-9 Fence around Flowers in Guanyingqiao .....                                 | 211 |

|   |     |
|---|-----|
| Commercial Pedestrian Street .....  | 211 |
| Fig.7-5-10 Lawn Area Surrounded by Bushes in Chongqing People’s<br>Square ..... | 212 |
| Fig.7-1-1 Spatial Elements and Culture Background.....                          | 217 |
| Fig.8-1-2 Food and Sitting Space influenced by Culture Background               | 219 |
| Fig.8-1-3 Relationships of Water, Sitting Space, and Triangulation...           | 220 |
| Fig.8-1-4 Relationships of Tree, Sun and Sitting Space.....                     | 221 |
| Fig.8-1-5 Relationships of Tree, Sun and Sitting Space.....                     | 222 |
| Fig.8-2-1 Relationship between Triangulation and Placemaking .....              | 226 |

## List of Tables

|   |     |
|---|-----|
| Table 3-2-1 Spatial Elements have been Observed in Each Site .....    | 34  |
| Table.4-2-1 Observation Date.....                                     | 47  |
| Table 4-2-2 Factors to Divide Study Area .....                        | 49  |
| Table 4-2-3 Information for each part of the place .....              | 50  |
| Table.4-2-4 ANOVA Analysis Results.....                               | 52  |
| Table 4-3-1 Data of Benches Affected by Position .....                | 74  |
| Table 4-3-2 Data selection and Edge Effect .....                      | 77  |
| Table 4-3-3 Number of Individuals in the Center Area.....             | 79  |
| Table.4-4-1 Number of People been Mapped .....                        | 89  |
| Table.4-4-2 Number of People in Categorized Behavior .....            | 90  |
| Table 6-3-1. Data Collected in Chongqing People’s Square .....        | 150 |
| Table 6-4-1 Data collected in Chongqing Guanyinqiao .....             | 164 |
| Table 6-4-2 Regression analysis of Dance/Sing in Guanyinqiao.....     | 167 |
| Table 6-5-1Data Cllected in Chongqing Chaotianmen Square.....         | 178 |
| Table 7-4-1 Activates Observed as triangulations in Study Sites ..... | 197 |
| Table.8-1-1 General and Regional Results .....                        | 215 |



# Chapter 1: Introduction

## **1.1 Background to the study**

The city is defined as a well-developed place where people work and live (Ramlee, Omar, Yunus, & Samadi, 2015). Everything that can be part of the built environment in cities, such as squares, streets, alleys, buildings, bollards, are understood as public spaces (Gehl & Savare, 2013). The creation of such parks has many benefits, both economic and civic. Public spaces like parks can raise the land values around the site, and some nearby houses have the highest sale prices. They also have many benefits for the environment, add pleasant atmospheres for people, and provide natural habitats for animals. Public space allows people to enjoy the art of nature and participate in the recreational activities they seek out. “Those places people love to share some common characteristics, people feel safe, have fun, and feel welcome in those spaces. Successful spaces always share these qualities: accessibility, activities, comfort and sociability” (Project for Public Spaces, 2000).

Some public spaces fail for a variety of reasons. Some public spaces are designed to be looked at, but not for people to use like most plazas in front of Chinese local government buildings designed 20 years ago. Furthermore, in Japan, the space of metropolises such as Tokyo is limited. Some pocket’s spatial elements are limited by size, which cannot work with other elements, results in limited function. Some other reasons include a lack of gathering spots, poor entrances and visually inaccessible space, dysfunctional features,

paths that do not lead people where they want to go, domination of space by vehicles, blank walls or zones around the edges of a space, or inactivity. All of these design failures result in space that people do not want to engage with. (Project for Public Spaces, 2000)

Many researchers focused on urban public space conducted in one region or country, and few studies would include multiple countries with different cultural backgrounds. While globalization continues with the development of technology which creates major cities in each country becomes multi-cultural. The number of foreign workers in Japan increase in recent years, and more than 480,000 foreign workers in Tokyo (Ministry of Health, Labour and Welfare, 2019). Foreign people in China also increased in these years, 1430695 foreign people (including people from Hong Kong, Macao, and Taiwan) resident in China, 77008 are for business, and 444336 are working in China. Moreover, with the decrease in the natural population growth rate, the number of foreign workers could increase in the future (National Bureau of Statistics, 2021). As for the United States of America, a multi-cultural environment could be found in most major cities. The cultural diversity in major cities requires urban public spaces to serve people with different cultural backgrounds. Researches and studies conducted in different countries with unique cultures are needed to improve people's lives and well-being in modern major cities.

Urban public spaces in different countries may have similar spatial elements.

Still, people with their unique cultural backgrounds may have distinct interactions with particular elements and their way of utilizing the space. This study conducted research in Japan, The United States, and China to determine how people use public space and interact with spatial elements in different countries. The category of spatial elements is based on William H. Whyte’s research. Some other features have also been observed and considered factors that may affect people’s behaviors.

## 1.2 Research flow

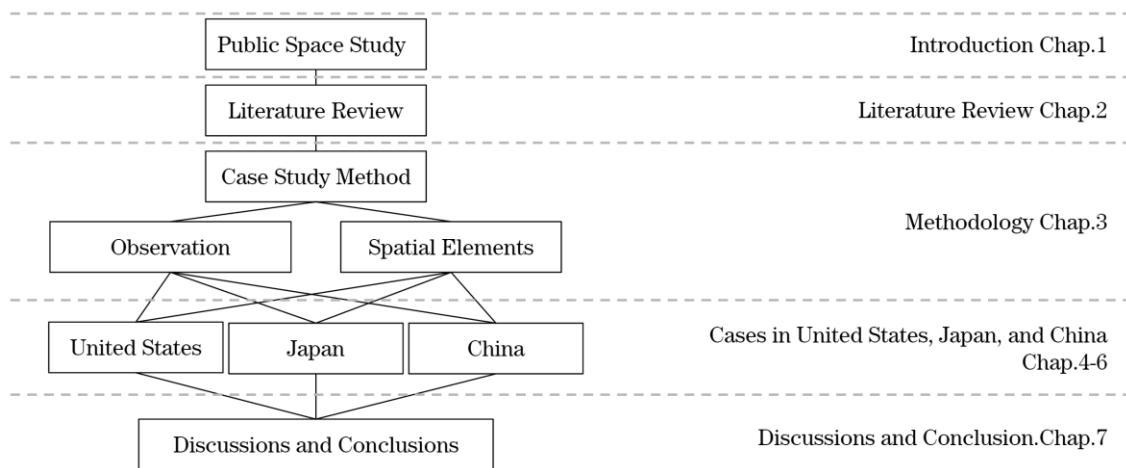


Fig.1.1 Research flow

The research focused on urban public space. Since there is no perfect public space and the existing conflicts in the real world between people and the physical environments would become the starting point of this study. Japan, The United States, and China have been selected to conduct research with international elements. Literature reviews have been focused on three countries’ public space, the design elements in public space, and direct

observation as the research methodology. Neighborhood and site analysis provides information in three different scales of selected areas. Moreover, the data collection process in three countries has also been conducted in systematic observation methods and then followed with data analysis. The discussion part includes more analysis which covers all three countries. And the final chapter would discuss and reflects results from each country and make a statement of limitation and research in the future.

## **Chapter 2: Literature Review**

## 2.1 Public space design elements

### What Makes a Great Place?

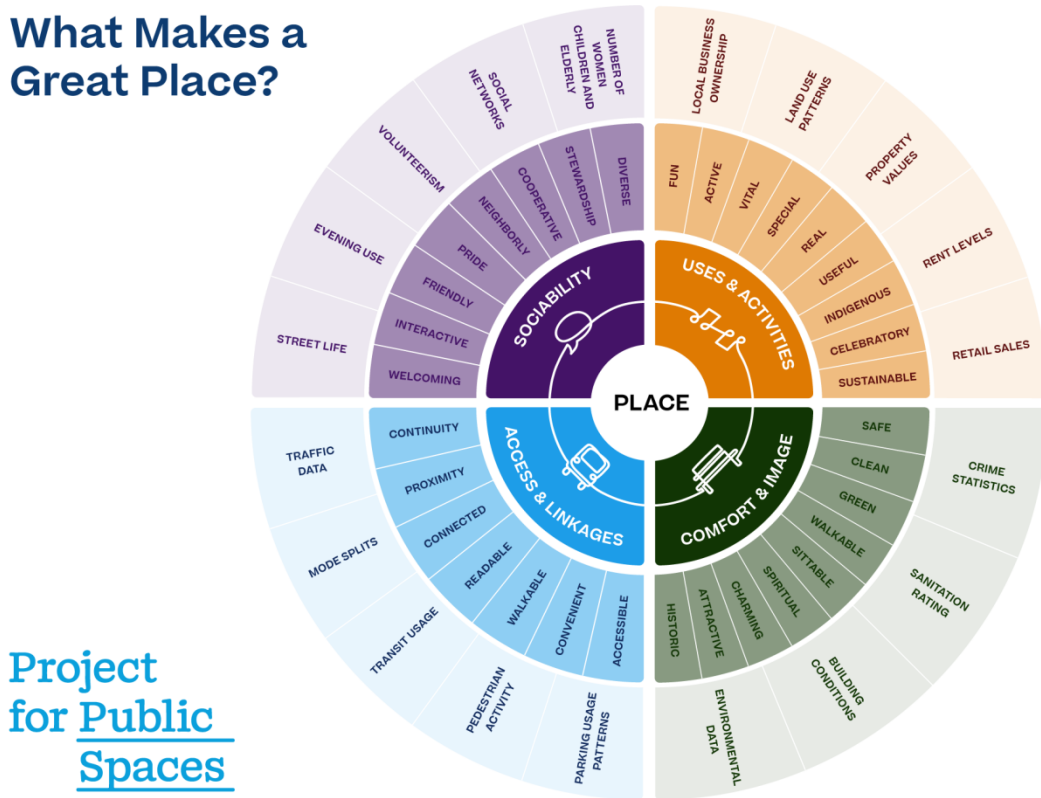


Fig.2-1-1 Project for Public Spaces' Great Place Diagram

(Source: <https://www.pps.org/article/grplacefeat>)

Public space design has many elements that affect people's use of public space. The description of public spaces could include attractive, lively, accessible, social. These descriptions could be delivered by manipulating physical environments, such as vegetation, benches, water, shops, stair/ramps.

The "Project for Public Spaces" Great Place Diagram presents categorized

aspects of placemaking in a comprehensive structure. The diagram divides public space's attributes into many intangible parts in 4 main qualities: Access & Linkages, Sociability, Uses & Activities, and Comfort & Image. Visual and physical connections make people could quickly get to and through the place. The comfort of space could include people's perception of cleanliness, safety, and availability to sit. The uses in the site are reasons people pay a visit, and people could have activities together and make the place special. People would feel a stronger place attachment if they could meet friends, greet neighbors, and conduct all kinds of social activities.

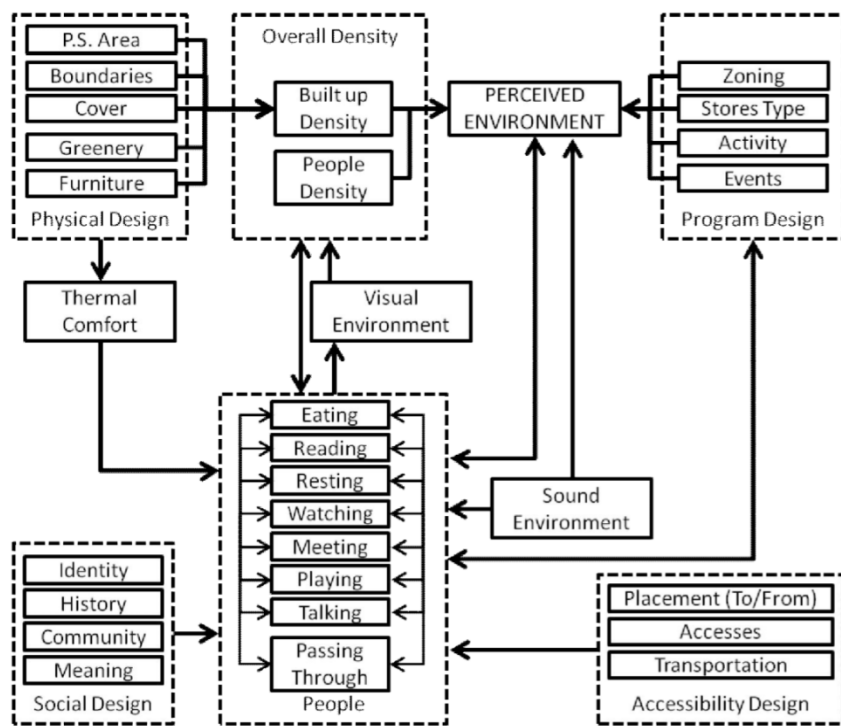


Fig.2-1-2 Public Space Design Structure

(Source: AVALONE NETO, Olavo)

Olavo has holistically summarized the structure of public space design. There are several parts in this structure, including Thermal, Social Design, Accessibility, Program Design, Visual Environment, and Sound Environment. These together could affect people's behavior and perceptions in public space.

## **2.2 Studies in the city and public space**

Many elements exist in the city and public space, and many researchers conducted their investigations and research in different places and countries. The following will introduce several researchers and their views.

### **2.2.1 William H. Whyte's elements in open public space**

William Hollingsworth Whyte was an urbanist, sociologist, and people watcher in The United States. He worked with New York City Planning Commission in 1969 and focused on how newly planned city spaces work. He walked in cities for more than 16 years, and he uses time-lapse photography with observation technics. Whyte served as a critical planning consultant for major cities in The United States and a professor at Hunter College of the City University of New York (Project for Public Spaces, 2010). He discussed seven essential elements required for good public spaces in his book *The Social Life of Small Urban Spaces*: the relationship to the street, seating, sun, water, trees, food, and triangulation.

## **Relationship to the street**

A good plaza starts at a street corner, so the relationship to the street can be one of the most important aspects of a space and the area where the street and plaza or open space meet is a key to space's success. With street corners often acting as a hub of activity, it will attract more people if there are some places to sit. Another essential feature of the street is its retail spaces, stores, windows with displays that attract people's attention. According to Whyte, developers should be required to devote at least 50% of the ground-floor frontage to retail and food uses (Whyte, 1982). The transition between the street and plaza should make it hard to tell where the end is and the other begins. Sight lines into the plaza or park can be an essential source of secondary enjoyment for people who pass by. Spaces with a slight elevation can be inviting, and the elevation should consider sight lines. Unless space is connected to a subway station or similar situations that make space go down, open space should not be sunken or declining.

Whyte studied this in several small urban spaces, including New York City's Greenacre Park and Paley Park. In New York, life is energetic both inside and outside of the park. People on the street love to look into the park, and thus the park has a secondary use. People will enter these small urban parks when musicians and other acts occur in these kinds of smaller urban parks. The park has an entry space from the street then expands into a plaza, which acts as a place for people to have conversations. When an area is completely cut off from the street, it becomes undesirable for people.

## **Sitting Space**

People prefer to get together on stairways or to sit on low planter walls. There should be more than one linear foot of seating space per 30 square feet of open space, and seating should be two backsides deep (Whyte, 1982). People will sit almost anywhere between a height of one foot to three feet as long as the seating is physically comfortable, which means the benches should have backrests and contoured chairs. The human backside should also be considered so that the sitting space is deep enough and comfortable for people's bodies. It is also essential to make the seating area socially comfortable, and movable chairs can provide more options for people to decide where to sit. People can sit in the back, up front, side, in groups or alone, in the sun, or the shade. Moveable chairs give people choices and help to build a relaxed social space. Ledges also play an essential role in space. Compared to railings and sloped surfaces, settable ledges can provide more sitting places. People will sit wherever possible and love to watch people's movement: a ledge is a place that can serve both of these needs at the same time. They also work like steps, offer infinite possible groupings, and create sightlines for watching the street. The busiest places in a sitting area are its corners. People prefer to get together at the corners, where interaction can take place. Sometimes people prefer to carefully get through the blockages at the corner rather than detour around.

## **The Sun**

At first, Whyte proposed that the sunlight could be a chief factor for people deciding where to get together, an idea that he revised later during his observations when the sunlight proved to be less significant but still a factor affecting people in public spaces. In colder months, the sunlight plays an important role, but not every public space can get direct sunlight in the city because the high structures can block the sunlight. If an area cannot receive direct sunlight, it can get secondary light from the reflection of buildings. Sun light also provides warmth that people generally sit in the sun and the shade in summer, but people will actively seek the sun in cool weather.

## **Food**

Food carts and cafes are important in the city. Food can attract people, attracting more people, so they are a perfect place for social interaction. Plenty of folding tables and chairs can extend the food space, such as in an outdoor café; an open area can be used to enjoy the food they get from the shop, and people can also bring their food and drinks. Food vendors pose a problem, however, in the form of the disposal of waste. Several waste baskets need to be placed around the vendor, and space needs to be regularly cleaned to maintain a waste-free city.

## **Water**

Water in a city works as a sound buffer against other noise such as that from street traffic. Whyte discovered that the water wall in Paley Park is about 75

decibels and blocks out other conversations in the park along with outside street noise. Other aesthetic features such as sight and touch are essential aspects of water: People love having fun and enjoying the water. Another example is the Ira Keller Fountain in Portland, Oregon. While the fountain is somewhat dangerous, people like to get together there and socialize.

### **Trees**

Whyte suggests that developers should be required to provide a tree for every 25 feet of sidewalk, and it must be at least 3.5 inches in diameter, planted flush with the ground. In plazas, trees must be provided in proportion to space (e.g., a plaza of 5,000 feet, a minimum of six trees). Trees should also be placed close to the sitting space. By providing “awning,” trees can help the people beneath them feel comfortable and protected by the enclosure. Trees can decrease the glare index, which can predict the discomfort glare due to the daylight. (Position and size of windows, interior luminance, and sky luminance are the factors that affect the glare index).

### **Triangulation**

According to Whyte’s definition, triangulation is a “stimulus” and an interaction between people; they are conversation-starting things people like to talk about when they walk by it. An example might be artificial objects in the center of a plaza where people like to sit around and get food from a nearby vendor. Musicians can play the same role; they can attract people, and those people can draw more people to come. Usually, musicians and

entertainers perform great acts and draw many people, but a terrible act can sometimes work even better. Some shops and stores with café outside will invite performers to help them attract customers.

### **2.2.2 Kevin A. Lynch's image of the city**

Kevin Andrew Lynch was an American urban planner, and he is famous for his work on the perceptual form of urban environments. He published several books about urban planning and site planning. The book *The Image of the City* is the most influential one, and he proposed five elements that referable to physical forms and reappeared in many types of environmental images (Lynch, 1960). These elements are closer to the town and city level, influencing spatial elements at a higher level.

#### **Paths**

Paths could be walkways, streets, transit lines, canals, and railroads. They work as channels that connect different areas and districts. People create the image of a city when they move through it, and the elements make up the main part of people's perception of the city. Paths also connect and work with other environmental elements that are related and arranged along.

#### **Edges**

Edges are worked as boundaries, and they could exist between two phases and work as linear breaks in continuity. Walls, edges of development, shores, and railroad cuts could all be considered as edges. These edges could work as

barriers, and sometimes they could be penetrated with people's interactions. They could become the close-off between two regions or become seams to connect two areas. Edges as an element in the city work as important organizing features that could hold generalized areas and become outlines as water or walls.

### **Districts**

Districts are observers mentally enter and recognized have some common characters, and usually have two-dimensional extent works as medium or large city sections. Therefore, people could identify this element from both inside and outside. Many cities' planning would structure the city with districts and work together with paths as dominant elements.

### **Nodes**

Nodes could be junctions, transportation places of break, a shifting between structures, paths' convergence, and a crossing. Street corners, enclosed squares, and many other concentrations of physical characters are also considered nodes. Sometimes, these nodes could concentrate and become the epitome of a district, have large radiates of influence, and stand as symbols. Nodes are related to the path concept since paths create junctions and naturally form the physical environment of nodes. Nodes could also work as cores in districts and become a populated centers. Events and activities could be held in node areas and become the dominant feature in districts.

## **Landmarks**

As another type of point-reference, landmarks could only be observed from the external. Buildings, stores, signs, and mountains, these physical objects could be considered as landmarks in the city. Landmarks usually could be seen from many angles and distances over other more minor elements and used as a reference. They could locate inside the city or become a constant symbolized direction with a distance, such as hills, domes, and isolated towers. Some other landmarks could be signs, trees, store fronts, and many other urban facilities. These landmarks are in the local area and could only be observed in restricted locations. They are used as clues of the identity of the local area, which require more time for people to recognize and become familiar with.

### **2.2.3 Jan Gehl's perspectives on the city**

Jan Gehl is a Danish architect and also and practicing urban design consultant. He is also a professor in Urban Design at the School of Architecture in Copenhagen. His research focused on the form and use of public spaces, which started in Copenhagen. His consulting firm Gehl Architects, participated in projects worldwide with the application of his research. In his book, *Cities for People* introduced aspects that a city should have and things that affect people at eye level (Gehl, 2010).

#### **At City level**

A city is designed to meet people's basic needs such as walk and bike, and the

city also should provide space for people to have movements and contact with society. A lively city would attract people with friendly and welcoming signals with social interactions. Public space in the city would reinforce city life, which could be a self-reinforcing process; things happen because something happened.

Events could be a good start for this process, which could attract many people. Shops, restaurants could serve the public well and may function along the street. The density of the city could hugely influence how people live in cities. Unsuccessful city planning could create high building density with little city space. City life requires reasonable population density, biking and walking distance, compact city structures, and good quality of city space.

Edges are an essential element in the city. People walk along the edges in town and experience edges as frontages people see and interact. Edges limit people's visual field, it communicates with people and creates the sense of a place. The edge shows the place's comfort, security, and how the place is organized. Soft edges could be more attractive and have more interactions with people. Edges with narrow units and more doors could be efficient. Doors and windows open to the public, shops with stalls outside, different shops could create a famous street.

Safety is crucial for city life; both perceived and experienced security could affect people. Traffic becomes a factor that usually a lively city would have

more slow traffic on streets. People could walk on pedestrian streets and have conversations. When cars take up the street, people would get fear and worry about safety on the street. Life along the street, such as people in buildings could see outside through windows, could make the street safer. Furthermore, soft edges mentioned before could create a transition of private and public, have more interactions with people, make the street have a better image, and make people feel secure.

### **At eye leave**

People live in the city, and their lives start on foot. Life takes place on foot, and several factors affect how people walk. Usually, people walk with their purpose, and they walk from place A to B. Most city centers have one square km to reach all-important city functions by walk to provide an acceptable walking distance. Obstacles on streets such as bus station shelters, traffic signs, parking meters could force people to make detours. People also could be stopped by stoplights when they want to cross the street. It may take several minutes to wait and have more stoplights in the poorly designed city center. Stairs and steps are not welcome by pedestrians; it also limited wheelchair and make the place less universal. When ramps are available, more people will choose to walk on ramps rather than walk on stairs. The pavement also affects people's walking, and uneven cobblestone could make high-heeled shoes hard to walk.

Stationary activities such as seating usually require the quality of the

situation, weather, and site. Pedestrians in the city may not be a good indication of good city quality. Insufficient transit options and long distances between functions in the city could result in too many people walking.

A typical short-term activity is standing and requires minimal quality of the site. People would like to lean against walls and all kinds of psychological support. When people need to stay for a length of time, they will choose somewhere to sit. The longer they would stay, the more carefully they would choose. In general, a good place for people to sit is a pleasant microclimate, good placement such as the edge of the space, covered back, good view, low noise level, and no pollution. An arm's length would be an idea for people's personal distance from individuals or groups. The comfort of seating also influences people's seating choice and the length of stay. Secondary seating options such as steps and flower pots could be selected when there are so many people and insufficient sitting space. Moveable chairs could also be primary seating and provide flexibility to users. Another element that could attract people is the café shop. People could get beverages and food from café shops then take seats and talk to their friends.

The city space also serves people as a gathering and meeting place. The city could hold events in the space, and people could have their activities such as play, exercise, and other ways of self-expression, all could take place in the city's public space. The scale of the place also makes a difference. A good scale that fits the human body and senses would make the place feel right.

Some new city areas would have too large amorphous spaces, making people feel cold and dismissive.

Weather condition is one of the essential criteria for the public space. The climate would vary with seasons and geographic locations. Sun could be an attraction in temperate reigns, while the shade is also prized in warmer climates, and wind could be a problem when the area is near tall buildings. The weather condition needs carefully planned from town level to microclimate in coroners.

## **2.3 More recent studies**

Studies that have been introduced before are based on three influential researchers, William Whyte and Kevin Lynch conducted their study decades before, with only Jan Gehl continuing his research. Many other recent studies also gain insight into urban public space and spatial elements.

The public space in japan also includes the area around subway stations where many people with commercial areas are occupied. Many research and studies focused on spatial elements and people's behavior in JR (Japan Railway) stations have been found and pointed out how people move and interact with facilities and spatial elements in station areas ( Kawai , Ikeda , Masuoka , & Zaino , 2000) (Ikeda , Kawai , & Masuoka , 2000) (Ikeda , Kawai , & Masuoka , 2001). Many research focused on streets , such as

urban elements in main streets (Yoshitsugu, 1999), frontage space in the boundary of public space been evaluated (Kazuo, Koichi, & Kohei, 2011). People's activity has been observed and evaluated by a human-oriented perspective, introducing Project for Public Space, Gehl, and William H. Whyte's research. Which mainly rely on the variety of people's activity, stationary activity, the number of secondary seating to evaluate people's behavior, and spatial elements in public space (Rui, Taku, & Haruna, 2016). Some researchers also suited spatial elements and factors in design. Public space such as Hibiya Park has been studied on spatial articulation and analyzed with GIS to determine user's movement and static occupation that spatial elements have been considering (SUGITA, DOHI, & MATSUI, 1997). Furthermore, people's activities and satisfaction have been researched in seaside parks (SASADA & KUROYANAGI, 1999).

Researches have been conducted in the United States, and other western countries have some studies related to spatial elements, such as setting activates by users in New York City (MITOMO, 2012). Some researchers conduct behavior mapping with GIS to discover spatial occupation patterns in urban open space (Marušić, 2010). Furthermore, space is encouraged to support mixed life, where people could have multiple ways to enjoy the space (Francis, 2010). Citizens involved in participation in spatial planning in urban areas, usually through community-based self-organizations, have been noticed and studied as participatory beyond government (Boonstra & Boelens, 2011) (van Meerkerk, Boonstra, & Edelenbos, 2013). Moreover, the

newly proposed 'Fourth Places' (different from 'third places') pointed out places that could invite strangers to join conversations and activities in public spaces (Simões Aelbrecht, 2016).

The placemaking in recent years also proposed several new ideas, such as Tactical Urbanism. This could be summarized by the phrase "Lighter, Quicker, Cheaper" proposed Eric Reynolds in 2010 (MACIVER, 2010), a low-cost, high-impact strategy for developing projects in urban public space. Tactical urbanism usually requires affordable cost with visible results quickly, could be applied to public spaces in neighborhoods and communities to make the place more attractive and solve local problems (Walljasper, 2010). Many researchers are also focused on race, and social justice, in North America. Public space is made by people and is supposed to serve the people, but in reality, different genders and races may use the public space differently and lead to injustice in public space (Helmuth, 2019) (McCann, 1999). Moreover, homeless people in public spaces have also been noticed, and the conflict of anti-homeless has been tabled on social justice (Mitchell, 2003).

In China, the conflict between people and urban public space becomes noticeable because of the fast development in urban areas. Many newly constructed and opened landscapes, squares, commercial spaces, "green" spaces are re-inventing the public space experience in China (Gaubatz, 2008). The public spaces in China change with the urban regeneration, in which

squares play an essential role and attract residents and tourists (Li, 2003). The public space design also changed, and the transition from traditional to contemporary has a massive impact on public life, which gets some inspiration from western with critiques (Yang & Volkman, 2010). The elements and characteristics of streets have also been identified (Istrate & Chen, 2021).

Simultaneously, conflicts between people and politics in the urban area emerged with the development. One of the problems is about the street vendors, most of these people are not very rich, and the policies usually do not support this kind of business (Huang, Xue, & Li, 2013). This problem leads to conflicts between street vendors and the municipal administration law enforcement bureau (Hanser, 2016). Sometimes, law enforcement would confiscate the vendor's property to improve the city's appearance (Caron, 2013). Another interesting phenomenon is public dance, which is very popular in squares and could be seen in the morning and night (Lin, Bao, & Dong, 2019). The public dance may influence by the tea culture in China. People could drink tea and have organized or half-organized public dances (Peng, 2020). The dancing in public space also has been noticed in Beijing, which could be observed almost every day conducted by women in the sixties and seventies with musicians playing drums, cymbals, and suona that create a sonic environment (Chen, 2010). Other activities have also been observed, such as jogging, dog walking, Taichi, and sward dance; these are activated mainly by elders (Ren & Cheng, 2019). These phenomena and people's

activities could be the erosion of public space and public life, involving monetary ruptures and everyday struggles, which was studied by Jeffrey Hou (Hou, 2010).

Researches and studies focused on urban public space are usually based on several cases in a particular area, city, or county. Cases from multiple countries with different cultural backgrounds have been studied are rarely found. In this study, cases from Japan, the United States, and China have been selected. People's behavior and spatial elements in public spaces have been recorded in different places, and various activities have been observed, especially in China. The globalization process makes people move around the world, communities with multicultural formed in major cities, and public justice and equality naturally work with public space, designed and managed to serve everyone from local and people with different cultural backgrounds.

The results in this study cover multicultural public spaces, find out the relationship between people's behavior and spatial elements in developed and developing, western (the United States), oriental (China), and a combination of the western and oriental county (Japan) (Fig.2-3-1). Case studies with nine sites in three different countries make results of this study with universality and regionality.

## How to Make a Successful Public Space

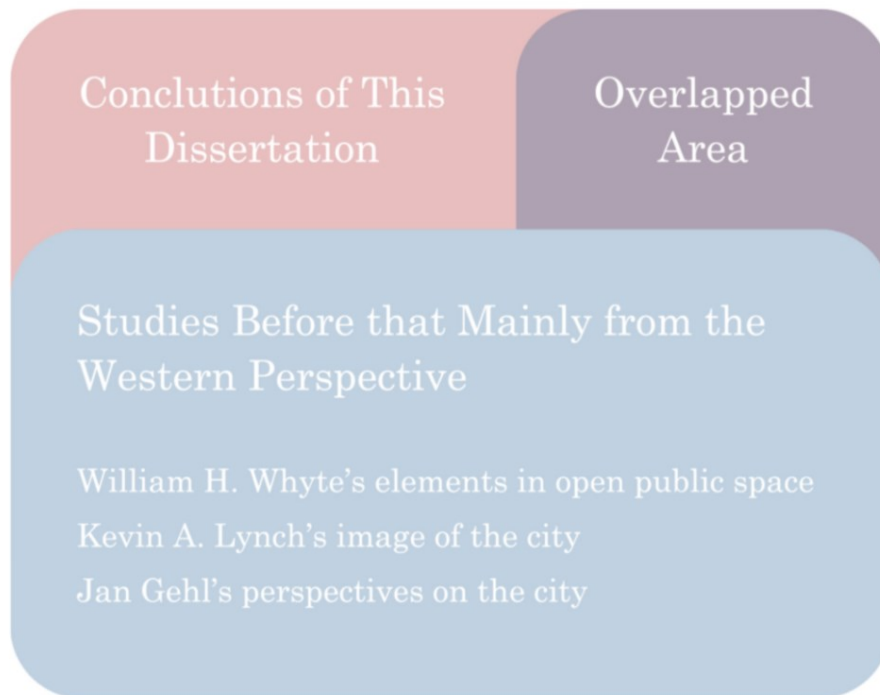


Fig.2-3-1 Contribution of This Dissertation

### 2.4 Elements selected for this study

Based on results from former researchers in the literature review part, spatial elements selected in this study are the results of the combination of former studies and influenced by the author's understanding of urban public space. They are sitting space, food, water, trees, sun, and triangulation, an element involved with people's activities and interactions with other spatial elements such as children playing with waters (Bozkurt, 2019). In America and European countries, triangulation usually referred to street performance such as street music (Gemci & Ferah, 2020), and digital kiosks that can be interactive also influence people's social behaviors in urban

public space (Ravija, 2019). While in China, square dance became very popular in urban public spaces, and other activities such as Taichi and sward dance were also considered triangulations (Ren & Cheng, 2019). These spatial elements have been studied and analyzed based on data from Japan, the United States, and China. Moreover, as former researchers proposed, stationery activities, people’s activities ’ kinds and variety, and secondary seating could be applied to evaluate the public space (UW Green Futures Research and Design Lab & Greenfutureslab, 2014) (Rui, Taku, & Haruna, 2016). Sitting space is closely related to stationery activities. Secondary seating could also be counted, making sitting space the center of spatial elements and triangulation, which includes people’s activities standing on top (Fig.2-4-1).

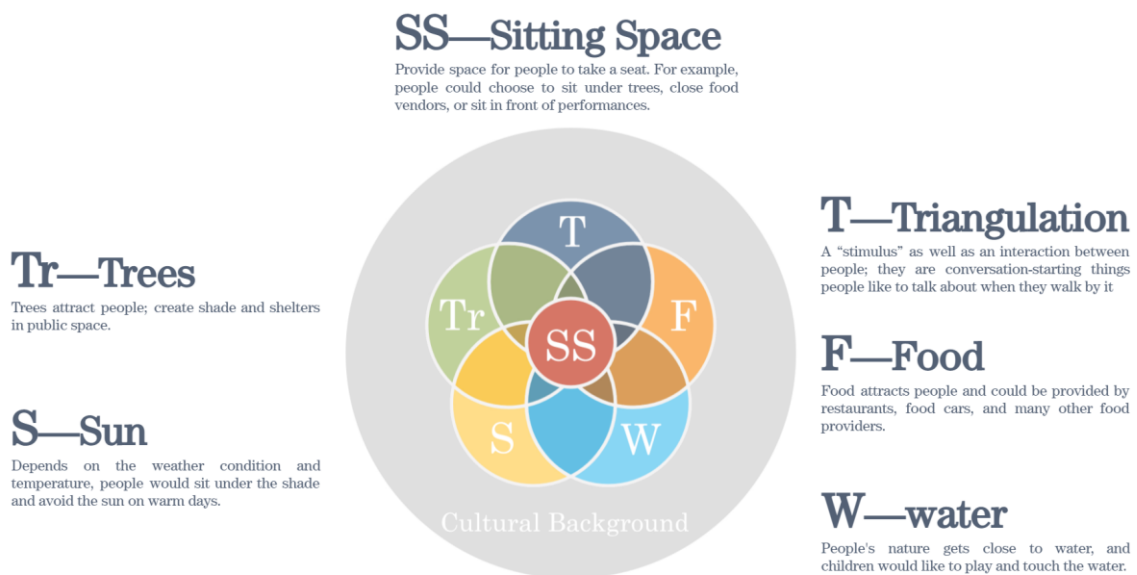


Fig.2-4-1 Spatial Element in Cultural Frame

## 2.5 Originality of this study

Former researchers studied urban public spaces for decades, from city level, neighborhood, and site. Spatial elements and their relationships between people's behaviors also have been categorized and studied in many regions and countries. Many studies focused on cases in a particular city or a single county, and these studies are limited by local culture and regulations, which could magnificently affect people's behavior and decision-making process. The same spatial element with people in different cultural backgrounds may have their unique way of utilizing the space. Food and people's behavior and activities are also affected by local culture. Few studies researched multi-cultural backgrounds with the perspective of landscape architecture.

In this study, three countries have been selected to conduct research: Japan, The United States, and China. These three countries covered developed countries and developing countries, oriental countries, and western countries, which Japan is considered a westernized country in Asia. Spatial elements selected in this research, such as water, trees, and sun, could be easily found in each country and perform similarly. At the same time, food may have huge differences based on different countries and their cultural backgrounds. The way people get food, types of food could affect people's preference on where they would like to enjoy their food which also influenced people's choice. For example, food cards could be seen in Japan and The United States' urban public space, while studies show that China's food stalls could conflict with

law enforcement. A limited amount of research focused on how these food stalls work in the public space studied in this study.

Another important spatial element that may significantly influence culture could be triangulation, which usually refers to people's activities and events. Based on Whyte's definition of triangulation, "A stimulus that provides a social bound between people." Different societies may have unique social boundaries between people, leading to different activities and events in urban public spaces. The spatial element of triangulation represents people's activities and events related to public justice. Based on former research, more kinds of activities have been observed in China's urban public space. In this study, types of triangulations have been categorized and collected in three countries. The variety of activities and events shows the inclusiveness of the public space. More kinds of events and activities may suggest that more people could use the space for multiple purposes, representing the situation of public justice in a particular space.

# Chapter 3: Methodology

### **3.1 Research Goals**

The goal of this study is to find out the relationship between people's behavior and spatial elements. Elements are selected based on literature reviews, and the next step is to decide where to conduct the research. People in different countries with cultural backgrounds would behave differently, and the same spatial elements could be constructed differently. To get general and regional results, research should be conducted in multiple countries with different cultural settings. Make conclusions of this study become international and also reflect local characteristics.

### **3.2 Case Study as a Research Approach**

The case study has been conducted in many different fields, such as business, economics, education, medicine, political science, social work, sociology, and many others. For this research, people's behavior in urban public space has been studied with a landscape architecture approach. Many elements are involved in landscape architecture, such as environment, architecture, art, engineering, and social-behavioral, which are focused on this study and categorized in sociology. There are many ways to conduct social science research, such as surveys, experiments, histories, and analysis of archival information. Each approach has its strong sides with some limitations, and when research questions have been posted has "how" and "why" case studies could be preferred (Yin, 2014). Since this study involves questions such as "how people behave" and "why urban public space is designed in this way,"

make case study becomes the idea approach for this research.

The case study method has a long and well-established history in the landscape architecture field and has been frequently used in education and research (Francis, 2001). Moreover, the definition and advantages and disadvantages of case study for landscape architecture proposed by Francis:

*“A case study is a well-documented and systematic examination of the process, decision-making, and outcomes of a project that is undertaken for the purpose of informing future practice, policy, theory and/or education.”*

The case study method in the Landscape architecture field has many valuable benefits. In teaching, case studies work as examples for students to understand and gain insight into past projects. Well-developed literature on case study methods could be found, and examples of case study analysis in MLA (Master of Landscape architecture) and Ph.D. dissertations are prepared for researchers. In practice, the case study method could be helpful to evaluate the success and failure of projects. Moreover, case studies also could be instrumental in theory building and develop new theories related to landscape architecture. Since case studies are usually based on projects that exist in the real world, criticism could be developed to help improve the site and form an efficient way to communicate the results of landscape architectural projects.

There are also things that limited the case study method. The first is time-consuming since the case study method requires data collected in every elected study site. Then the designers, owners, and managers may not provide information that reveals the site's problem during the interview and lie on questionnaires. New projects are not suitable for evaluation just after construction and need years to find out how it works. Comparison between cases may not be practical because of the lack of comparable methods. Limited information on existing cases and the number of cases been studied could weak results of the study. Because of these limitations, case studies may portray only one solution to a particular issue or problem and limited study results.

In this study, the researcher conducted case studies in Japan, The United States of America, and China. One city has been selected in each country, and three sites in urban areas have been chosen, all serve the public for years or decades. Three cities that have been selected are Tokyo, Boston, and Chongqing. Tokyo is a city with the capital function of Japan, the City of Boston is a place where the United States of American started, and Chongqing is one of the municipalities that directly under the central government (others are Beijing, Tianjin, and Shanghai) with the fast development in recent years. These three cities are cultural and commercial centers in areas, cities with ports, high population, and density. This way of selection could partly represent the country's urban public space and people's behaviors.

### 3.3 Neighborhood and Site Analysis

Site analysis has been conducted for each selected site, and people's behavior has also been observed and collected. The number of cases and variety created by different cultural backgrounds may border the creativity of results in the study.

In three selected cities, three sites have been selected; they are places in front of a public facility (Ueno Park, Boston City Hall Plaza, and Chongqing People's Square) commercial areas (Tokyo Dome City, Faneuil Hall Marketplace, and Guanyinqiao Commercial Pedestrian Streets), and sites close to water (HarumibashiPark & Toyosu Park, Columbus Waterfront, Chaotianmen Square). Each site has multiple spatial elements that have been observed (Table. 3-2-1), while not every site has been studied for each selected spatial element. The selection of spatial elements to be researched depends on the existence of elements and the element's influence on people. Some study sites do not have water inside, places such as Tokyo Dome cannot conduct research when there are too many people, and not every site has many tree shades that connect to the element of sunlight. One exception is sitting space, which could be found in every selected site and have a non-negligible influence on people's behavior.

Table 3-2-1 Spatial Elements have been Observed in Each Site

| Country           | Sites                                     | Spatial Elements |      |       |       |     |               |
|-------------------|---|------------------|------|-------|-------|-----|---------------|
|                   |   | Sitting Space    | Food | Water | Trees | Sun | Triangulation |
| Japan             | Ueno Park                                 | ○                | ○    | ○     | ○     | ○   | ○             |
|                   | Tokyo Dome City                           | ○                |      |       |       | ○   |               |
|                   | HarumibashiPark & Toyosu Park             | ○                | ○    | ○     |       |     | ○             |
|                   |   |                  |      |       |       |     |               |
| The United States | Boston City Hall Plaza                    | ○                |      |       | ○     |     | ○             |
|                   | Faneuil Hall Marketplace                  | ○                | ○    |       | ○     |     | ○             |
|                   | Columbus Waterfront                       | ○                |      | ○     |       |     |               |
|                   |   |                  |      |       |       |     |               |
| China             | Chongqing People's Square                 | ○                | ○    |       | ○     | ○   | ○             |
|                   | Guanyinqiao Commercial Pedestrian Streets | ○                | ○    | ○     | ○     |     | ○             |
|                   | Chaotianmen Square                        | ○                | ○    | ○     |       |     | ○             |

Neighborhood analysis focused on the environment around sites that have been selected. Places such as bus stations, the subway entrance, relationships to the street, shops, and restaurants are marked on maps. This information shows how people access the site and get food and drinks. Facilities around the area have also been marked on maps.

The last one is site analysis, which focused on spatial elements inside the site. Elements including trees, benches, stairs, ramps, food vendors are located on maps. Spatial elements that have been selected are also presented

in Table 3-2-1, which shows spatial elements been researched in each study site. The site analysis also provides base maps for on-site observation and behavior mapping.

### **3.4 Methods for Urban Public Study**

There are several ways to conduct research in urban public spaces and collect information, and these methods are categorized as Observation, interviews, and questionnaires. These research methods are based on William H. Whyte and Jan Gehl's researches.

#### **3.4.1 Observation**

The observation method is based on William Whyte's research and conducted systematically, which is essential in assessing physical activity and identifying activity (Mckenzie, 2002). There are several basic observation techniques to study public places, such as behavior mapping, counting, trace measures, and tracking. These techniques could be used in different ways and over an hour or for longer periods of time. Observations should be conducted over several different periods of time, on weekdays and weekends, in the morning and night.

#### **Behavior mapping**

Behavior mapping could show where and how people utilize the public space. The data collected through behavior mapping should also be taken place in

systematic ways that would collect the data during different times of day and weeks. All kinds of activities also should be categorized and create a comprehensive image of how people use the place. Though the technique of behavior mapping could record stationary people and those in motion. However, the mapping is more limited to people's stationary activities, and counting would be more suitable for movement.

### **Counting**

Counting is a systematic method to collect numerical data in a specific place. The number of people and vehicles could be counted. The data collected by counting could provide meaningful information only when comparisons are made, such as the number of women compared to men and the number of people sitting and standing. When the selected site has too many people, counting may only record the number of people in the place. In contrast, when there are fewer people, the type of behavior could also take into consideration. Like the observation technique, the counting should also be conducted several times a day from morning to night.

### **Tracking**

Tracking is also a kind of observation technique that requires the observer to follow visitors or stay in a position with a good view of the location in research sites. The tracking method usually works for research that focuses on people's movement from one place to another and reflects the frequency, paths, and destinations used. This technique requires concentration and

takes time to follow a user. Comparing to observation and counting technique, tracking provides limited information of people, should be considered only the movement of people is the core issue to the research question.

### **Trace Measures**

People would leave traces when they use the place. Usually, two types of traces exist, physical evidence and erosion traces. Trashes such as beer cans and litter are evidence of people's stay. Erosions such as the path worn across a lawn area could indicate people's shortcuts when they pass through the place. These shreds of evidence could be recorded by handwriting and drawing on paper, photograph, and video recording.

### **3.4.2 Interviews and questionnaires**

Then the study needs to measure people's attitudes and perceptions in public space; interviews and questionnaires are required. There are several methods to conduct interviews and questionnaires, and they will be described as follow.

#### **Informal interview**

It is more like a casual conversation try to find out how people perceive and use a place. During the conversation, the exact words and phrases the express people's thinking should be recorded since the informal way of interview would provide limited information and not suitable for numerical

data collection.

### **Guided interview**

The interviews with well-structured series of questions that could be compared are considered as guided interviews. The interview could be very flexible, and interviewers can rephrase questions and ask additional questions to explore the interviewee's perceptions and feelings.

### **Questionnaire and survey**

The questionnaire and survey should be carefully phrased and ordered. Usually, multiple-choice and Likert scaled questions could be applied to questionnaires. Questionnaire-making techniques could use simple language and avoid leading questions, more straightforward questions before specific ones.

### **3.4.3 Methods have been selected**

Since this study conducted research in three different countries, this research aims to focus on people's behavior. Interviews and questionnaires could be conducted to ask what and where people do in urban public space, but conducting a field study and observing in public space could get direct information with less subjective involvement from people interviewed. Moreover, what people think they do or prefer to do could be different when they are in the field and then make decisions, while observation with video recording and photographs could be more objective. Though, data collected

from people (interview and questionnaire) and observation all need researchers' interpretation which is subjectively affected by researchers.

As a result, the observation method has been selected for this research, including behavior mapping, counting, and trace measurement reflected by photos conducted in Japan, the United States, and China. More detailed observation methods are described in each chapter which is structured for each site.

### **3.5 Data Analysis**

The data have been collected from observations are analyzed on maps, and quantitative data are analyzed statically. The result of behavior mapping on maps could show how people utilize the place in a visualized way. Areas that favorite by people could be recognized easily on the map. Excel analyzes other data for primary findings. Some quantitative data have also been analyzed by SPSS software, where a One-way ANOVA test has been conducted to determine the static significance of differences across cases.

## **Chapter 4: Cases in Japan**

## 4.1 Regional analysis and site selection

There are no laws that designated Tokyo as Japan's capital, but “capital area(首都圏)” has been defined as the Greater Tokyo Area (Fig. 4-1-1). Twenty-three special wards encompass the regional government of Tokyo, and the wards and the metropolitan government work together as a unique administrative system. The metropolitan government takes some of the area's responsibilities and autonomy to these special wards (TOKYO METROPOLITAN GOVERNMENT).



Fig.4-1-1 Twenty-three Special Wards Area in Tokyo

(Source: modified based on Google map)

The area is about 620km<sup>2</sup>, and data from the Statistics Bureau of Japan shows that the population of 23 Special Wards in 2021 is 9640742 (Statistics Bureau of Japan). As a major international finance center, Tokyo has several

world's largest investment banks' headquarters, many large firms' headquarters also located in Tokyo, leading to high living expenses. In 2019 before the Covid-19 pandemics, Japan attracts over 3 million tourists worldwide, and 47.2% of them visited Tokyo (Japan Tourism Statistics). The transportation in Greater Tokyo Area has trains, buses, and subway networks, trams, and monorails also take park in the transportation system. The port of Tokyo is one of the largest seaports in the Pacific Ocean, which has a cargo volume of 87806 thousand tons in 2019 (Tokyo Bureau of Port and Harbor). Many famous and top-ranked universities, such as the University of Tokyo and Waseda University, are located in Tokyo.



Fig.4-1-2 Three Selected Sites in Tokyo

(Source: modified based on Google map)

Three sites have been selected in the special wards of Tokyo (Fig.4-1-2). Ueno Park, located in Taitō City, has Tokyo national museum, Ueno Zoo, and many

other museums. Tokyo Dome City, a commercial area in front of Tokyo Dome. Moreover, two coastal parks next to each other are named Harumibashi Park and Toyosu Park in Kōtō City.

## 4.2 Ueno Park

|                       |   |
|-----------------------|---|
| Name                  | Ueno Park   |
| Location              | 110-0007 Tokyo, Taito City, Uenokōen  |
| Date Designed/Planned | Originally, Toeizan Kan'ei-ji's temple territory back in 1625 opened to the public in 1876, one of the first public parks in Japan. |
| Size                  | 538,506.96m <sup>2</sup>  |
| Managed by            | Managed directly by Tokyo Bureau of Construction  |

Ueno Park as a Special Park (History) 「特殊公園 (歴史)」 defined by Japan Ministry of Land, has a vast amount of vegetation, many museums, schools, universities around and Ueno Zoo inside, which attracts visitors all over Tokyo. These make Ueno Park become an important historical site and very attractive. While at the same time, only a few researches about Ueno Park in Japan. One research is about space uses in Ueno Zoological Garden (ARIMA, 2010), a particular part of Ueno Park. Public Ceremonies and their effect on spatial development have also been researched and predominantly focused on unique ceremony spaces (ONO, 1996). For an important historical site with 14196000 visitors per year (data from Tokyo Bureau of Construction), to make the park a better place for all park users and both gender, Ueno Park may need more research on ordinary park users' spatial elements inside.

So far, studies have been conducted and showed that men and women have many aspects in common about what they concern in the park. Men emphasize private space, while women concern more special facilities and space layout (Liu & Shen 2008). Compared to men, women are more concerned about the safety of a place and prefer to stay in groups (Deng, Liu, Zhao, & Wu 2014). A clear and readable physical demarcation could also make a situation more straightforward for people to understand and feel secured (Gehl, 2013). This makes women more like to evaluate parks and consider some park characteristics as “important” (Ho, et al. 2005), and apt to be more sensitive to characteristics they perceive as making a place safe (Whyte, 2018). One of the factors is the vegetation in the park. Women saw greater aesthetic value in green spaces than men (Sang, Knez, Gunnarsson, & Hedblom 2016). Research indicates that vegetation abundance is significantly associated with lower rates of assault, robbery, and burglary in a city, but not theft (Wolfe & Mennis 2012). A study also shows a strong inverse relationship between tree canopy and index of robbery, burglary, theft, and a 10% increase of tree canopy was associated with a roughly 12% decrease in crime (Troy, Grove, & O’Neil-Dunne 2012). Also, well-maintained plants with adequate sightlines are preferred by female park users (Hashim, Thani, Jamaludin, & Yatim 2016). Another factor is the time of day that could affect how women use public space. Women are less likely than men to stay in public spaces at dusk or after dark (Franck & Paxson 1989).



Fig.4-2-1 Ueno Park Neighborhood Analysis

(Source: Author)

There are also some limitations to this case study. First, the site is unique in Japan since it's one of the public parks that first open to the public in Japan. Moreover, the park also is a Special Park (History) 「特殊公園 (歴史)」 defined by Japan Ministry of Land, which make the park more special. Unlike most other urban public spaces, Ueno Park is surrounded by museums, and the famous Ueno Zoo is also within a close range, making the site popular. The observation was conducted in October and early November and dates for observation are selected that are comfortable without rain. Therefore, the weather and environment around the study site may limit the finding of this case study.

#### **4.2.1 Neighborhood analysis**

An analysis of the existing facilities around Ueno Park includes museums, schools, universities, temples, Shrines, restaurants, Coffee shops, stores, a City Hall, and Ueno Zoo, which is a part of Ueno Park (Fig.4-2-1).

#### **4.2.2 Observation in Ueno Park**

The observation is based on Whyte's research handbook and has been conducted systematically on the number of people, gender, and behaviors. In each study area, data were collected, including three weekdays and two weekends during the autumn of 2018. Also, the observation-only is conducted when the weather is comfortable and avoids holidays or events that may hugely affect people's behaviors (Table.4-2-1).

Table.4-2-1 Observation Date

| Study Area | Date                    |                         |                         |                          |                          |
|------------|-------------------------|-------------------------|-------------------------|--------------------------|--------------------------|
| Area A     | 10-Oct<br>(Mon.)20-26°C | 19-Oct<br>(Fri.)14-20°C | 20-Oct<br>(Sat.)13-20°C | 22-Oct<br>(Mon.)11-22°C  | 23-Oct<br>(Tue.)12-22°C  |
| Area B     | 29-Oct<br>(Mon.)12-22°C | 5-Nov<br>(Mon.)15-21°C  | 7-Nov<br>(Wed.) 14-19°C | 10-Nov<br>(Sat.) 13-21°C | 17-Nov<br>(Sat.) 10-19°C |

There are six periods of time to collect the data, 8:00-8:30, 10:00-10:30, 12:00-12:30, 14:00-14:30, 16:00-16:30 and 18:00-18:30. In every time period, the observation was conducted in each part of the study area. A tiny 4K sports camera (GoPro 6) also captured videos during the observation, and the film data could help increase the accuracy of counting.

### 4.2.3 Results

Ueno Park is very close to Ueno Station and is surrounded by museums (Fig.4-2-1). There are two big open spaces; one is in the south part of the park, has a square of statue Saigo and close to the commercial area and Ameyogo Market (Study area A). Another one is on the west side of Ueno Station, also recognized as the Great Fountain area (Study area B). These two open spaces have more people choose to stay.

Study areas are divided into many parts which are based on the physical environment and the results of observations of people's behavior. Which also with a reasonable size for researchers to practice observation (B8 and B13

are two vast areas because they are the only two large areas almost totally covered under the tree canopy, and B10 is a children's playground full of play equipment). Moreover, spatial elements which could affect people are identified (Table 4-2-2).

In each Study Area, spatial elements are identified. To conduct the study systematically, [Study Area A] is divided into nine different parts (Fig.4-2-2), and [Study Area B] is divided into 13 parts (Fig.4-2-3) according to the spatial elements, size of the study area, and the type of people's behavior from observation (B8 and B13 are two large areas that mostly under tree canopy different from other parts). Table.4-2-3 shows each part's man and woman's number, percent of man and woman, part size, space size (space that people could access), canopy size, and canopy coverage, percent of sitting space.

Table 4-2-2 Factors to Divide Study Area

|                      |  |
|----------------------|--|
| Physical Environment | Toiles, Statues, Restaurants, Coffee Shop, Water, Fountains, Plants & Trees, Edges, Smoking Area, Benches, Sitting Area (Planter's edge, Stairs) |
| Observations         | Walking, Sitting, Playing, Eating, socializing, Cycling, Dog Walking, Smoking  |

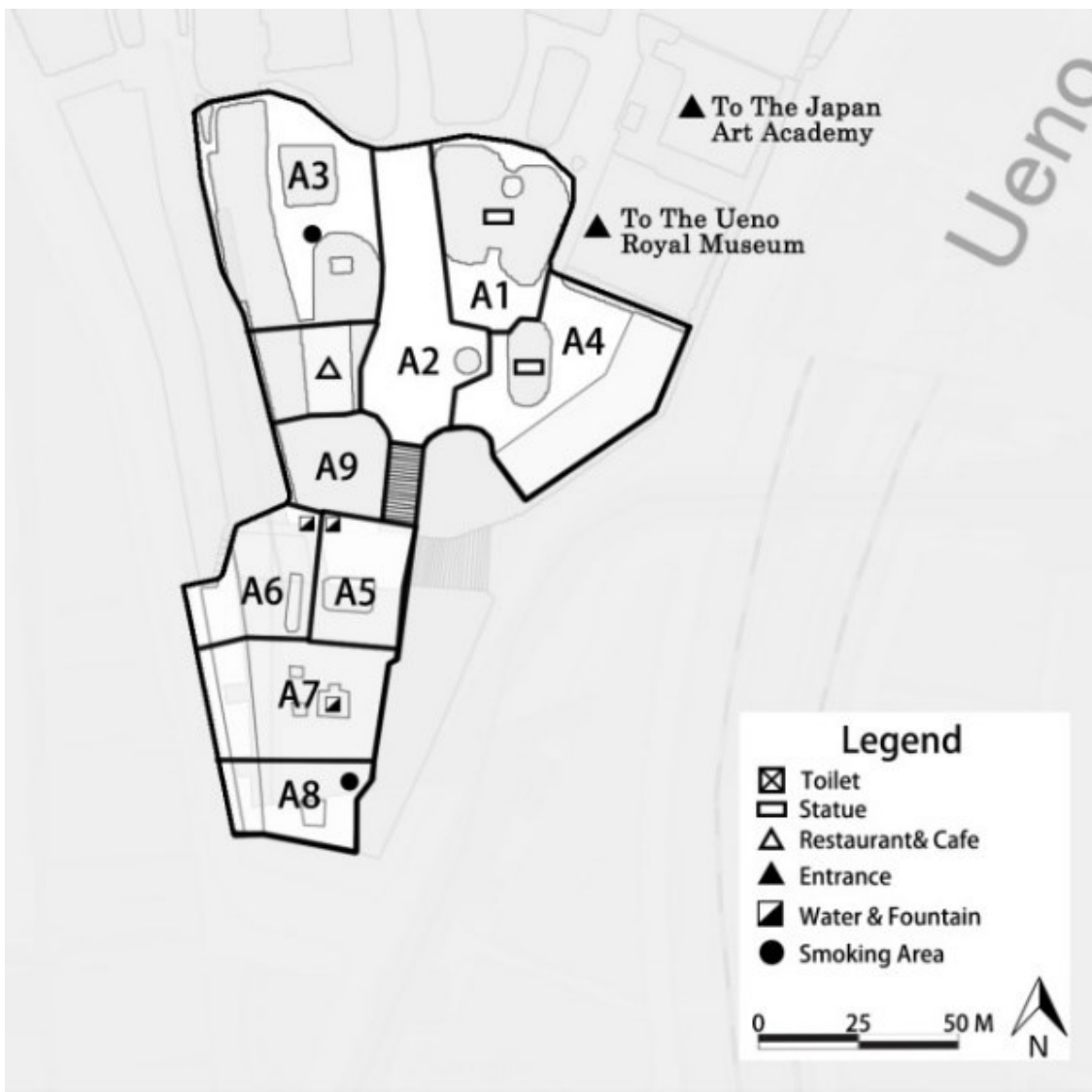


Fig.4-2-2 Site Analysis of Study Area A

(Source: Author)

Table 4-2-3 Information for each part of the place

| Place | Men | Woman | Percent of Man | Percent of Woman | Part Size (m <sup>2</sup> ) | Space Size (m <sup>2</sup> ) | Tree Canopy Size (m <sup>2</sup> ) | Tree Canopy Coverage | Percent of Sitting |
|-------|-----|-------|----------------|------------------|-----------------------------|------------------------------|------------------------------------|----------------------|--------------------|
| A1    | 396 | 213   | 0.65           | 0.35             | 1022                        | 604                          | 546.6                              | 0.53                 | 2.32%              |
| A2    | 287 | 224   | 0.56           | 0.44             | 983                         | 965                          | 164.8                              | 0.17                 | 0.00%              |
| A3    | 399 | 141   | 0.74           | 0.26             | 1767                        | 727                          | 1397                               | 0.79                 | 1.38%              |
| A4    | 453 | 294   | 0.61           | 0.39             | 1303                        | 1098                         | 166                                | 0.13                 | 0.73%              |
| A5    | 440 | 348   | 0.56           | 0.44             | 1000                        | 745                          | 385                                | 0.39                 | 7.92%              |
| A6    | 383 | 283   | 0.58           | 0.42             | 824                         | 531                          | 548                                | 0.67                 | 6.40%              |
| A7    | 473 | 226   | 0.68           | 0.32             | 989                         | 662                          | 409                                | 0.41                 | 5.44%              |
| A8    | 568 | 250   | 0.69           | 0.31             | 726                         | 451                          | 405.3                              | 0.56                 | 7.87%              |
| A9    | 84  | 31    | 0.73           | 0.27             | 774                         | 477                          | 715                                | 0.92                 | 1.89%              |
| B1    | 415 | 535   | 0.44           | 0.56             | 1808                        | 1535                         | 588                                | 0.33                 | 2.93%              |
| B2    | 410 | 514   | 0.44           | 0.56             | 2589                        | 2509                         | 454.3                              | 0.18                 | 0.00%              |
| B3    | 168 | 168   | 0.5            | 0.5              | 2606                        | 2606                         | 502                                | 0.19                 | 0.00%              |
| B4    | 407 | 480   | 0.46           | 0.54             | 3625                        | 2983                         | 1041                               | 0.29                 | 7.64%              |
| B5    | 335 | 327   | 0.51           | 0.49             | 2559                        | 1917                         | 0                                  | 0                    | 11.27%             |
| B6    | 267 | 193   | 0.58           | 0.42             | 3521                        | 2627                         | 2192                               | 0.62                 | 3.73%              |
| B7    | 192 | 109   | 0.64           | 0.36             | 4095                        | 3524                         | 3059                               | 0.75                 | 0.45%              |
| B8    | 151 | 184   | 0.45           | 0.55             | 6847                        | 6269                         | 5360                               | 0.78                 | 0.32%              |
| B9    | 677 | 966   | 0.41           | 0.59             | 2886                        | 2378                         | 132                                | 0.05                 | 3.36%              |
| B10   | 307 | 382   | 0.45           | 0.55             | 1759                        | 1709                         | 1236                               | 0.7                  | 2.46%              |
| B11   | 313 | 465   | 0.4            | 0.6              | 2167                        | 1327                         | 1395                               | 0.64                 | 1.81%              |
| B12   | 454 | 539   | 0.46           | 0.54             | 1961                        | 1931                         | 446                                | 0.23                 | 3.94%              |
| B13   | 203 | 248   | 0.45           | 0.55             | 9103                        | 8104                         | 7671                               | 0.84                 | 0.42%              |

The site observation shows an unbalanced distribution of gender. More male users than female users in [Study Area A]; on the contrary, the situation reversed in [Study Area B]. Fig.4-2-5 and Fig.4-2-6 show more men than women in every part in [Study Area A]. While in [Study Area B], there are 8 out of 13 parts with more women than men.

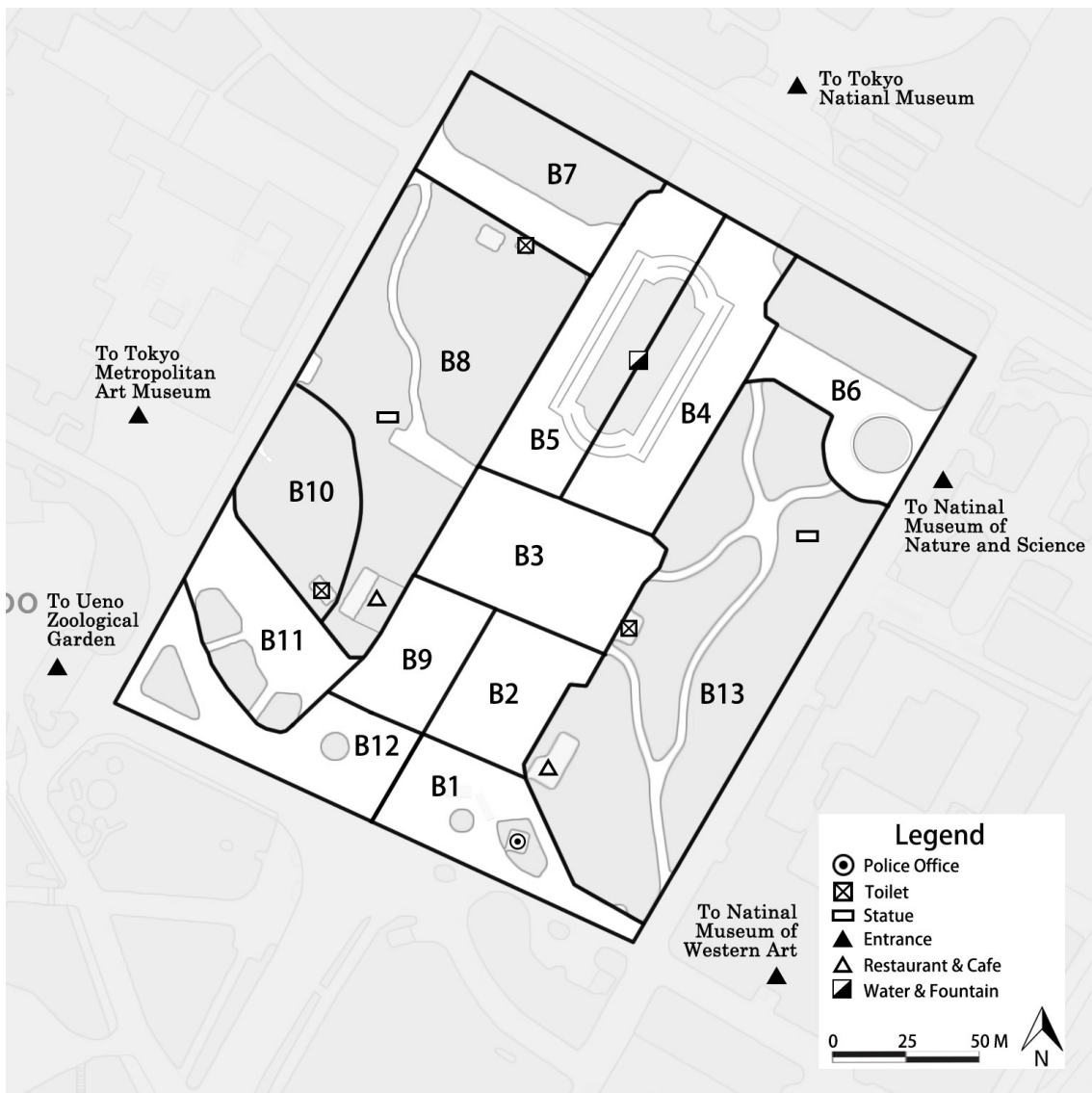


Fig.4-2-3 Site Analysis of Study Area B

(Source: Author)

In Study Area B, B3, B4, B5, B6, B7 have more men than women (Table 4-2-3). B3 has fewer spatial elements and works basically as a corridor to connect the whole place. For B6 and B7, the two parts have similar spatial elements. Several benches are under heavy canopy cover, have limited sunlight even during noon. The limitation of sunlight could be one of the reasons that have fewer female users in this place. B4 and B5 will be discussed later. The analysis in this park involved canopy coverage, excluded data from 18:00 to 18:30. During this time period the park becomes dark and makes canopy coverage have less influence on sunlight.

Table.4-2-4 ANOVA Analysis Results

| ANOVA         |                 |       |                    |       |       |       |           |       |            |       |
|---------------|-----------------|-------|--------------------|-------|-------|-------|-----------|-------|------------|-------|
|               | Canopy Coverage |       | Percent of Sitting |       | Water |       | Part Size |       | Space Size |       |
|               | F               | Sig.  | F                  | Sig.  | F     | Sig.  | F         | Sig.  | F          | Sig.  |
| Man           | 3.382           | 0.041 | 1.236              | 0.347 | 0.163 | 0.691 | 1.053     | 0.432 | 1.634      | 0.207 |
| Woman         | 2.750           | .073  | .954               | .498  | .392  | 0.538 | 0.957     | 0.486 | 4.136      | 0.012 |
| Total User    | 3.696           | .031  | 1.154              | 0.386 | .031  | 0.862 | 0.938     | 0.497 | 2.560      | 0.064 |
| Percent Man   | 1.038           | 0.400 | 0.622              | 0.730 | 0.621 | 0.440 | 1.438     | 0.265 | 4.775      | 0.006 |
| Percent Woman | 1.038           | 0.400 | 0.622              | 0.73  | 0.621 | 0.440 | 1.438     | 0.265 | 4.775      | 0.006 |
| Man Density   | 1.930           | 0.161 | 1.808              | 0.164 | 1.263 | 0.274 | 2.082     | 0.117 | 2.527      | 0.066 |
| Woman Density | 4.545           | 0.012 | 1.947              | 0.137 | 0.994 | 0.331 | 1.859     | 0.155 | 1.720      | 0.185 |

The One-Way ANOVA analysis (Table 4-2-4) was conducted on Canopy Coverage, Percent of Sitting, Existing of Water surface, Part Size, and Space Size (space that people could access). The density of men and women is calculated as the number of men or women divided by the space size. The analysis indicates that the number of men, the total number of park user and

density of woman has a strong connection with canopy coverage (Sig. <0.05). Only the result of the density of women could be significant since the number of people could be affected by the size of the place. The correlation of man and woman density with canopy coverage (Fig.4-2-4 and Fig.4-2-5) also shows that both have been affected, first rise with canopy coverage and later will drop around 50%. The density of women will drop much faster than men and been affected more by the canopy coverage.

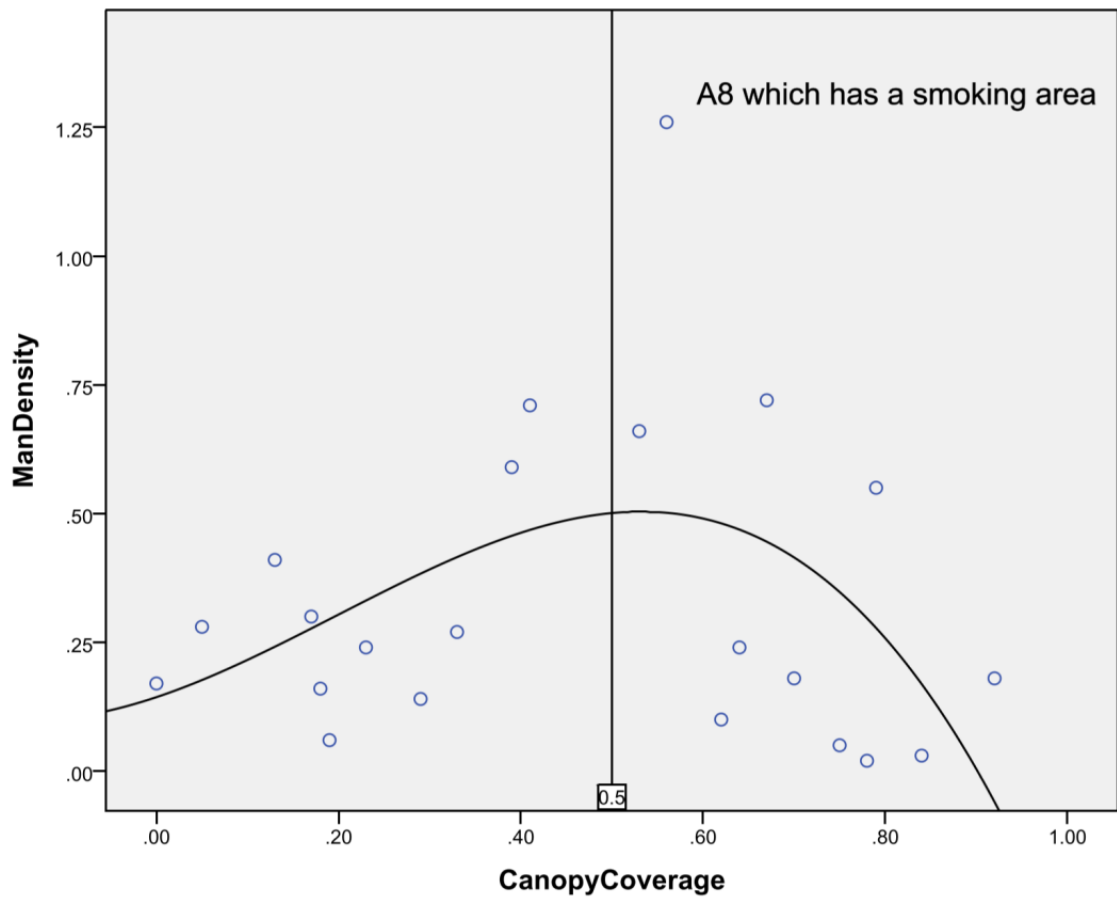


Fig.4-2-4 Correlation of Density of Man with Canopy Coverage

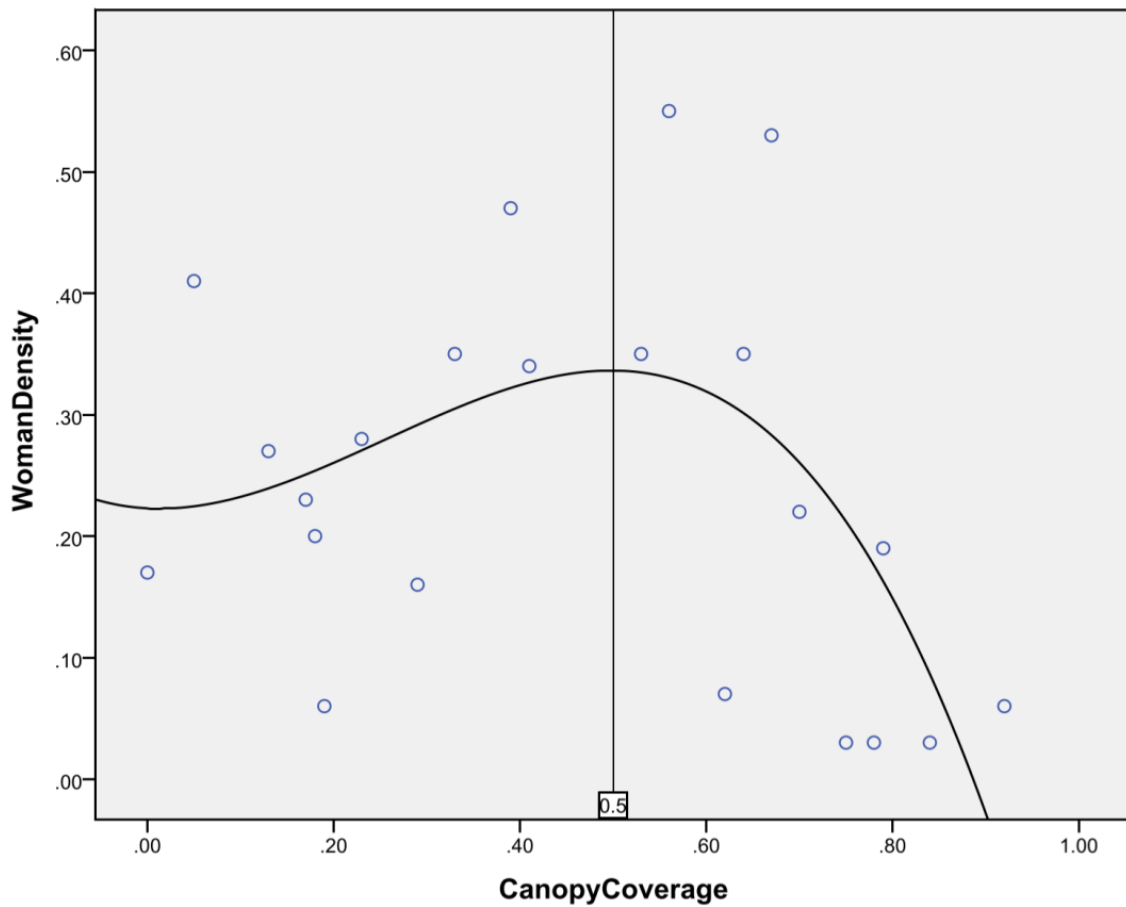


Fig.4-2-5 Correlation of Density of Woman with Canopy Coverage

Another finding is that the percent of men and women could have a connection with space size. From two correlations of percent of men and women with the space size (Fig.4-2-6 and Fig.4-2-7), male park users may prefer relatively smaller space while the woman may prefer relatively larger space.

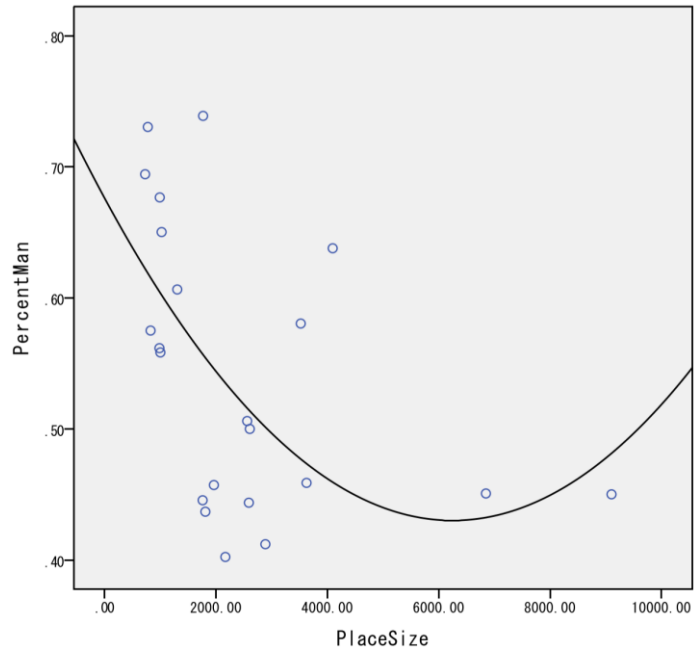


Fig.4-2-6 Correlation of Percent of Man with Space Size

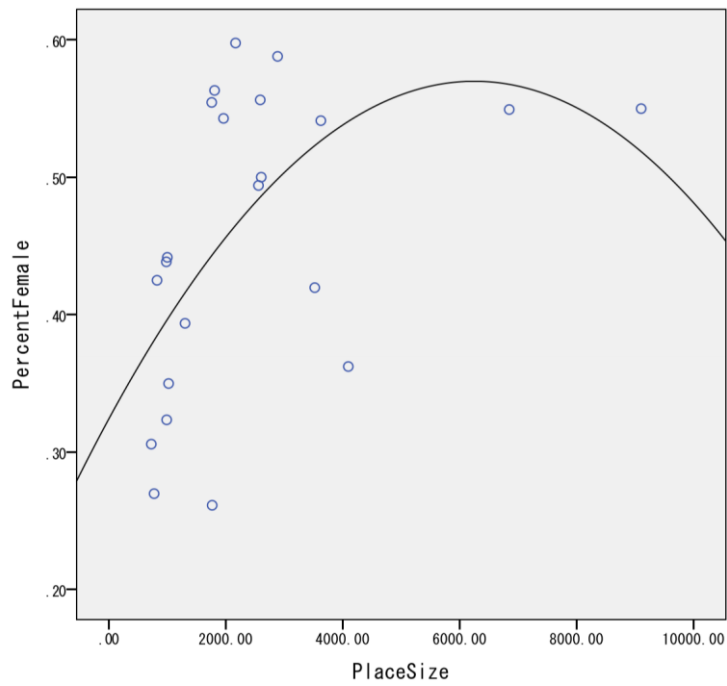


Fig.4-2-7 Correlation of Percent of Woman with Space Size

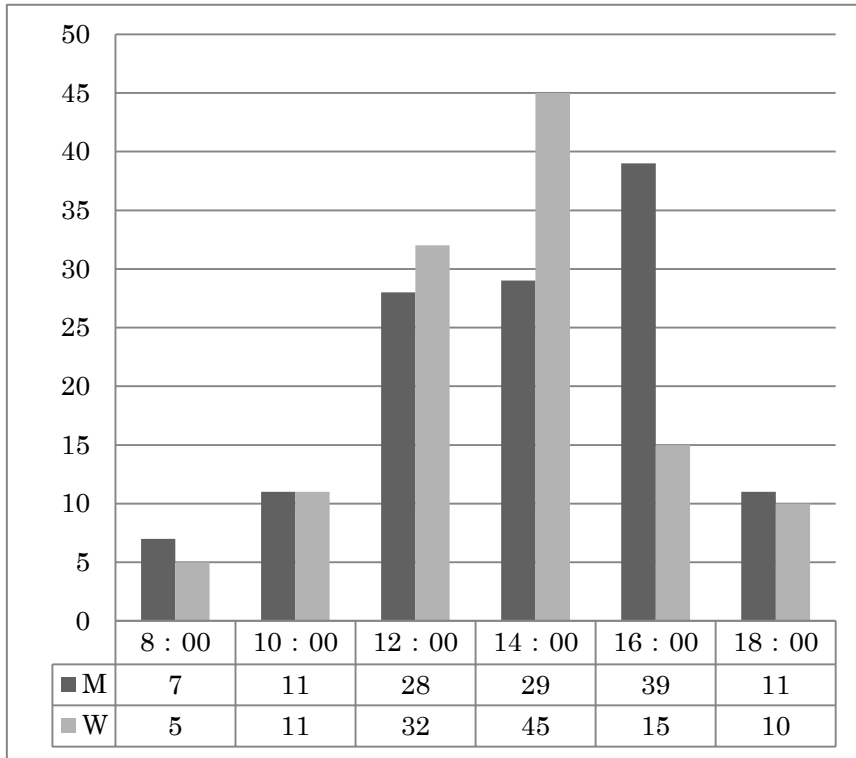


Fig.4-2-8 Average Number of People Change with Time in B4

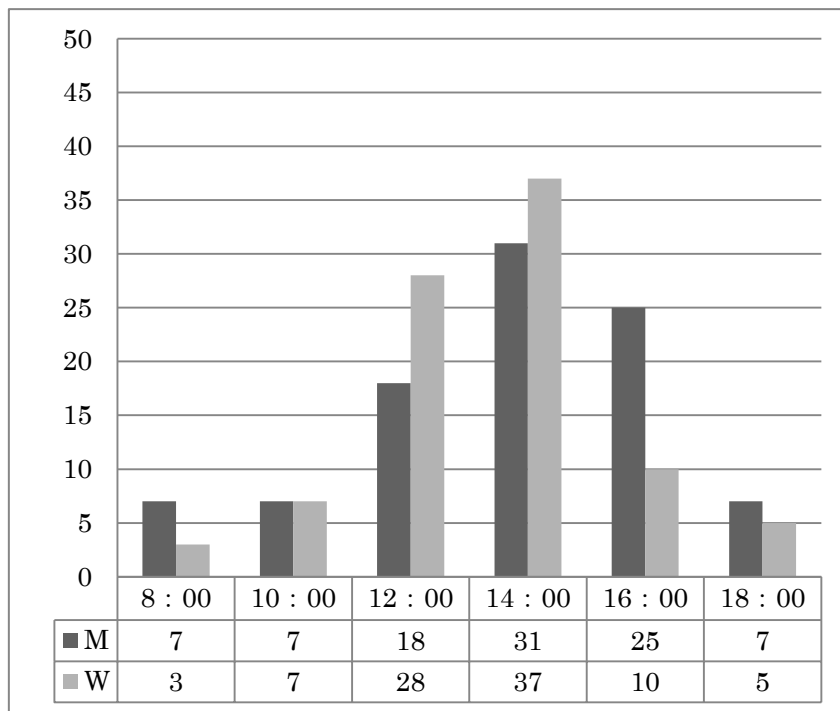


Fig.4-2-9 Average Number of People Change with Time in B5

The result of B4 and B5 could also relate to the change of time. Female users have many types of behaviors in B4 and B5 during noon. Students prefer to stay here and appreciate the fountains; groups of women have their lunch together, and children play around with their mothers sitting aside. Around 10:00, the average number of people in B4 and B5 almost has the same number of male and female users. Around 12:00 and 14:00, there are more female users, and later around 16:00, the number of female users drops significantly, and less than half of male users (Fig.4-2-8 and Fig. 4-2-9).

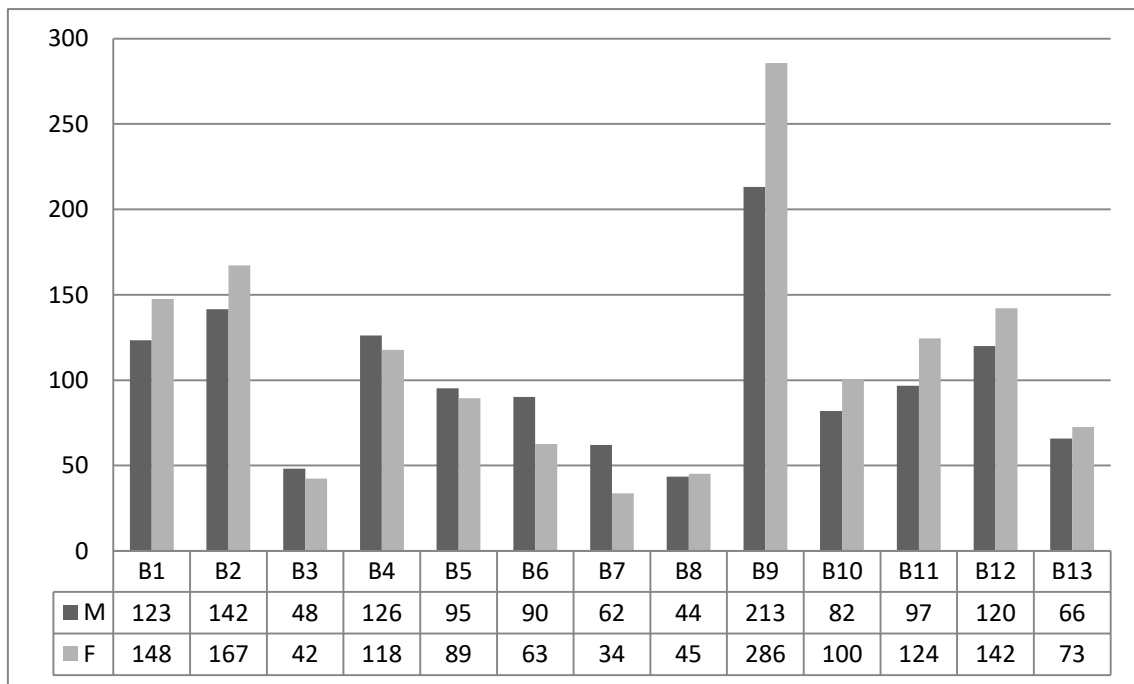


Fig.4-2-10 The Average Number of People in Study Area B

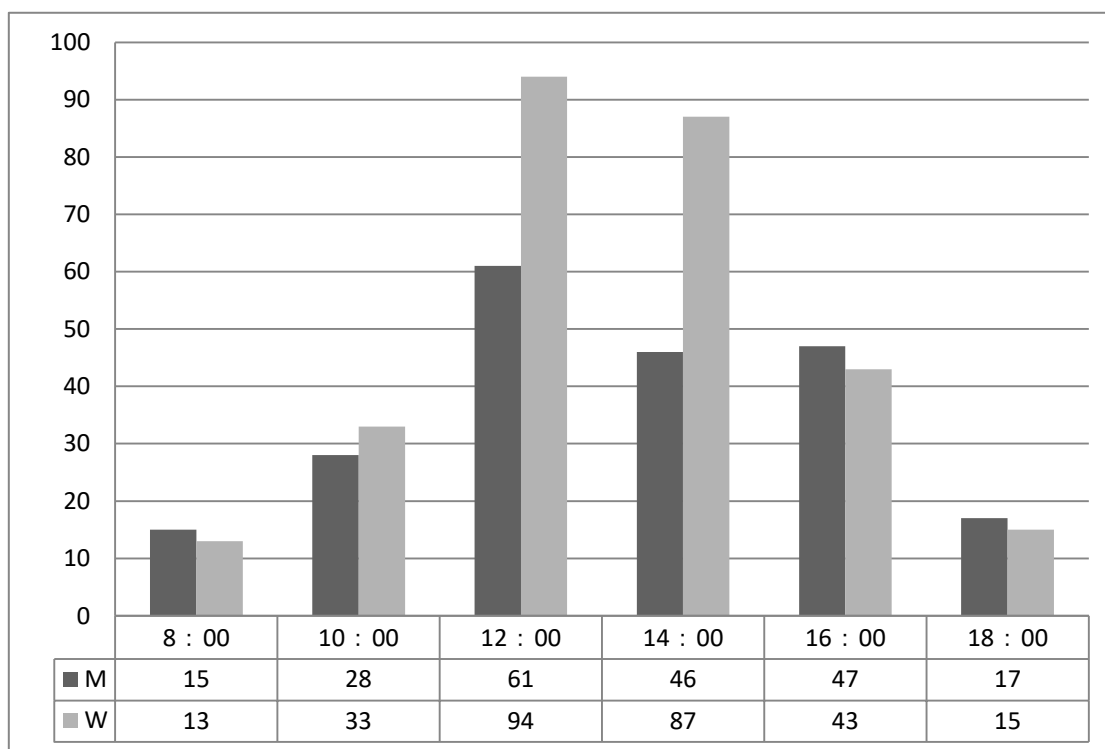


Fig.4-2-11 People's Number Change with Time in B9

Part 9 in Study Area B attracts both men and women, a Starbucks Coffee with a large outdoor seating space free to access. Fig.4-2-11 shows that B9 has the highest number of users, especially female users. The number of female users in B9 also hugely increased after 10:00 and dropped significantly after 14:00. There are two other outdoor cafes in Ueno Park. One is in B2 called Park Side Cafe, and the other is a Cafe& Restaurant called Le Quattro Stagioni next to A2. They have outdoor space but are not free to enter. In this study, they are not considered as a part of public space in Ueno Park.

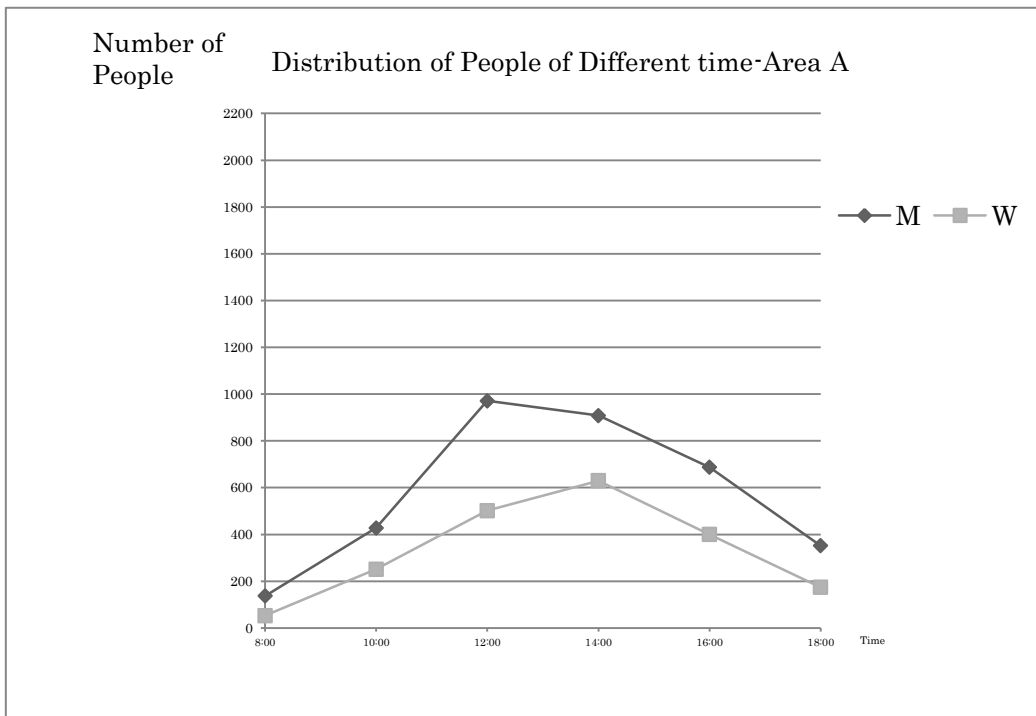


Fig.4-2-12 Distribution of People of Different time-Area A

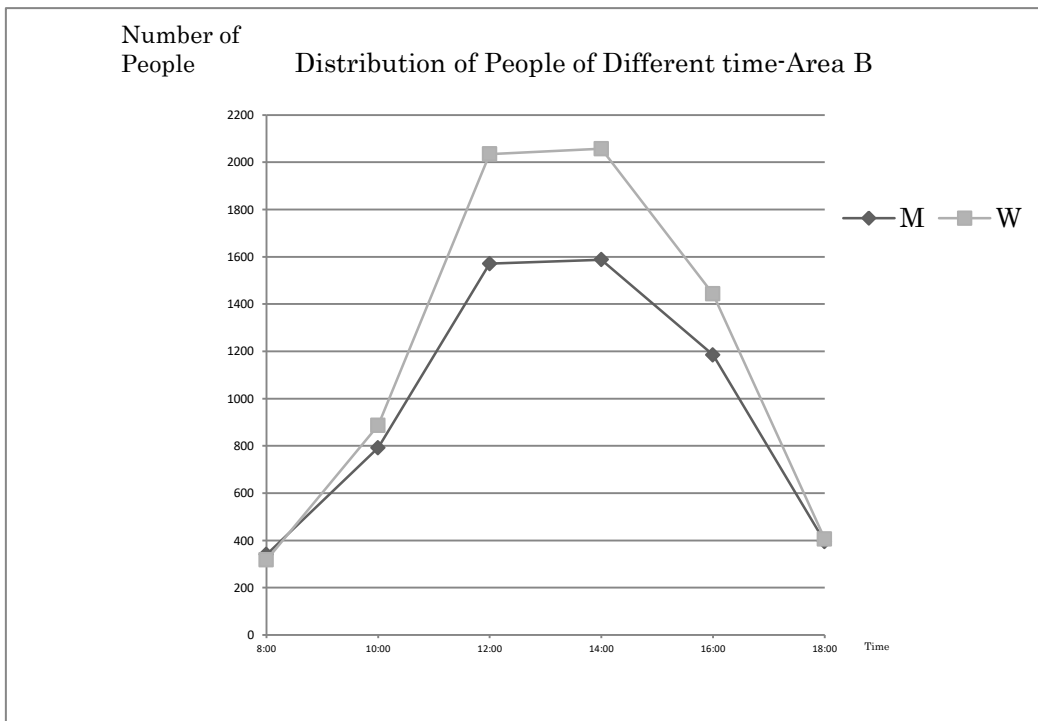


Fig.4-2-13 Distribution of People of Different time-Area B

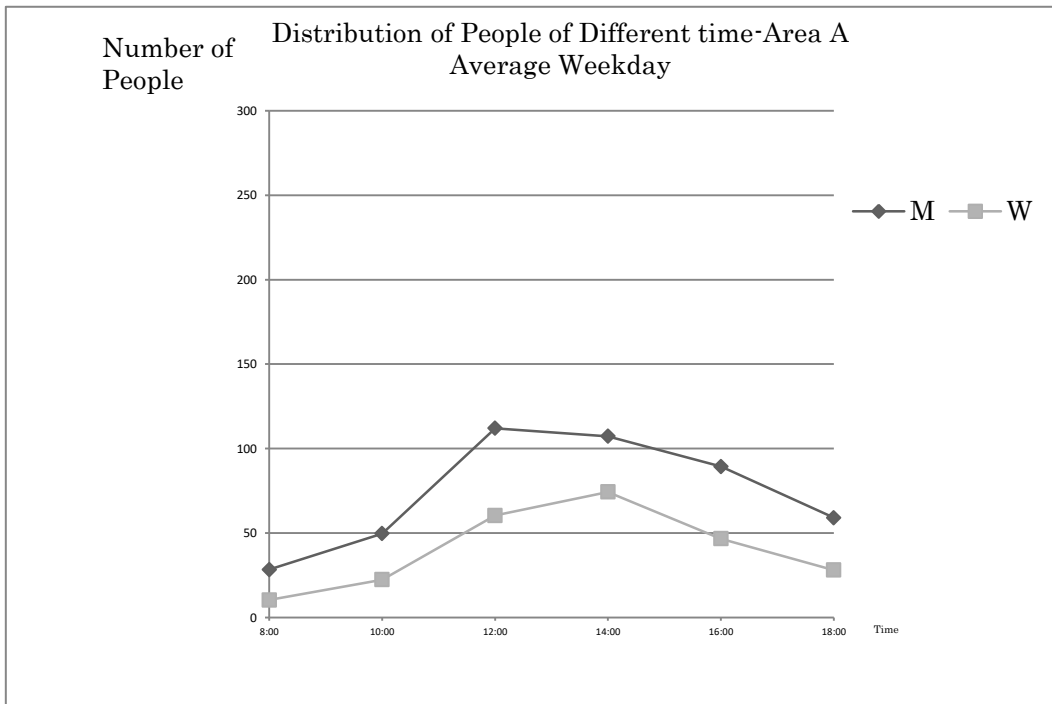


Fig.4-2-14 Distribution of People of Different time-Area A Average-Weekday

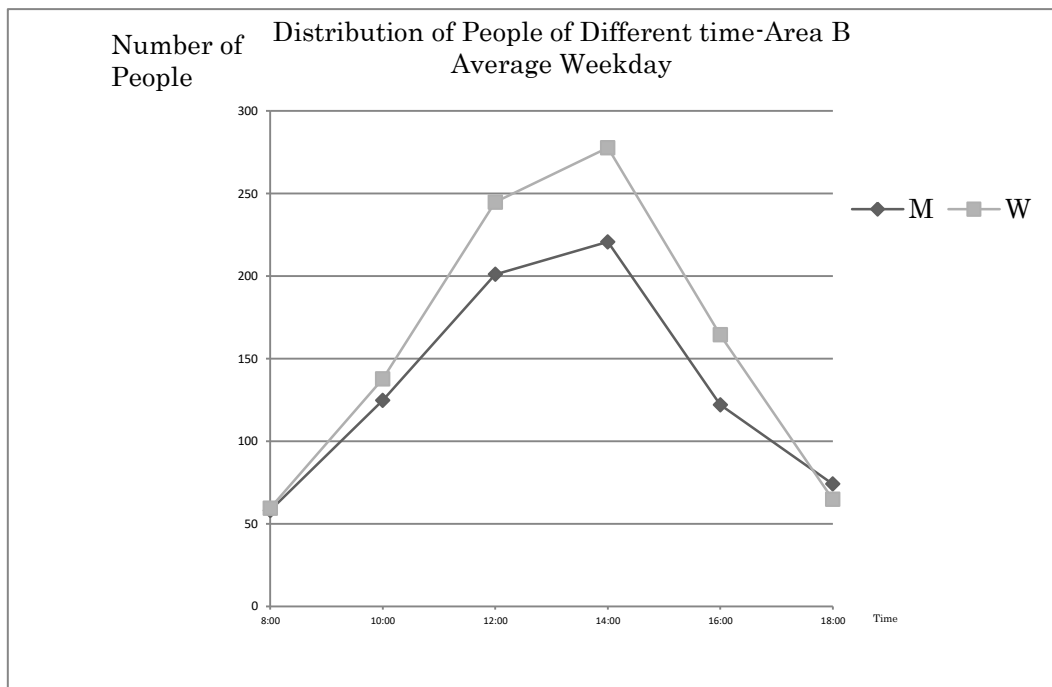


Fig.4-2-15 Distribution of People of Different time-Area B Average-Weekday

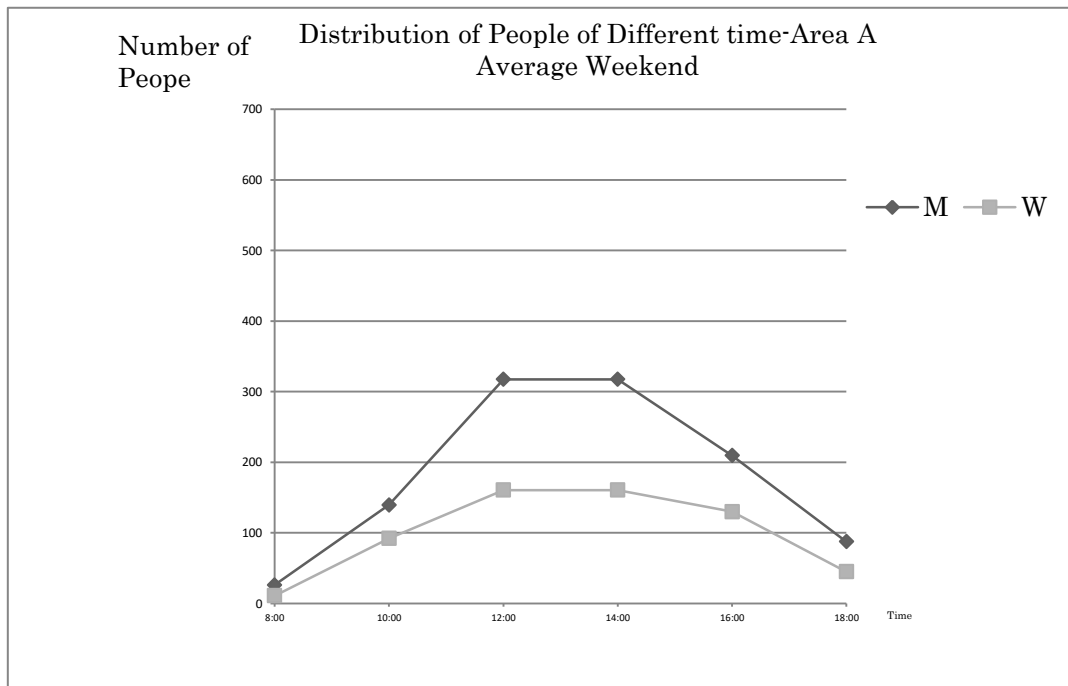


Fig.4-2-16 Distribution of People of Different time-Area A Average Weekend

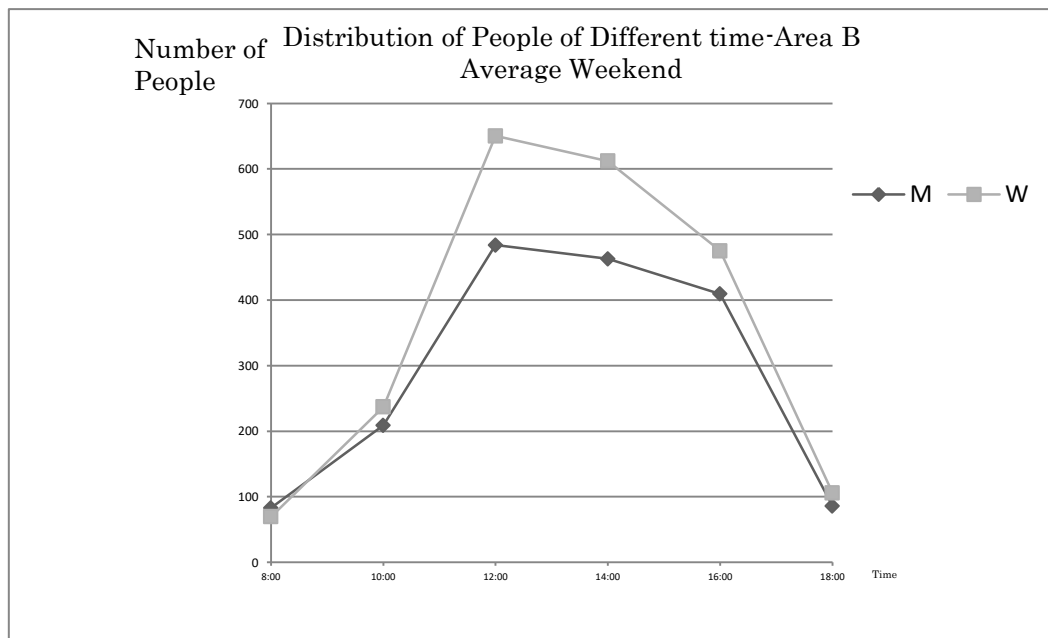


Fig.4-2-17 Distribution of People of Different time-Area B-Average Weekend

The observation showed that the park has more visitors during the weekends (Fig 4-2-12 to Fig.4-2-17). For weekends, the number of people nearly doubled; men's and women's numbers flow similarly. However, in [Study Area B], the peak hour changed from 14:00 to 12:00 compared to the weekend.

Analysis indicates that canopy coverage could affect both men and women in Ueno Park. There is a strong connection between the tree canopy coverage and women's density in study areas. The density of both men and women would rise with canopy coverage at first and start to drop when the coverage reaches a point which is around 50%. This phenomenon suggests that park users prefer some canopy coverage to provide comfortable shadows and shape the space. Park users may avoid places that have too many canopies.

Moreover, the shadow created by the canopy may be connected to the darkness of a space which may relate to safety issues. Moreover, in this research, female users are more sensitive to canopy coverage compared to male users. This result may also suggest that women are more concerned about safety issues.

Also, another finding is that the size of space people could access could be preferred differently based on gender. The man may prefer a relatively small space, and the woman may prefer a relatively large space. This preference may also relate to issues such as the openness of a space. If the space is small

and surrounded by bushes, which could be considered a place that is too private, female users may choose a larger space with a better view and more public.

The outdoor cafe space in the park becomes the most popular place that attracts both men and women, and it also has the highest number of female users in area B. The free open outdoor cafe provides tables and seats to create a comfortable place for people to stay and talk with friends, especially female users, to have conversations and socialize. Also, Starbark Cafe may have a famous brand effect that may amplify free open outdoor cafe space.



Fig.4-2-18 B7 in Study Area B



A9



B13



A8



B9



A1



B5

Fig.4-2-19 Photo of A1, A8, A9, B13, B9, B13

The number of female users is affected by the time of the day, especially around fountains and outdoor cafes. The results point out that the number of female users increasing from 10:00, peaking around 14:00, and having fewer female users after 16:00. The outdoor cafe also attracted a number of female users, and the total number of park users almost doubled on weekends compared to weekdays. This result suggests that time issues may significantly impact how people utilize space, such as Ueno Park. The number of female park users drops faster than male park user numbers, usually after 14:00. This phenomenon gets stronger after 16:00, which may also relate to sunlight and darkness issues and lead to safety issues that women could be more sensitive to.

Events held in Ueno Park on weekends would attract many people to gather in Study Area B in front of the fountain. Street performers would come to the park during the weekends. They play music, hold performances, wear traditional Japanese customs, and perform Sichuan opera Bian Lian from China. All these performances and events attract people and make the park more energetic.

Some people stand on the stairs and play on their cell phones. Most people play Pocket Monster Pokémon, a cell phone game application that leads people to public spaces such as parks and holds events. In the future, the way people use the internet in public space also affects how people behave in public space then changes the design of space.



Fig.4-2-20 Street Performance in Ueno Park



Fig.4-2-21 People Stand on Stairs



Fig.4-2-22 Teenagers Playing skateboard

Some signs say that skateboard is not allowed in the park. Still, some young people will practice in Ueno Park's open space in the late afternoon. Other activities such as Otagei dance (オタ芸, a type of dance usually performed by fans of Japanese idol singers ) and video creation for social media have also been observed.



Fig.4-2-23 Homeless People Get Food from Volunteers

Many homeless have been observed in Ueno Park. It is hard to tell whether a person is homeless in Japan since many are well-dressed like ordinary people. Homeless people usually do not appear in the park's central open space. Many of them keep a distance from other people and prefer to stay in the park's corners. Volunteers organized by NGOs (Non-Governmental Organizations) will hand out food and some toiletries for them regularly.

### 4.3 Tokyo Dome City

|                       |  |
|-----------------------|--|
| Name                  | Tokyo Dome City  |
| Location              | 1 Chome-3-61 Koraku, Bunkyo City, Tokyo 112-0004   |
| Date Designed/Planned | Korakuen Stadium opened in 1937, and the Tokyo Dome City Attractions (Kōrakuen) opened in 1958. In 2000, the name changed to Tokyo Dome City |
| Size                  | About 130,000 m <sup>2</sup>   |
| Managed by            | TOKYO DOME Corporation   |

Tokyo Dome City is surrounded by train and bus stations, which makes access easy. Furthermore, it attracts over 40 million visitors each year. Long linear benches in front of Tokyo Dome comprise stone. Grass, bushes, trees, and billboards are behind the benches. Many other physical factors surround them, thus ensuring the plaza in front of Tokyo Dome is ideal for studying individuals' seat preferences on long linear benches in public spaces.

Since Whyte began studying public spaces in 1969 and conducted

observations in New York City, research has been conducted on individuals' seat preferences in public spaces. Whyte (2018) posited that several spatial elements affect individuals in public spaces, including sitting spaces. He revealed that individuals prefer to sit on corners. Gehl (2008) also observed the edge effect where more individuals sit on both ends of the bench. Horiguchi et al. (2001) revealed that the equipment on which one sits might affect seating behavior.

Furthermore, the environment around the bench may also play an important role (Hiromo & Hashimoto, 2014). Moreover, personal space may also affect individuals' seat preferences and the duration they sit there (Shinozaki, 2002). A plethora of research has examined seat preferences inside rooms and on short benches. However, not many studies have been conducted on long linear benches in public spaces. Short, immovable benches limit an individual's choice of where to sit in a public space. Furthermore, it is imperative to understand an individual's seat preferences in the frame of environmental psychology.

Limitations for the case study in Tokyo Dome City also exist. Unlike other commercials, public spaces, Tokyo Dome itself is a landmark of Tokyo to attract many people to visit the place. The observation data is also limited by weather which sunny days with comfortable weather are selected. Moreover, the date selected to conduct research does not include event days that could attract too many people to visit, eventually may change the way people use

this site compared to days that do not have events.



Fig.4-3-1 Neighborhood analysis around Tokyo Dome

(Source: modified based on Google map)

In the present study, onsite observation and mapping in Tokyo Dome City were conducted to explore factors that may affect individuals' seat preferences on long linear benches. These factors included the position of benches, environment around benches, various forms of benches' edges, number of people, and billboards behind benches.

#### 4.3.1 Neighborhood analysis

Tokyo Dome is in an area with many shops and restaurants, attracts so many people to visit. Subway stations and bus stations around make the place very easy to access. Tokyo Dome Hotel and its garden also provide greens for this place. The study area is focused on the second floor of the

place, which has several entrances to the Tokyo Dome and long-liner sitting space for people waiting to enter the Dome.

### **4.3.2 Observation in Tokyo Dome City**

The observation process employed was based on Whyte's research observation methods (Kent, 2000) and conducted systematically because Tokyo Dome hosts many events, attracting many people who occupy almost all the space on the benches. If all the places on the benches were occupied, it would be challenging to observe seat preferences. Thus, it was essential to limit the number of individuals on the study site, which may have weakened the validity of the data. Consequently, three weekdays and two weekend days in 2019 without events were selected for data collection: Friday, May 17, Monday, June 3, Wednesday, October 16, Saturday, October 26, and Sunday, October 27. No extreme weather was experienced on the selected days. Instead, the weather was mostly cloudy, which ensured the effect of the sun was diminished. Furthermore, the air temperature was relatively comfortable and ranged between 14°C and 25°C. The data were collected every two h from 8:00 until 20:00. On each occasion, the researcher walked near the selected benches and recorded videos with a camera.

The data from the observations and recorded videos were mapped as seat position data on a scaled map, including gender, behavior, and the number of people on a bench, such as single, couple, or more.

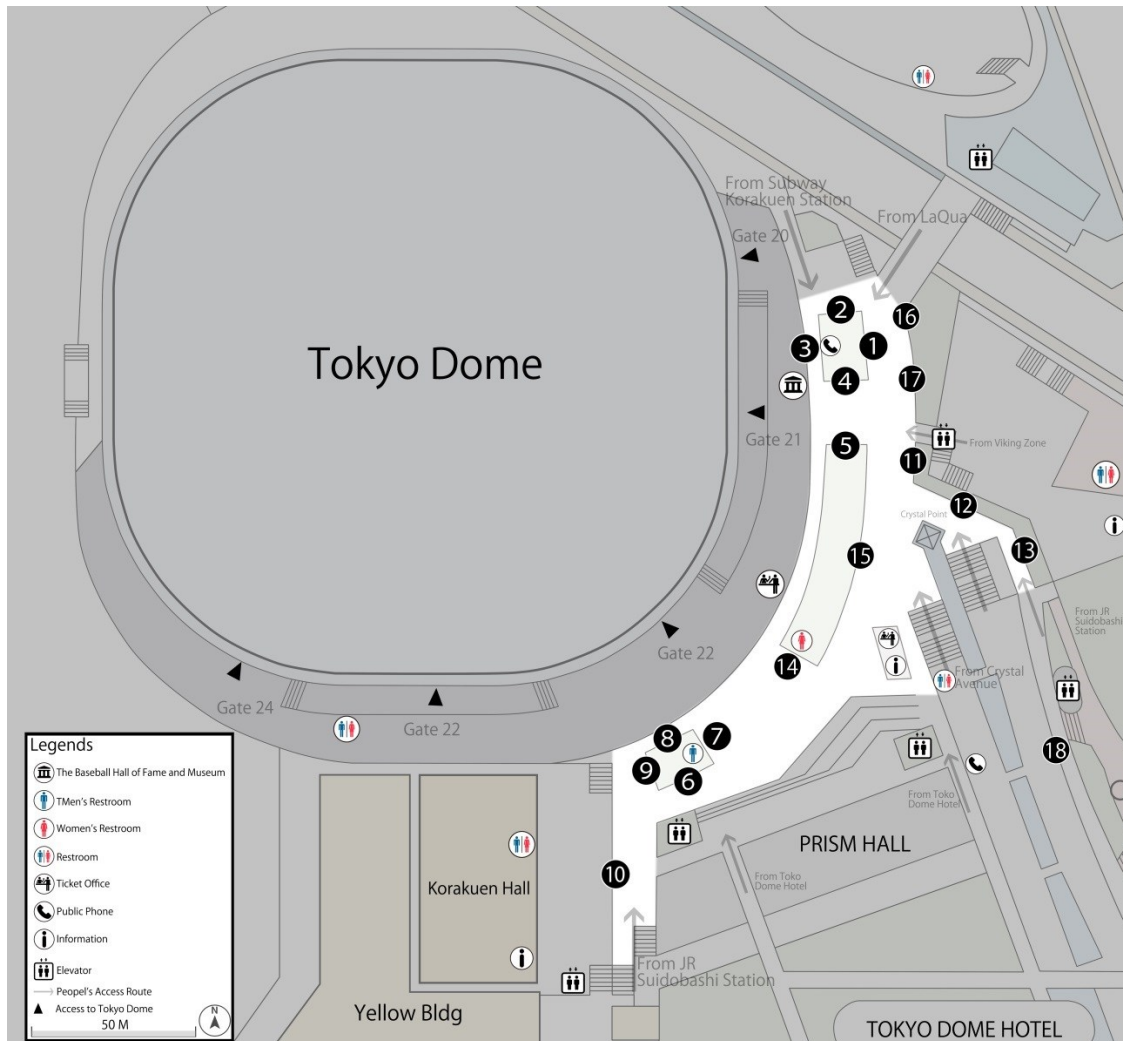


Fig.4-3-2 Spatial Analysis and Selected Benches

### 4.3.3 Results

The study area was located on the second floor in front of the Tokyo Dome, approximately 6,940 m<sup>2</sup>. Although there were 18 benches in the study area, only 13 benches were employed in this study (Fig.4-3-2). In contrast to the other benches in the study, the following benches had an arc shape: nos. 15, 17, and 18. No. 14 always had two trucks in front of it, even when there were

no events in this area. No. 16 was a short bench that only had space for two individuals. Consequently, bench nos. 1 to 13 was employed for this study. Although the selected benches had different lengths (Table 4-3-1), most had the same physical parameters (Fig. 4-3-3). However, nos. 3 and 8 had no bench backs and were wider.

All the benches employed in the study are comprised of stone and positioned in different places with varying physical environments. Bench no. 12 was the longest and had one billboard behind it. While nos. 2 and 7 had one billboard behind them, no. 11 had one billboard behind it and one next to it on its north side. No. 9 had two billboards behind it. At the same time, a giant billboard spilled no. 8 in two, no. Three were spilled in the middle by two phone boxes. Nos. 1 and 6 had two inside corners. Furthermore, while the former had one billboard behind it, the latter had two. Nos. 4 and 5 each had a trash box, and there was also a billboard behind no. 5. No. 13 had a vending machine on its south side, and no. 10 was just a long bench with two edges on each side (Fig.4-3-3).

Table 4-3-1 Data of Benches Affected by Position

| Bench | Length (M) | Number of Edges | Edge Area (M) | Number of People | People per M |
|-------|------------|-----------------|---------------|------------------|--------------|
| 1     | 20.6       | 6               | 4             | 72               | 3.5          |
| 2     | 14         | 4               | 2             | 61               | 4.36         |
| 3     | 20.8       | 4               | 2             | 42               | 2.02         |
| 4     | 14         | 2               | 1             | 21               | 1.5          |
| 5     | 14         | 4               | 2             | 30               | 2.14         |
| 6     | 19.2       | 7               | 3.5           | 74               | 3.85         |
| 7     | 13.8       | 4               | 2             | 45               | 3.26         |
| 8     | 6.4        | 4               | 2             | 17               | 2.66         |
| 9     | 13.8       | 6               | 3             | 47               | 3.41         |
| 10    | 11         | 2               | 1             | 59               | 5.36         |
| 11    | 9.6        | 4               | 2             | 21               | 2.19         |
| 12    | 35.4       | 4               | 2             | 22               | 0.62         |
| 13    | 20.6       | 2               | 1             | 8                | 0.39         |

The total number of individuals observed on each bench during the five selected days is shown in Table 4-3-1. They tended to sit on benches close to the access routes in the study area. In the north, those from LaQua and Korakuen station used bench no. 2, which could seat 61 and equated to 4.36 individuals per meter. Individuals from Suidobashi station in the south sat on the bench no. 10, which had 59 individuals and equated to 5.36 people per meter. Bench no. 6 was more prevalent among those who used the access route from Tokyo Dome Hotel than nos. 7 and 9. Fewer individuals used the route from Crystal Avenue and Suidobashi Station in the east. Only eight people were seen on bench no. 13. This phenomenon may have been due to fewer people accessed the site from the southeast side.

With the exceptions of bench nos. 2, 4, 5, and 12, most individuals preferred to sit on the edges of the benches. Examining the data in Fig.4-3-3 reveals that bench nos. 4 and 5 had a trash box at one end of the bench. It is assumed that individuals would rather not sit next to a trash box. The Crystal Point was at the front of no. 12, which attracted more to the west side of the bench. Couples and groups tended to sit in the center of bench no. 2; this is discussed subsequently. Billboards behind benches also tended to affect individuals' preferences. Only eight were observed sitting in front of billboards. The boards either contained information or just displayed commercial advertisements. Most chose seats to the side of the billboards.

When an individual sat less than 0.5 m from the edge, it was counted as inside the edge area. Research has observed the edge effect (Gehl, 2008; Whyte, 2018). This effect was also observed in the study area, not only around two ends of a bench. Edges in this study encompassed both ends of a bench, edges that were designed in the bench, such as bench nos. 1 and 6 had two corners inside them, edges created by billboards behind the benches, and public phone boxes that spilled the benches in the middle (Fig.4-3-3).

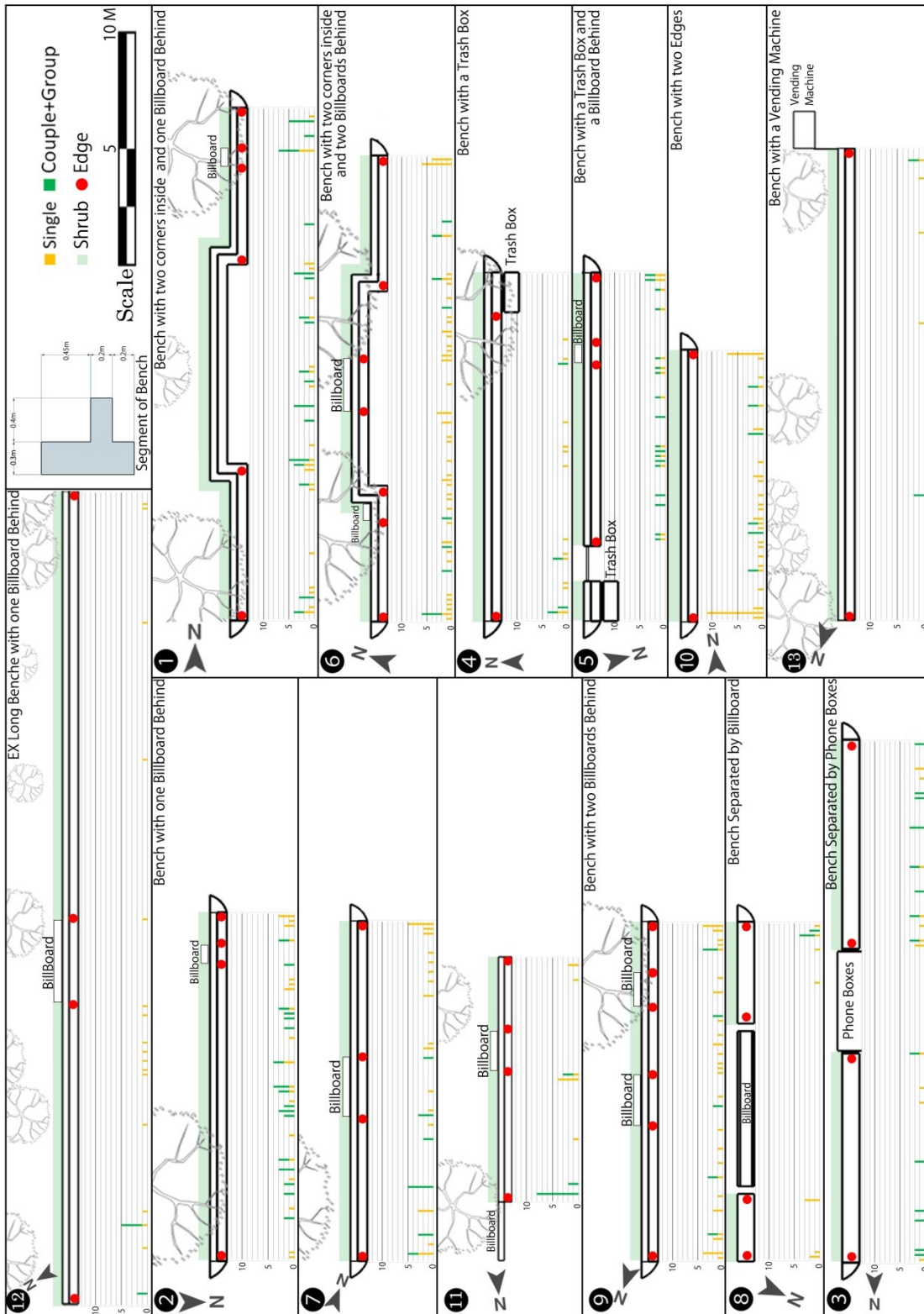


Fig.4-3-3 Seat Preferences, Facilities around Benches, and Segment of Bench

Table 4-3-2 Data selection and Edge Effect

| Before Selection |      |                     |          |                         |
|------------------|------|---------------------|----------|-------------------------|
| Bench            | Edge | People Per M (Edge) | Not Edge | People Per M (Not Edge) |
| 1                | 40   | 1.94                | 32       | 1.55                    |
| 2                | 11   | 0.79                | 50       | 3.57                    |
| 3                | 16   | 0.77                | 27       | 1.3                     |
| 4                | 7    | 0.5                 | 15       | 1.07                    |
| 5                | 7    | 0.5                 | 23       | 1.64                    |
| 6                | 44   | 2.29                | 30       | 1.56                    |
| 7                | 25   | 1.81                | 15       | 1.09                    |
| 8                | 14   | 2.19                | 3        | 0.47                    |
| 9                | 20   | 1.45                | 27       | 1.96                    |
| 10               | 23   | 2.09                | 36       | 3.27                    |
| 11               | 17   | 1.77                | 4        | 0.42                    |
| 12               | 7    | 0.2                 | 15       | 0.42                    |
| 13               | 1    | 0.05                | 7        | 0.34                    |
| Total            | 232  | 1.09                | 284      | 1.33                    |
| After Selection  |      |                     |          |                         |
| Bench            | Edge | People Per M (Edge) | Not Edge | People Per M (Not Edge) |
| 1                | 16   | 0.78                | 8        | 0.39                    |
| 2                | 6    | 0.43                | 11       | 0.79                    |
| 3                | 8    | 0.38                | 9        | 0.43                    |
| 4                | 2    | 0.14                | 9        | 0.64                    |
| 5                | 4    | 0.29                | 12       | 0.86                    |
| 6                | 35   | 1.82                | 20       | 1.04                    |
| 7                | 17   | 1.23                | 10       | 0.72                    |
| 8                | 14   | 2.19                | 1        | 0.16                    |
| 9                | 18   | 1.3                 | 19       | 1.38                    |
| 10               | 15   | 1.36                | 6        | 0.55                    |
| 11               | 17   | 1.77                | 4        | 0.42                    |
| 12               | 6    | 0.17                | 11       | 0.31                    |
| 13               | 1    | 0.05                | 5        | 0.24                    |
| Total            | 159  | 0.75                | 125      | 0.59                    |

The edge effect suggests that individuals may prefer to sit on the edge of a bench. However, when there are more individuals than edges, some have to sit elsewhere on the bench. The data were divided into two groups to determine how individuals' seat preferences were affected by the edges in the study area. The data "Before Selection" referred to the original data. When the number of people sitting on the bench is less than the bench's edge, these data were referred to as "After Selection." (Table 4-3-2)

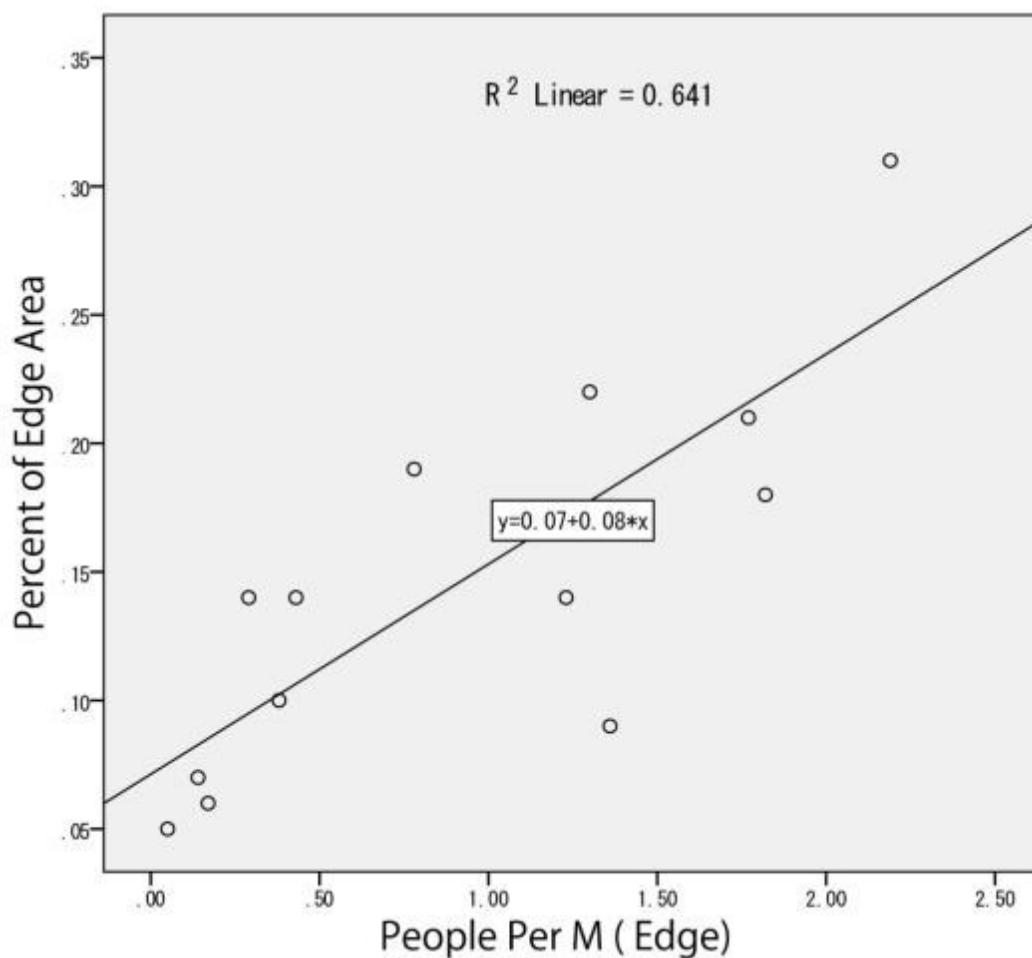


Fig.4-3-4 Correlation Analysis

The information in Table 2 reveals that more individuals sat outside the edge area before data selection. This number was reversed after the data selection. The correlation analysis (Fig.4-3-4) also suggests a strong connection between the percentage of the edge area and that of the individuals in the edge area after data selection, with  $R = 0.8$  and a significance level of 0.01.

While most individuals tended to sit around the edges, some preferred the center of the bench, especially couples and groups. The center area, defined as 100 centimeters from the bench's midpoint in this study, was preferred by couples and groups. The number of individuals in the center area of benches is presented in Table 4-3-3. Only 6 of 13 benches were selected. The other benches in the study area had billboards, phone boxes, and an edge area in the middle.

Table 4-3-3 Number of Individuals in the Center Area

| Bench | Before Selection |               |       | After Selection |               |       |
|-------|------------------|---------------|-------|-----------------|---------------|-------|
|       | Single           | Couple+ Group | Total | Single          | Couple+ Group | Total |
| 1     | 3                | 4             | 7     | 1               | 2             | 3     |
| 2     | 5                | 14            | 19    | 2               | 5             | 7     |
| 4     | 4                | 0             | 4     | 1               | 0             | 1     |
| 5     | 3                | 7             | 10    | 2               | 5             | 7     |
| 10    | 8                | 5             | 13    | 1               | 0             | 1     |
| 13    | 0                | 0             | 0     | 0               | 0             | 0     |
| Total | 23               | 30            | 53    | 7               | 12            | 19    |

Research has previously revealed the edge effect (Gehl, 2008; Whyte, 2018). However, most research has focused on short benches and/or had fewer facilities in the surrounding area. In this study, the corners inside the benches acted similarly to the edges. Furthermore, nonphysical edges on benches created by billboards behind the benches may have acted as psychological edges and attracted people. However, while the edge effect revealed that individuals preferred to sit in edge areas, not every kind of edge attracted them. The edge areas created by the trash boxes in bench nos. 4 and 5 did not reveal the edge effect.

Although Shinozaki's (2002) study in Japan was also conducted on long linear benches, they were divided by stones into short benches. He also noted the edge effect and suggested that people as a factor could also affect seat preferences. In this study, the data revealed a more significant result concerning the edge effect. When there were fewer individuals, they could decide whether to sit in the edge areas. Shinozaki's (2002) analysis was based on groups where a single person was also considered a group. However, in this study, it appeared that single individuals had different seat preferences to couples and those in groups.

Other findings such as how people sit when Tokyo Dome holds a baseball game on weekends would sit so tight and do not care about personal space (Fig.4-3-5). People would sit on the sides of the stairs and leave the middle for people to get through (Fig.4-3-6).



Fig.4-3-5 People Sit on Benches When There is A Baseball Game



Fig.4-3-6 People Sit on Stairs



Fig.4-3-7 People Sit on Table



Fig.4-3-8 People Sit on Planters

Other places such as tables and planters were treated as sitting spaces (Fig.4-3-7, 4-3-8). This kind of phenomenon only occurs when there is a big event in Tokyo Dome City. When people do not have enough sitting space, they have no choice but to sit wherever they could take a seat. People's sitting choice also shows that usually, people would like to sit under shade though the weather condition is comfortable (Fig.4-3-9).



Fig.4-3-9 People Sitting under Shade

The study in Tokyo Dome City's results summary is as follows: 1) A bench's position in an area may have an immense effect on the number of individuals who sit on it. Benches that are close to access routes are likely to be utilized more than benches in other places. 2) When allowed to choose where to sit on

a bench, they prefer to sit in “edge areas.” In this study, edges included two ends of a long bench and telephone boxes, edges in the bench, and the two ends of billboards. However, not every edge was favored by individuals as while the Crystal Point attracted, they shunned more individuals, the trash boxes at the edge. 3) More couples and individuals in groups tended to sit in the center of benches. 4) Individuals tended to avoid sitting in front of billboards.

This study revealed that people’s seat preferences could be affected by the position of benches, surrounding facilities, the edge effect created by physical and psychological edges on benches, and the number of people who sit together. Other factors that may also affect people’s seat preferences include sunlight, air temperature, and wind. It is recommended that further studies be conducted on these factors as well as different types of benches.

## 4.4 Harumibashi Park and Toyosu Park

|                       |  |
|-----------------------|--|
| Name                  | Harumibashi Park   |
| Location              | 2-Chome, Toyosu, Kotoku, Tokyo                                 |
| Date Designed/Planned | 1978   |
| Size                  | 23,967.84 m <sup>2</sup> (water area 3,852.24 m <sup>2</sup> ) |
| Managed by            | Tokyo Metropolitan Government Bureau of Port and Harbor        |

|                       |  |
|-----------------------|--|
| Name                  | Toyosu Park  |
| Location              | 2 Chome-3-6 Toyosu, Koto City, Tokyo 135-0061  |
| Date Designed/Planned | Opened in 1961, land was transferred from Tokyo Metropolis. Opened after renovation in 2006. |
| Size                  | 152,000 m <sup>2</sup>   |
| Managed by            | Toyosu Park management JV  |

Harumibashi Park and Toyosu Park are two parks next to each other, located in Kōtō special ward in Tokyo metropolis. They are coastal parks managed by the Tokyo Metropolitan Government Bureau of Port and Harbor with shops and commercial areas. Since the park is also designed for damp-proof purposes, the ground is higher than the sea level. The two parks have a large lawn area with slopes that people could lay down and get a good view of Harumi Bridge and the sea (Fig.4-4-1).



Fig.4-4-1 A View from Harumibashi Park

The limitation of this case study could be that this case study is based on two parks, Harumibashi Park and Toyosu Park. These two parks are next to each other, making the site have more spatial elements. The environments around the two parks are shopping malls, which also perform as food providers and work with food cars in the parks as the spatial element of food. The data collection based on observation is also limited in days with comfortable weather, which does not cover all the situations.

#### **4.4.1 Neighborhood analysis**

The Toyosu Station and several bus stations are around the site (Fig.4-4-2). Commercial buildings such as LaLaport with restaurants are around the place. Toyosu Pier brings visitors from central Tokyo to the site, and many people like to sit on stairs and watch excursion boats come and go. The site is next to Toyosu Park, a large lawn area and a playground with many playsets that attract children.



Fig.4-4-2 Neighborhood Analysis of Harumibashi Park

(Source: modified based on Google map)

#### 4.4.2 Observation in Harumibashi Park and Toyosu Park

Harumibashi park is a coastal park that next to Toyosu Park. Since the COVID-19 hugely influenced people worldwide, the observation was completed in early April 2021 after the government of Tokyo announced the state of emergency was lifted. Three weekdays and two weekends were selected. They are Thursday, April 1. Friday, April 2. Saturday, April 3. Wednesday, April 7, and Sunday, April 8. The air temperature was ranged between 10°C and 21 °C, and the data were collected every two h from 10:00 to 18:00. The observation data include recorded videos, the position of people, gender, behaviors. Since the site has many children play around, areas that attract children have also been noticed.

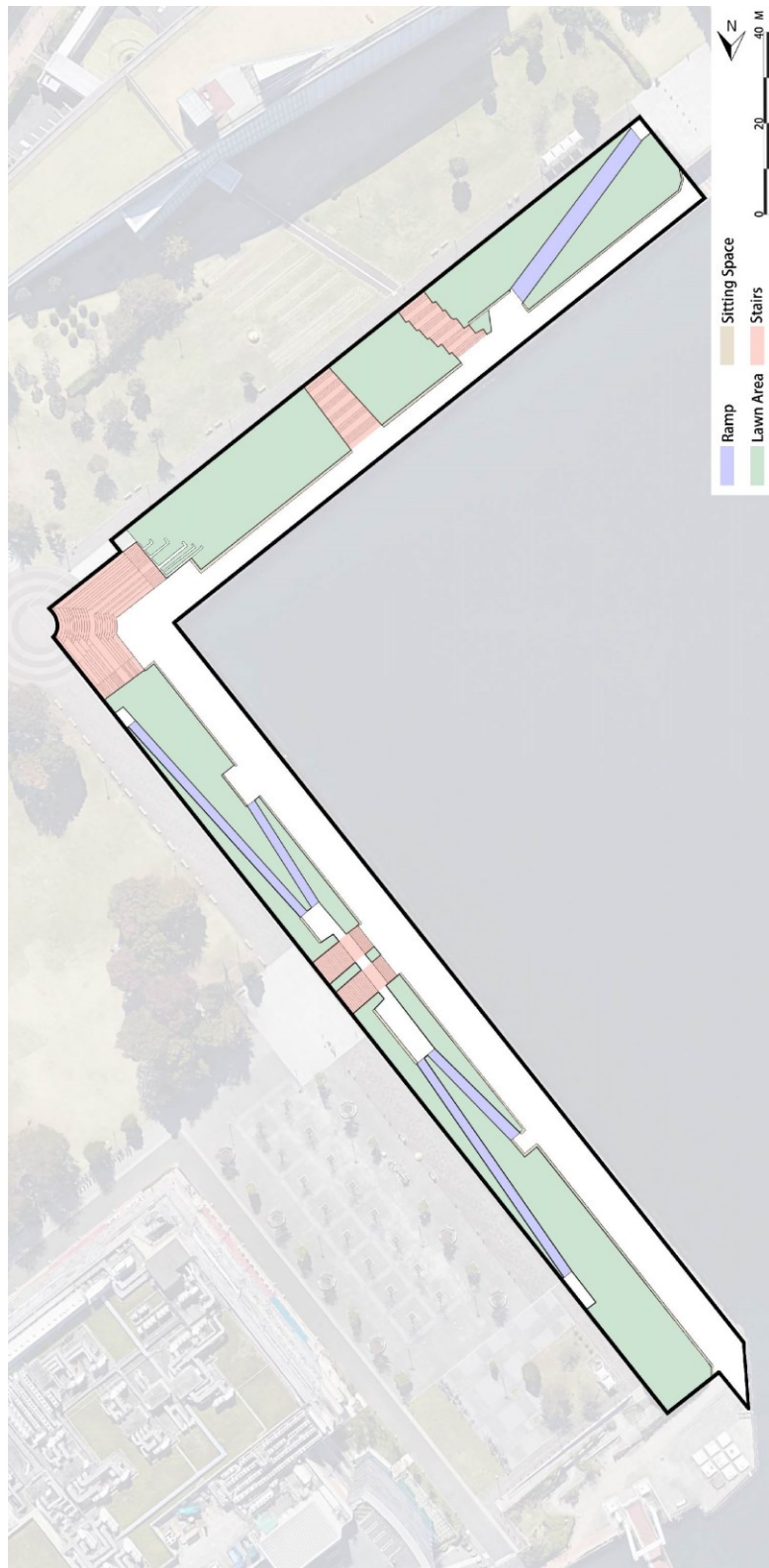


Fig.4-4-3 Area Conducted Behavior Mapping in Harumibashi Park

(Source: modified based on Google map)

Table.4-4-1 Number of People been Mapped

| ALL   | Number of People |       |     |      |
|-------|------------------|-------|-----|------|
|       | Man              | Woman | Boy | Girl |
| 10:00 | 29               | 11    | 7   | 5    |
| 12:00 | 67               | 62    | 20  | 30   |
| 14:00 | 123              | 139   | 44  | 60   |
| 16:00 | 166              | 217   | 55  | 59   |
| 18:00 | 50               | 87    | 6   | 8    |
| ALL   | 435              | 516   | 132 | 162  |

### 4.4.3 Results

The observation covered the Harumibashi and Toyosu parks but focused on two long linear spaces close to the water with large green spaces behind (Fig.4-4-3). Behavior mapping was conducted in these two long linear spaces, people's position and behavior were recorded (Table.4-4-1, Table.4-4-2). People's number also changes with time, which shows in Fig.4-4-4.

There are large lawn areas in the behavior mapping area, stairs, and ramps connecting Toyosu Park and Harumibashi Park. The edge of the lawn area also provides sitting space, and people could eat and rest all along with the place.

During the behavior mapping, people were categorized into Man, Woman, Boy, and Girl. Boy and girl before going to junior high school are defined as children. Some people bring babies with them, but those infants have not been considered in this study.

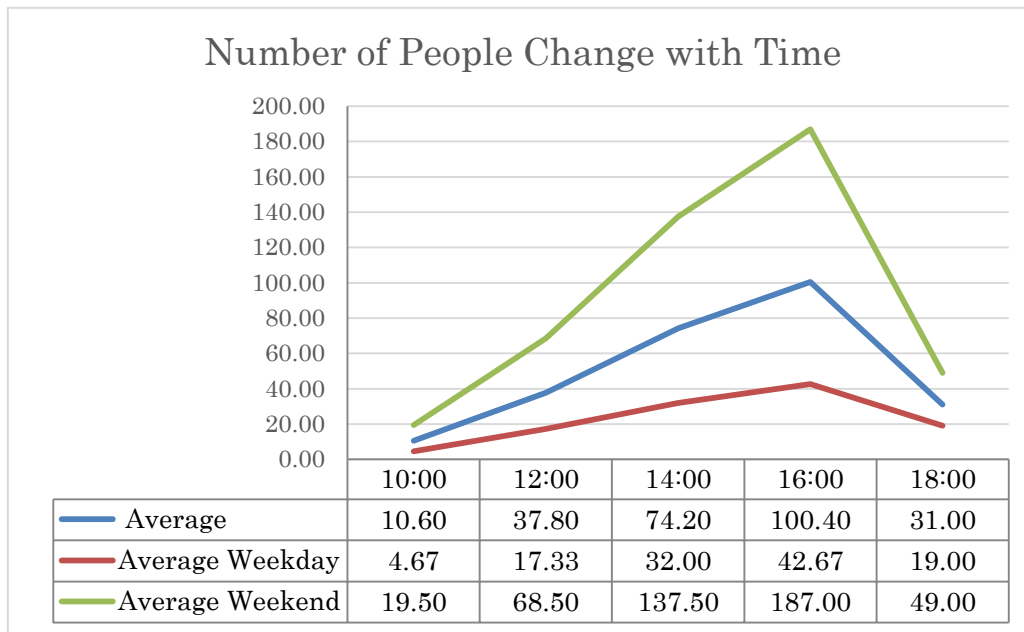


Fig.4-4-4 Number of People Change with Time

Table.4-4-2 Number of People in Categorized Behavior

|        | Sitting/<br>Rest | Phone/<br>Sitting | Talking/<br>Siting | Eating/<br>Sitting | Playing<br>(Lawn) | Playing<br>(Ramp/Stairs) | Playing<br>(Other Place) | Fishing |
|--------|------------------|-------------------|--------------------|--------------------|-------------------|--------------------------|--------------------------|---------|
| Male   | 75               | 67                | 163                | 60                 | 13                | 6                        | 8                        | 31      |
| Female | 67               | 88                | 219                | 75                 | 12                | 5                        | 10                       | 15      |
| Boy    | 8                | 0                 | 2                  | 13                 | 44                | 30                       | 26                       | 9       |
| Girl   | 10               | 6                 | 10                 | 23                 | 49                | 26                       | 28                       | 10      |

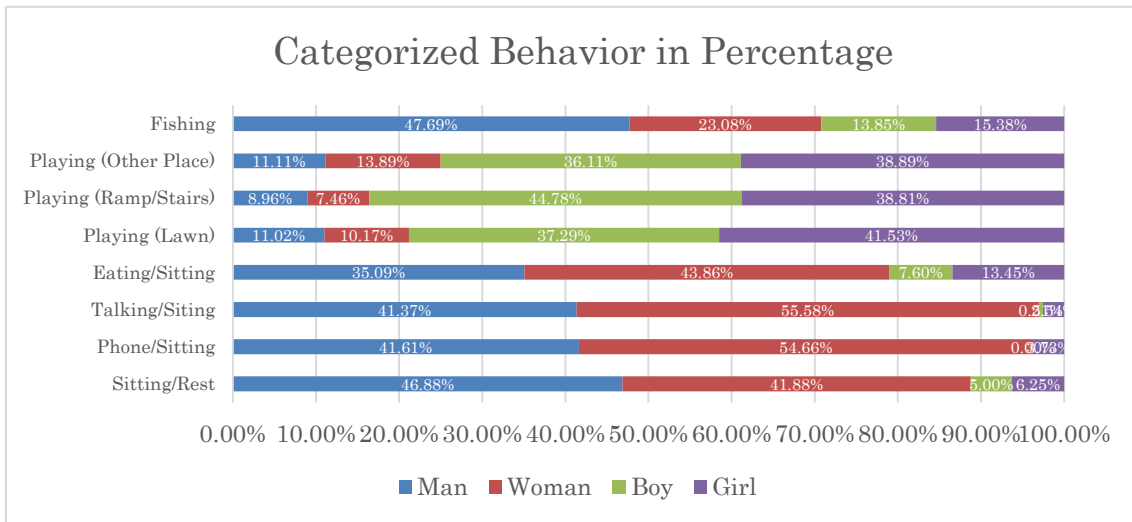


Fig.4-4-5 Categorized Behavior in Percentage

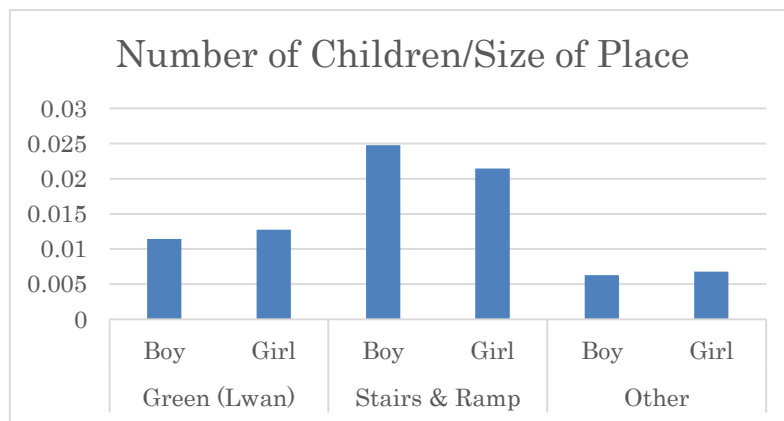


Fig.4-4-6 Number of Children / Size of Place

People’s behavior has been counted and analyzed (Fig.4-4-5). Most people in the area are sitting while they were talking or playing on the cell phone. Food cars will come to Toyosu Park, and people could also get food from food cars (Fig.4-4-8), shops in shopping malls around, and then enjoy their meal here. Fishing has only been observed on weekends, a tiny shop will come to the site, and people could rent fishing equipment (Fig.4-4-10). Parents play

around with their children in the lawn area and along ramps and stair areas. When the place's size has been considered, more kids and their parents play in the ramp/stairs area (Fig4-4-6).

Most of the time, children's parents are around their kids and take care of them while they play together. Boys and girls running on stairs and climbing handrails without parent supervision were also observed a lot. There are warnings written on handrails that "Do not climb" (Fig.4-4-7), but children may not notice that, or they could not realize the danger of running, running on stairs, and climbing the handrail (Fig.4-4-9). On the other hand, some researchers find out that it a natural propensity for children to conduct risky play, and it helps them evaluate and manage risk (Brussoni, Olsen, Pike, & Sleet, 2012), and risky play influence children's affordances for all play (Obee, Sandseter, & Harper, 2020).



Fig.4-4-7 Warning on Handrail



Fig.4-4-8 Food Cars in Toyosu Park



Fig.4-4-9 Children Playing on Stairs and Climbing Handrail



Fig.4-4-10 Shop Rent Fishing Equipment



Fig.4-4-11 Tent on Lawn Area

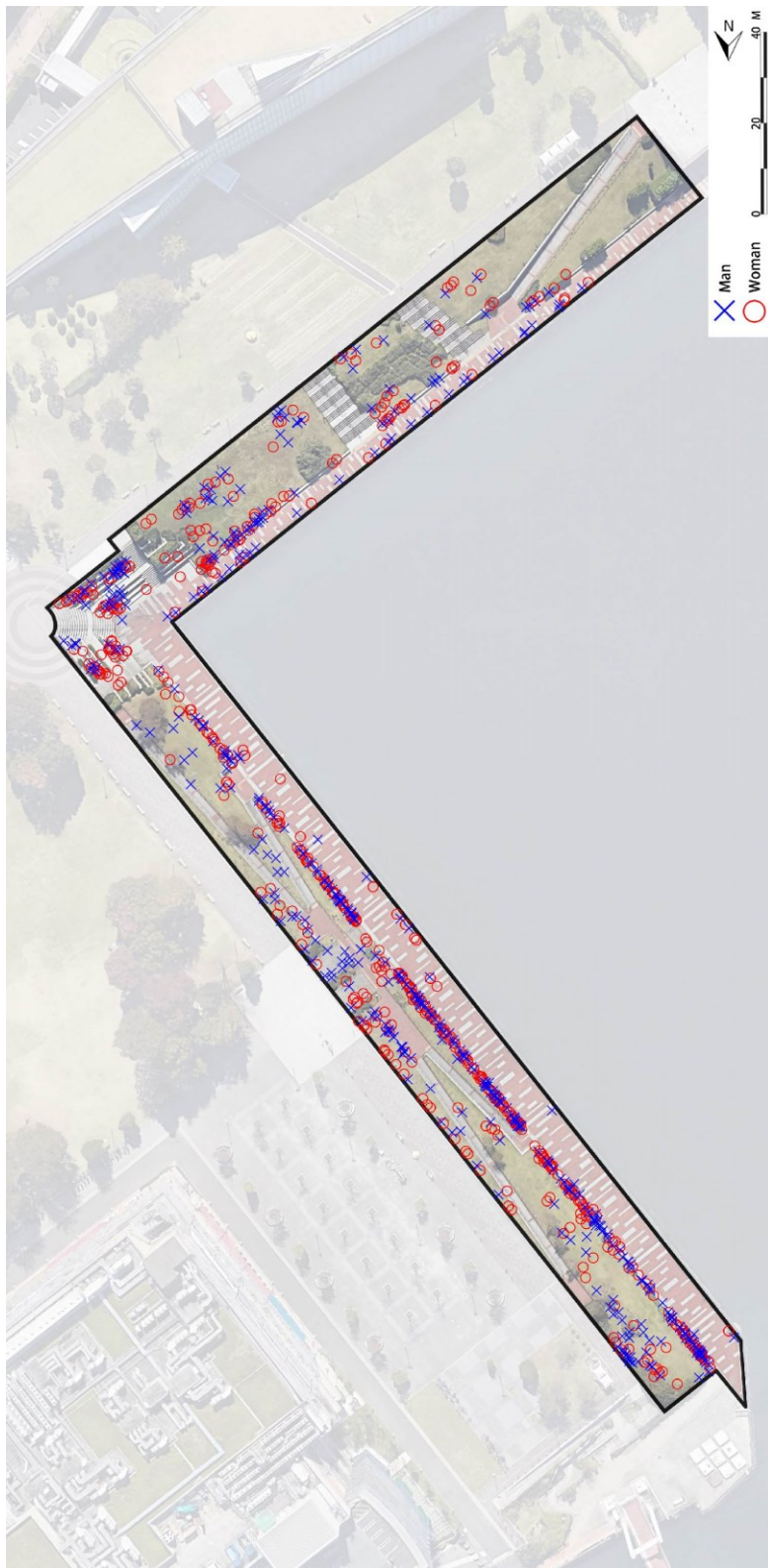


Fig.4-4-12 Mapping of Man and Woman

(Source: modified based on Google map)



Fig.4-4-13 Mapping of Boy and Girl

(Source: modified based on Google map)

People would like to bring their tent to the park and set it up under trees (Fig.4-4-11). The tent works as a rest and storage place for people, many people will visit the park with their family and stay in the park for several hours. They could rest and eat in the tent, the tent also creates a shelter for them, and children could play in the park and know where to find their parents. The children's playground in the park also provides an attractive place for children.

The mapping data in Fig.4-4-12 and Fig.4-4-13 represent where people would like to stay in the park. Most adults would prefer to sit on the edge of lawn areas while children play in stair, ramp, and lawn areas.



Fig.4-4-14 Children's Play Ground



Fig.4-4-15 People Sit on Stairs

The stairs in Fig.4-4-15 are located in front of Toyosu pier. Like people watching trams on the pedestrian bridge, people also like to watch ships in and out. People chose to sit here though there are several benches along with the site, and people will leave space for people to pass through.

There are some seats designed for people to sit and lie down for a rest. The place for these seats is selected, people could have the best view of the sea and Harumi Bridge (Fig.4-4-16)

Toyosu Park has a Garden Club open every Friday morning (Fig.4-4-17). It is free of charge, and everyone could learn how to take care of plants, appreciate nature, and park the market open each weekend, selling plants and bonsai (Fig.4-4-18). So people could learn first and then practice in the park and home when they get plants from the market.



Fig.4-4-16 Seats Designed for People to Lie Down



Fig.4-4-17 Toyosu Garden Club



Fig.4-4-18 Park Market at Park's Trance

## 4.5 Chapter Conclusion

Three cases in Japan mainly focused on three spatial elements that tree, sitting space, and water. Many other elements work with each other.

In Ueno Park, Starbucks coffee's outdoor café has the highest density of people except the crowd of people in front of events during weekends. Data shows that when a place has high tree canopy coverage, the number of people will decrease. The fountain in Study area B also works with stairs that work as sitting space attracts people to sit around it, and children would like to play around and touch the water in the fountain. Events were held every week, street performers would conduct their performance along the street in the park, and major events would be held in front of the fountain.

In Tokyo Dome City, the site has many shops, restaurants, and food vendors around. When there is no event in the Dome, most of the time, people could pick where they would like to sit on long linear stone benches. People would like to sit around edge areas, which trees and advertisement boards behind the bench have been considered as edge areas. People also like to sit in front of Crystal Point. The Crystal Point works similarly as a sculpture, create edges in the front of the bench. When there is a baseball game or event in Tokyo Dome, so many people will come to the site, and the sitting space is not enough for everyone. In this case, people would sit wherever they could take a seat. People would sit on sitters, tables, and planters that were not originally designed for people to sit.

As for the coastal parks of Harumibashi Park and Toyosu Park, since the park also has a damp-proof function, people cannot assess the water could only view the sea. This makes Harumibashi Park also has long linear sitting space along the water, and lawn areas with slope provide people to lie down and enjoy the view. Food is provided by restaurants in commercial areas and food cars inside the park. People in Toyosu Park would bring their tiny tents and create their shelters on grass. Since there is also a children's playground in Toyosu Park, many parents will bring their children to this place. The shelter also provides a place for parents to store their things, and they could rest in the tent while their children play around. The observation results show that children would like to play in stair and ramp areas. Compared to

flat ground, stairs and ramps create a more complex physical environment and challenge children, encouraging affordances and risk management.

Results in these three sites suggest that spatial elements close to each other in the same site may attract more people, but exceptions also exist. Trees in Tokyo Dome may attract people to sit close to it, but high tree canopy coverage may create awareness of safety issues. Furthermore, people could also create spatial elements. Though shelter is not an element in William H. Whyte's seven elements, people's tents in Toyosu Park create space for people to rest, and the shelter created by people becomes a kind of spatial element and works with trees. The spatial element not provided by the designer but created by people based on their needs may reflect people's demands of urban public open space.

## **Chapter 5: Cases in the United States**

## 5.1 Regional analysis and site selection

Boston is the capital and largest city of the Commonwealth of Massachusetts in the United States (Fig.5-1-1, Fig.5-1-2). It is one of the oldest cities in the United States, founded on the Shawmut Peninsula in 1630 by Puritan settlers from England (Kennedy, 1994). After gaining independence from Great Britain, the city became an important port and manufacturing hub and an education and cultural center (About Boston, n.d.).

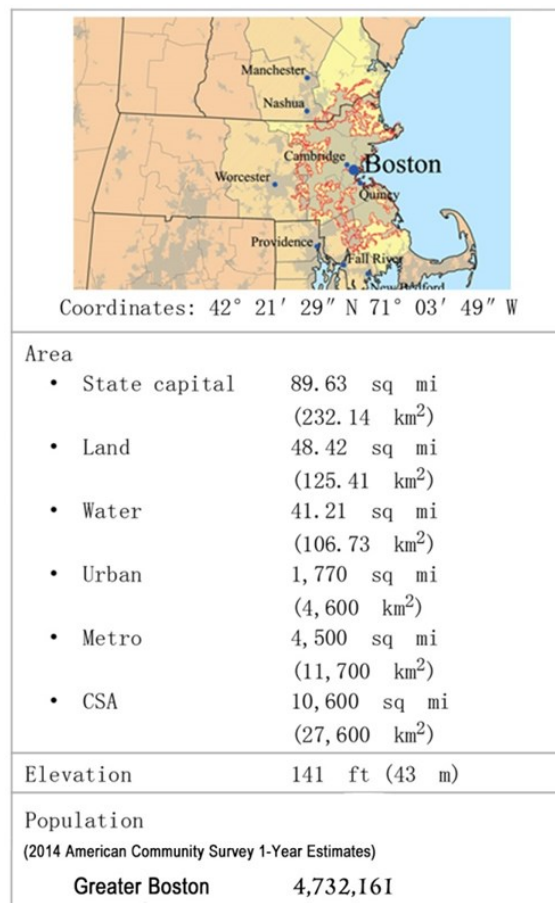


Fig.5-1-1 Boston Regional Data

(Source: Wikipedia)

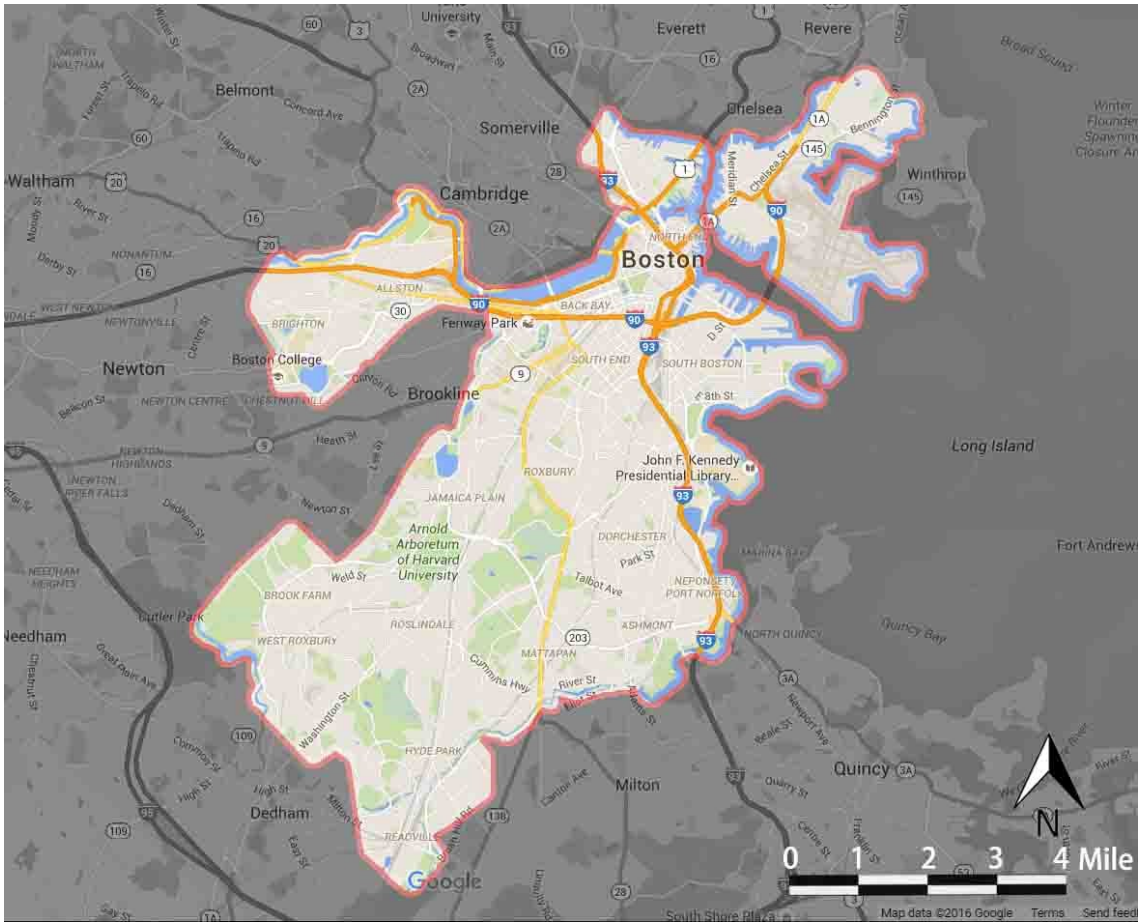


Fig.5-1-2 Main Boston Urban Area

(Source: Modified based on Google Map)

There are many colleges and universities in the city that make Boston a center of international higher education. The nation's oldest institution of higher education, Harvard University, is located in Cambridge. With Massachusetts Institute of Technology they have been ranked highest globally (World Reputation Rankings, 2016).

The city of Boston is the economic and cultural center of the substantially

larger metropolitan area called Greater Boston, with a population of 4,732,161 in the 2014 U.S. Census estimate (2014 American Community Survey 1-Year Estimates, n.d.). Over 80 % of Massachusetts's population lives in the Greater Boston region, and it is ranked tenth in population among U.S. metropolitan areas. Boston is encircled by the Greater Boston region and bordered by Winthrop, Revere, Chelsea, Everett, Somerville, Cambridge, Newton, Brookline, Needham, Dedham, Canton, Milton, and Quincy. The Charles River and the Cambridge separate the city. The Neponset River forms Boston's southern boundary and the Quincy, the town of Milton. Mystic River separates Charlestown from Chelsea and Everett, and East Boston is separated from Boston proper by Chelsea Creek and Boston Harbor (Fig. 5-1-3) (Massachusetts Topographic Maps, n.d.). The Greater Boston region was a center for transcendentalist, temperance, and abolitionist movements before the Civil War, and later in 2004, same-sex marriage was first legally recognized.



Fig.5-1-3 Overview of Boston

(From left to right: Boston City Hall, the West End, the North End, Charlestown, Boston Harbor, and East Boston. Source: Wikimedia Commons, Author: Rene Schwietzke)

The transportation system in Boston includes subway, roadway, regional rail, air, and sea options. Bus, subway, water ferries, and short-distance rail are operated by The Massachusetts Bay Transportation Authority (MBTA). Amtrak provides rail service mainly from northeastern cities. The South Station works as a major bus terminal served by several intercity bus companies.

Three sites are selected in Boston: Boston City Hall Plaza located in front of government facility, Faneuil Hall Market Place Center a commercial center in Boston, and Columbus Waterfront Park, a coastal park (Fig.5-1-4).

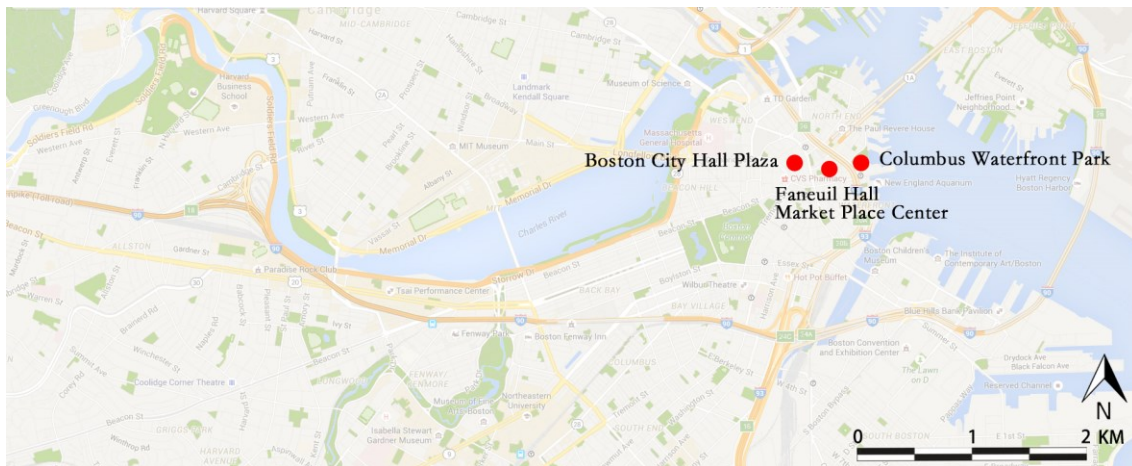


Fig.5-1-4 Three sites in Boston

(Source: Modified based on Google Map)

## 5.2 Observation in Boston

The observation is based on William Whyte's research. And the data was collected by using behavior mapping and counting. Data are collected on

three weekdays and two weekends, one Saturday and one Sunday. The observations were conducted avoiding holidays and on days with good weather. According to William Whyte's research, one site needs at least six periods to collect the data. So in this research, they are 8:00-8:30, 10:00-10:30 12:00-12:30, 15:00-15:30, 18:00-18:30 and 20:00-20:30. Many different activity types and numbers of people for each activity are represented, and each observation period has its' own time sheet.

Every site has several observation points to collect the data, and the site can also be divided into the same numbers of areas. This technique helps the observer to locate the data not only in time flow but also spatially.

### 5.3 Boston City Hall Plaza

|                       |  |
|-----------------------|--|
| Name                  | Boston City Hall Plaza   |
| Location              | 1 City Hall Square, Boston, MA 02203, United States  |
| Date Designed/Planned | Designed by Kallmann McKinnell & Knowles in 1962. Constructed from 1963 to 1968. The Boston City Hall Plaza Renovation Project is under construction, led by Sasaki Associates (A design firm specializing in architecture, interior design, planning and urban design, landscape architecture, ecology, civil engineering, and place branding.) |
| Size                  | About 7 acres (28,328 m <sup>2</sup> )   |
| Managed by            | Managed through the City's Operations Cabinet by the Public Facilities Department in partnership with the Property Management Department and is assisted by owners project manager Skanska USA   |

Boston City Hall Plaza is an unadorned Plaza in the Government Center area of the city with Boston City Hall behind it, and the photo shows in Fig.5-3-1, which is a former picture with a fountain in the left corner, now the fountain does not exist in this site. The planning of City Hall, the space arrangement of the plaza, and other structures around the Government Center was the responsibility of I.M.Pei (A Chinese-American architect), commissioned by Edward J. Logue. The plaza is built on the former site of Scollay Square (1838-1962), a vibrant city square in downtown Boston and named for William Scollay (An American developer and militia officer from Boston). Before that, the site acted as a commercial site. The City Hall and

the Plaza were constructed between 1963 and 1968, and the plaza consists of red brick and concrete with irregular shapes and multi-levels, making some people consider it a seedy area (Allison, 2004). To improve the plaza, the United States Environmental Protection Agency made recommendations for the greening of the plaza in 2011 (Greening America's Capitals Boston's City Hall Plaza [PDF]. n.d.). The construction started in 2014, and the new Government Center MBTA station opened in March 2016 (Moskowitz, 2016). More accessibility and landscaping improvements to the plaza are scheduled for completion in later 2016 (Halvorson Design). Public events have long been held in the City Hall Plaza. Annual events include Big Apple Circus and Art exhibits such as Boston Red Sox and Strandbeest.



Fig.5-3-1 Boston City Hall Plaza

(Source: <https://goo.gl/qHF3RQ>)

The case study in Boston city Hall also has some limitations. The site is in front of the city hall, which makes the place holed many official events. Since the site has been criticized for many years, which is not well designed and attractive for citizens. Not many people would like to stay or conduct any activities without many spatial elements. This case study may provide a typical example of an urban public space that is not so successful.



Fig.5-3-2 Boston City Hall Plaza Neighborhood Analysis

(Source: Modified based on Google Map)

### 5.3.1 Neighborhood analysis

The site is in front of Government buildings, has several restaurants and

shops around, and can access the place by bus or subway (Fig.5-3-2). The site has big open plazas with some tree canopy coverage. Most events are scheduled during weekends, and people will occupy the space during that time.



Fig.5-3-3 Boston City Hall Plaza Site Analysis

(Source: Modified based on Google Map)

### 5.3.2 Observation and Spatial analysis

There are four observation points in Boston City Hall Plaza. The first one is under the tree canopy designed for people to have lunch and sit beneath; there is a tiny stage in the south of the first point, with stairs around that

help the canopy and stage work together as an amphitheater. The second observation point is the place where the plaza holds public events. The third observation point is close to the subway entrance, where the highest number of people walk by. The fourth observation point is an intersection that leads to Faneuil Hall Marketplace. Sometimes food trucks will park in the east of this observation point, where there is also a tree canopy, but the planting bed is a little high for people to sit on.

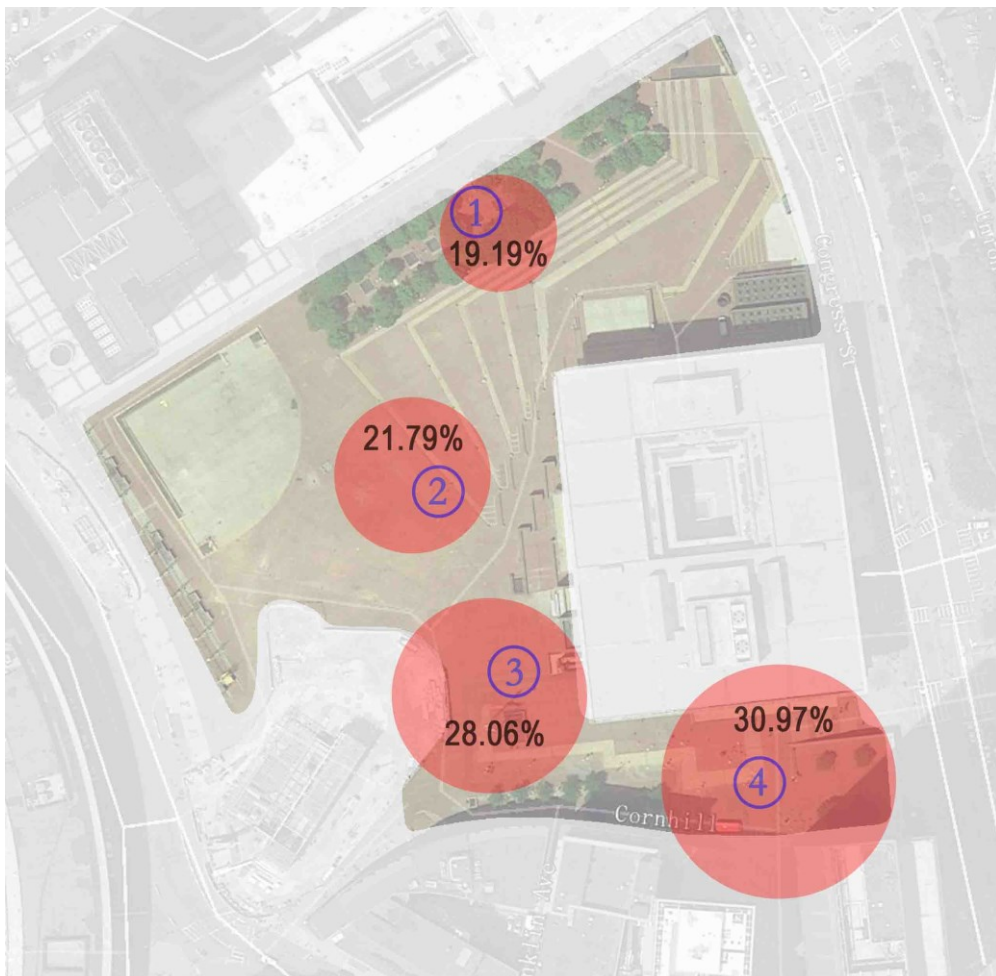


Fig.5-3-4 Distribution of People been Observed in Boston City Hall Plaza

(Source: Modified based on Google Map)

### 5.3.3 Results

Boston City Hall Plaza had 315.8 people counted per day during the six time periods measured. Trees are one of the elements that affect where people stay, according to William H. Whyte's seven elements. From the Spatial analysis (Fig.5-3-3), point 1 in City Hall Plaza is covered with tree canopies with stone benches. This place, however, has fewer people compared to the other three points in the plaza (Fig.5-3-4).

All the events held in Boston City Hall Plaza are scheduled by the city or with other organizations. Point 2 in City Hall Plaza is the place to hold all kinds of events; people will only gather there, however, when there is an event. However, since this place does not have an event every day, there are no people in that area. The number of people been observed is shown in Fig.5-3-5, and the age distribution and people's activities are presented in Fig.5-3-6 and Fig.5-3-7.

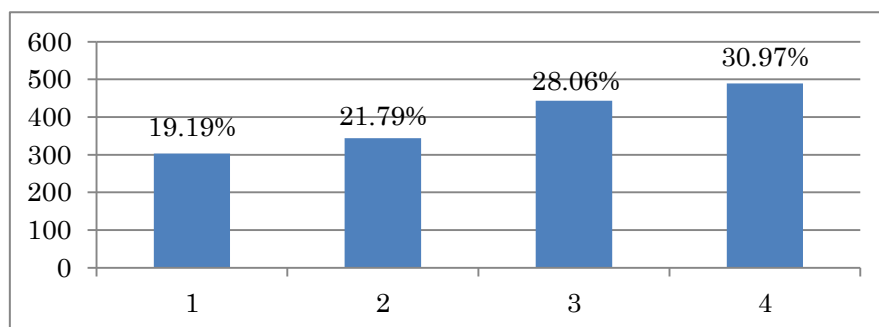


Fig.5-3-5 Number of People been Observed in Boston City Hall Plaza at Each Observation Point

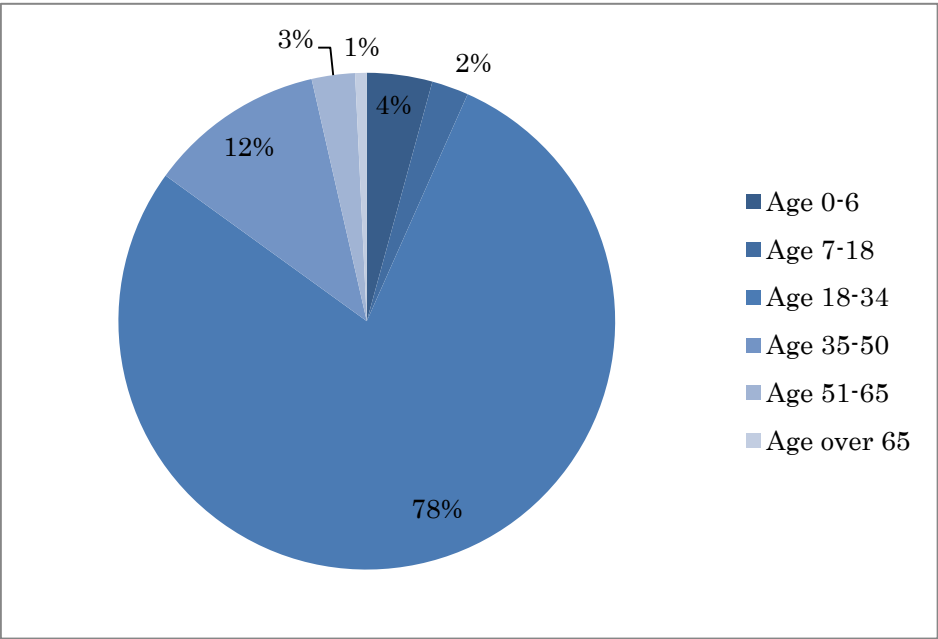


Fig.5-3-6 Boston City Hall Plaza Age Distribution

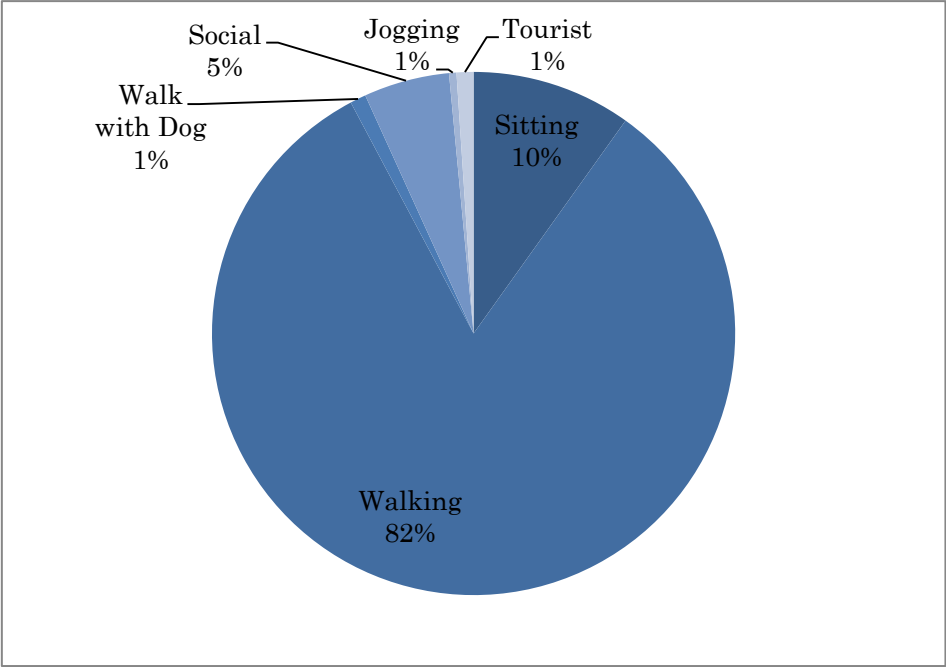


Fig.5-3-7 City Hall Plaza People's Activities



Fig.5-3-8 Few People Sit under Tree Canopy in Boston City Hall Plaza



Fig.5-3-9 Few People Stay in Boston City Hall Plaza

The level differences in Boston City Hall Plaza make it hard for people to fully use it (Fig.5-3-8). Designers constructed the ground as stairs for the amphitheater, but the stage is small and only has a red brick wall for the

background (Fig.5-3-9). The level changes also make the entire space less accessible. People have to climb up to reach the canopy area (Observation point 1). There is no store inside Boston City Hall Plaza, and the closest restaurants are in the west. There are a few tree canopies in the Boston City Hall Plaza, but the planting beds are too high for people to sit on.

Most people walk through the Boston City Hall Plaza rather than stay on the site. Lack of food vendors, too many stairs, and construction build-up work zones before every big event make the space unpleasant to stay. The plaza could have several food vendors under the trees and close to the sitting space to make the space more attractive. This change could provide an eating space and make the plaza more than a passage to Faneuil Hall Marketplace. Stairs in the north make the space less attractive and block people from sitting on the hill. One way to solve the problem could be to plant trees in the stair area, extend the sitting space, and make stairs into a sitting area.

There is nothing in the middle of City Hall Plaza and a long work zone for events. This situation makes the space off limits for long periods and makes people feel this space is only for big events and not for their daily use. Since the place is in front of City Hall, and the City Hall needs a space for big events, it is better not to change the usage of the space but to strengthen it. More trees could be planted around the space, and these trees could also be placed along with the subway station nearby. This tree line could lead people to the City Hall and get across into the event space, where they could then sit

on planting beds designed for that purpose.

## 5.4 Faneuil Hall Marketplace

|                       |   |
|-----------------------|---|
| Name                  | Faneuil Hall Marketplace  |
| Location              | 4 S Market St, Boston, MA 02109, United States  |
| Date Designed/Planned | The hall was built by artist Jon Smibert in 1740-1742 and expanded by Charles Bulfinch in 1806.   |
| Size                  | Two hundred thousand square feet (18580.608 m <sup>2</sup> ) of retail and 160,000 square feet (14864.4864 m <sup>2</sup> ) of space on Boston's iconic mixed-use festival marketplace. |
| Managed by            | Ashkenazy Acquisition Corp  |

The Faneuil Hall was built in September 1742 by artist John Smibert and is located in between today's Government Center and the waterfront. It has worked as a marketplace and meeting hall since 1743. It was designed for selling groceries, meat, and other products (Faneuil Hall, n.d.). Later in 1806, the Hall was greatly expanded by Charles Bulfinch, and in 1824-1826, Quincy Market, which is the main building, was constructed. In 1898-1899, Faneuil Hall was rebuilt entirely with noncombustible materials. On October 9, 1960, the building was designated as a National Historic Landmark and later added to the national register of historic places. (National Park Service, n.d) In 1976, Faneuil Hall was renovated as a festival marketplace through Jim Rouse, architect Benjamin Thompson and Mayor Kevin White which combined three long granite buildings called North Market, Quincy Market, and South Market. Now the place provides space for fast food and food stalls (Fig.5-4-1).

Boston Faneuil Hall Marketplace is a popular place for workers downtown to have lunch, with seating areas provided inside the building and around the building in the form of stone benches, moveable tables, and chairs. There are also street vending spaces provided against the outside wall of the Quincy Market building. The marketplace's east and west ends are spaces for street performers; some vendors are also there. Street performances are well programmed, and performers can attract hundreds of people during the weekends (Faneuil Hall Marketplace, n.d.).



Fig.5-4-1 Faneuil Hall Market Place Center

(Source: <https://goo.gl/V9ePXx>)

The limitation for this case study could be that the Faneuil Hall itself works as a street of the food court which provides food and movable tables and chairs outside the building. The site is also close to Boston City Hall, which may also become a factor that attracts people to visit. The observation data also focused on days that with good weather, which limited the data source.

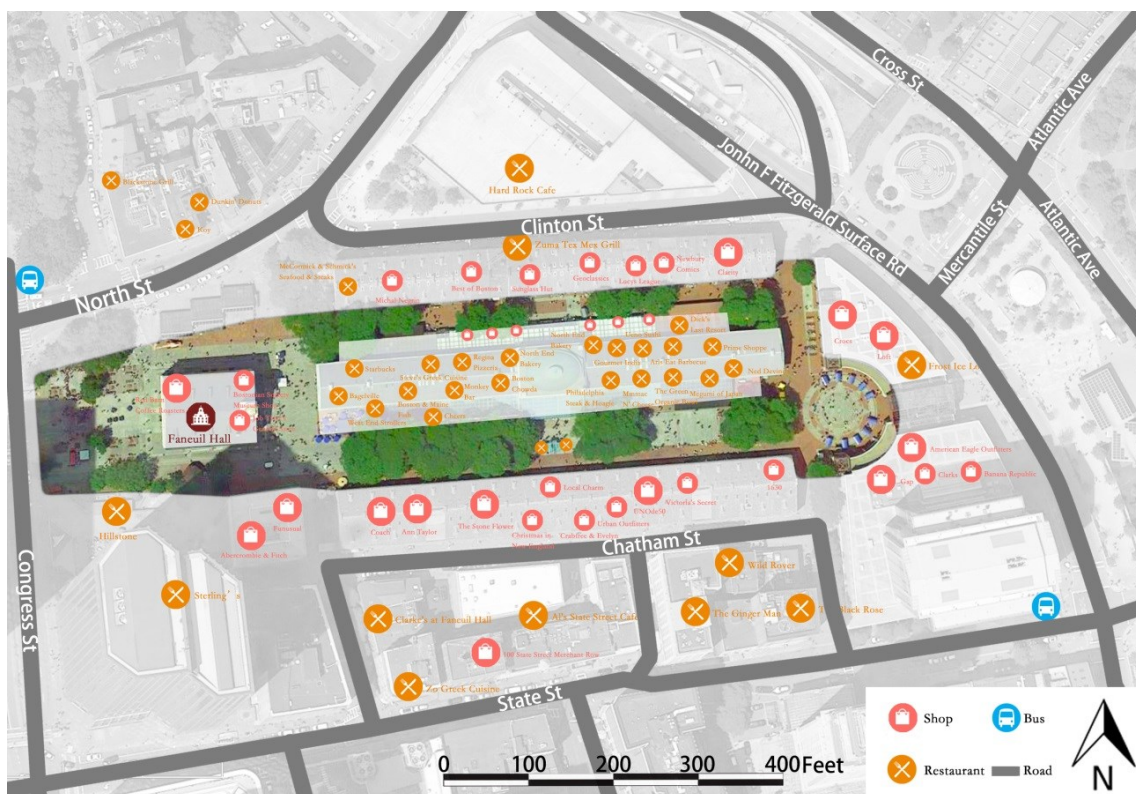


Fig.5-4-2 Faneuil Hall Market Place Center Neighborhood Analysis  
 (Source: Modified based on Google Map)

### 5.4.1 Neighborhood analysis

The site is a commercial space that people can walk through. People can walk into Faneuil Hall Market Place from the City Hall Plaza, and the bus

station is at the west entrance (Fig.5-4-2). There are stores and restaurants along the pedestrian streets, and sitting space is provided under the tree canopy. Food courts are in the middle of two parallel pedestrian streets, which are next to the street. Tree canopy also covered a large portion of the street.

#### **5.4.2 Observation and Spatial analysis**

There are nine observation points in Faneuil Hall Marketplace. The north path is a little narrower than the south path, which also has more sitting space, so there are more people and observation points in the south path. No.1 is at the Marketplace entrance; there is plenty of sitting space under the tree canopy, and performers usually perform at the small open space in the north. No.2 is at the entrance of Quincy Market, where there is also space for performers. People like to sit on the stairs at the entrance and watch the show in the front. No.3 is totally under tree canopies with stone benches. No.4 and No.9 are two entrances to the center of Quincy Market, and there are stores and food vendors at No.4 with several moveable tables and chairs. No.5 is another open space for events, and the Red Auerbach statue sits on the bench, attracting tourists to sit down and take photos together. No.6 is a place with vendors and stores around, and benches are in the center in a circle form. No.7 is a sitting area with many wooden benches where people enjoy their food after shopping in Quincy Market. No.8 has several benches where performers always sing and play the guitar here (Fig.5-4-3).

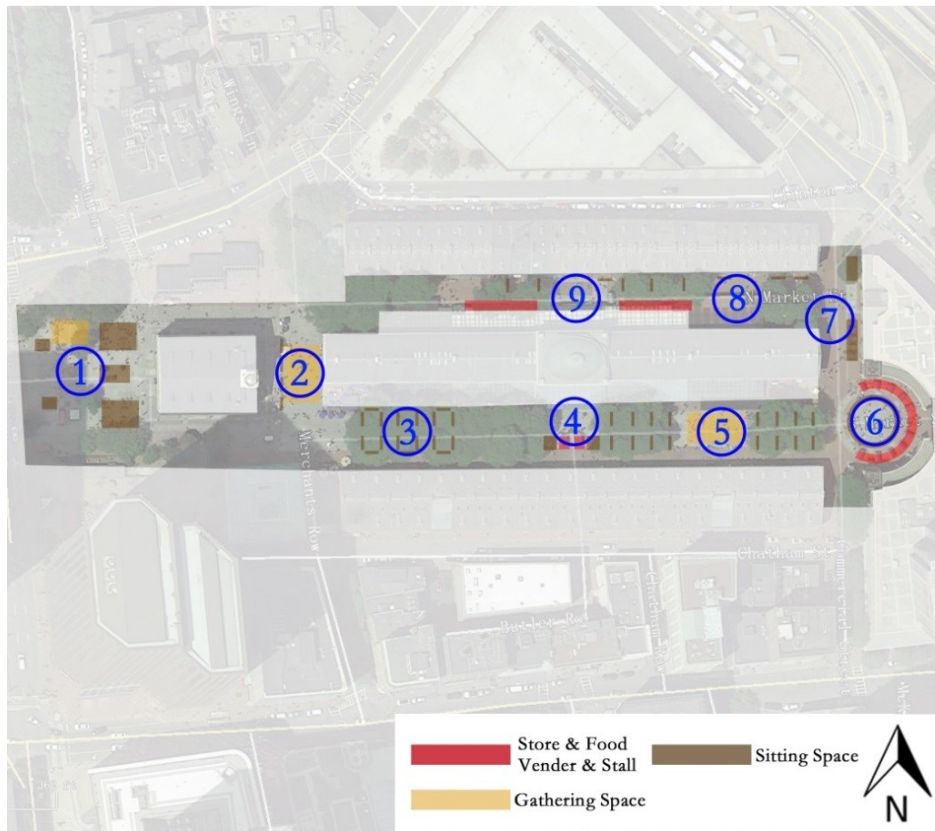


Fig.5-4-3 Boston Faneuil Hall Market Place Site Analysis

(Source: Modified based on Google Map)

### 5.4.3 Results

Faneuil Hall Marketplace is a historical site and has become a commercial area. There are no big or high buildings around Faneuil Hall Marketplace. Trees in Faneuil Hall Marketplace are tall and provide huge shadows covering the entire street and providing moveable chairs and tables (Fig.5-4-8). The number of people observed, people's activities and age distribution are presented in Fig.5-4-5, Fig.5-4-6 and Fig.5-4-7.

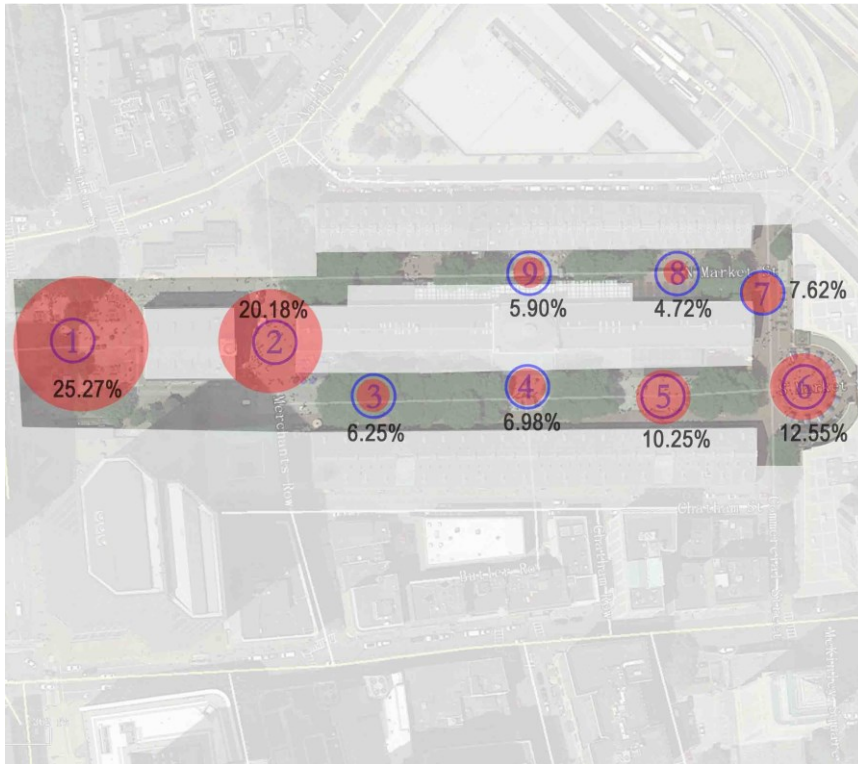


Fig.5-4-4 Distribution of People been Observed in Market Place  
(Source: Modified based on Google Map)

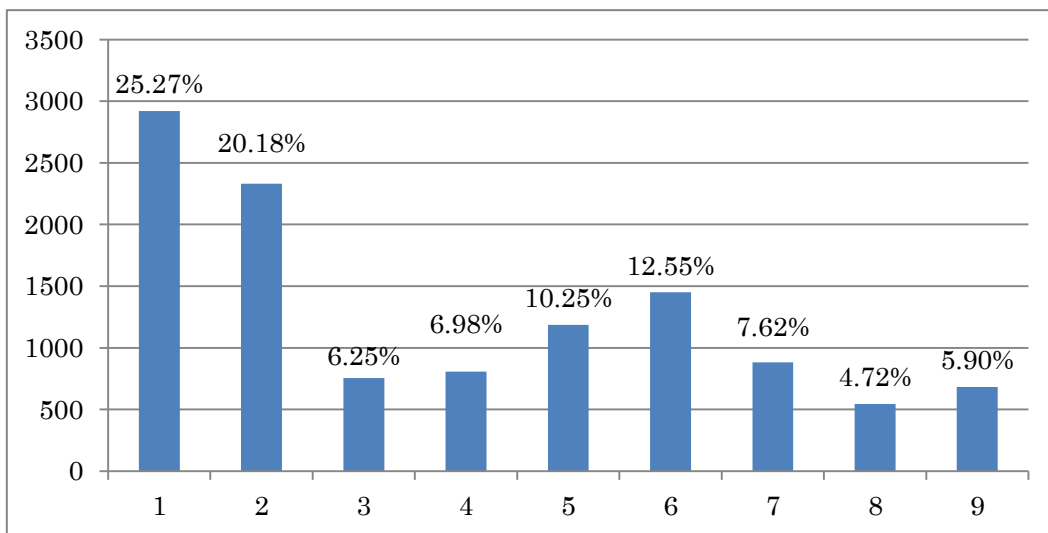


Fig.5-4-5 Number of People been Observed in Market place at Each  
Observation Point

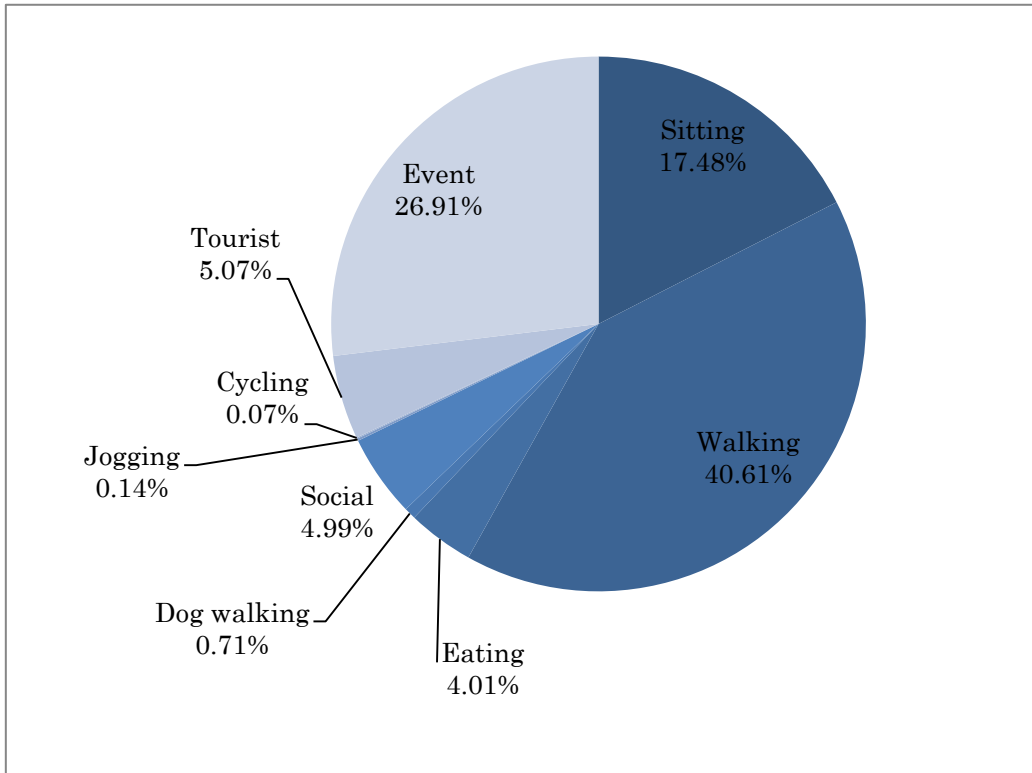


Fig.5-4-6 Faneuil Hall Marketplace People's Activities

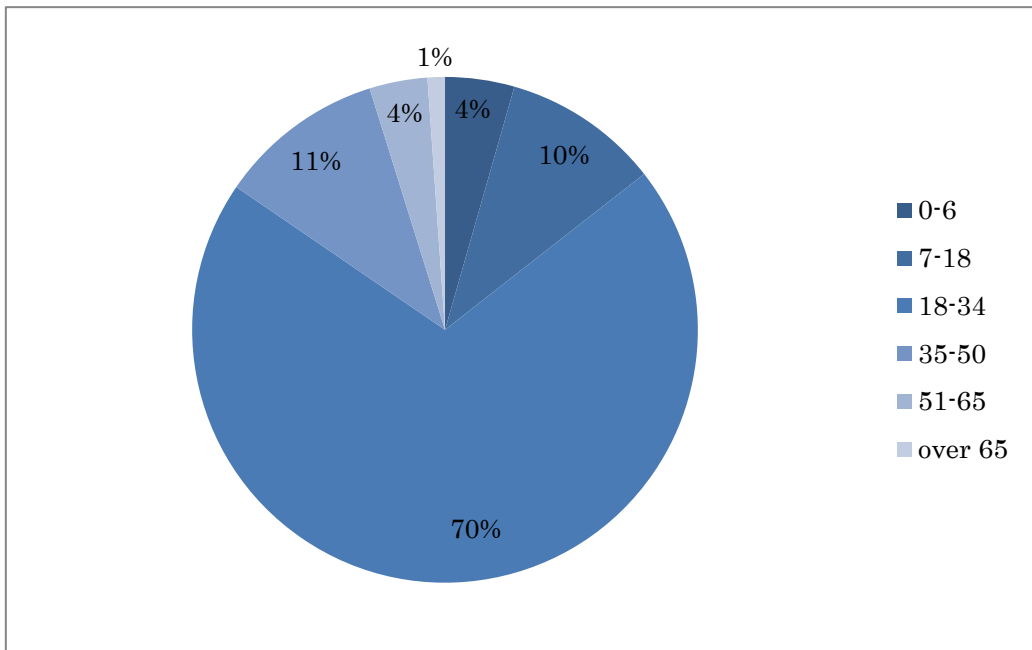


Fig.5-4-7 Faneuil Hall Marketplace Age Distribution



Fig.5-4-8 Tables and Chairs under Trees in Faneuil Hall Marketplace



Fig.5-4-9 People Eating in Faneuil Hall Marketplace



Fig.5-4-10 Shops outside Buildings in Faneuil Hall Marketplace



Fig.5-4-11 Shops on the second floor

Many people in Faneuil Hall Marketplace enjoy the food, events, shops, and history of the site, attracting more people (Fig.5-4-9, Fig.5-4-10). These spatial elements and historic buildings make this place hard to make any significant changes. However, shops on the second floor in the east can be accessed only by three stairs, two in the front hiding behind two concrete pillars, one in the side face of the building (Fig.5-4-11). Few people would find those stairs to get to the second level. Changing the position of those stairs could make people realize that they can get upstairs and better view the entire site.

## 5.5 Columbus Waterfront Park

|                       |   |
|-----------------------|---|
| Name                  | Columbus Waterfront Park (Christopher Columbus Waterfront Park)   |
| Location              | Atlantic Ave, Boston, MA 02110, United States   |
| Date Designed/Planned | Designed by Sasaki Associates in 1974. In 1999, Halvorsen Design Partnership renovated the place, reopened in 2003. |
| Size                  | About 4.5 acres (18210.9 m <sup>2</sup> )   |
| Managed by            | Friends of Christopher Columbus Park  |

Columbus Waterfront Park originally opened in 1976 and is a historical park located close to City Hall plaza and linked to Faneuil Hall Marketplace. Sasaki did its original design and won lots of awards, including the ASLA (American Society of Landscape Architects) Centennial Medallion Award in 1999. It is also one of American's earliest waterfront parks of the modern era (The Landscape Architect's Guide to, n.d.). There is a delightful playground for kids in the park and the Greenway just across the street where kids can

hop on the Carousel (Fig.5-5-1).

The limitation of this case study could be the location of this site. The Columbus Waterfront Park is close to Faneuil Hall Marketplace, a commercial area with a food court. This environment may lead to a few food cars and food providers being observed in the study area. The observations are conducted on days that with comfortable weather without rain. Another important thing is that the park has a statue of Christopher Columbus, which was heavily damaged during the Black Lives Matter movement. So that maybe not everyone likes to stay in this park because of the statue.



Fig.5-5-1 Columbus Waterfront Park

(Source: <http://goo.gl/okWTuZ>)



Fig.5-5-2 Columbus Waterfront Park Neighborhood Analysis

(Source: Modified based on Google Map)

### 5.5.1 Neighborhood analysis

Columbus Waterfront Park is close to the water and has ferry terminals nearby. Also, they are both surrounded by stores and restaurants. Many people, especially tourists in the Columbus Waterfront Park, come from the Faneuil Hall Market Place; the bus station is near the entrance. The ferry terminal in the east also brings people to the place (Fig.5-5-2).

### 5.5.2 Observation and Spatial analysis

There are No.9 observation points in Boston Columbus Waterfront Park. No.1 is at the park entrance and has the only store in the park, and the store only sells shirts. No.2 is a walkway lined with benches, but a restaurant's outdoor eating space is just behind the benches, making people prefer not to

sit there. No.3 is a small intersection, with the Marriott Long Wharf in the south and a huge tree with benches around in the center. No.4 has a fountain that pumps water from the ground in summer, and there is also an open space for people to get together. No.5 is a walkway to the north with benches in the east. The walkway from No.7 to No.6 has benches along, and Christopher Columbus's statue is at No.6. No.8 has a fountain in the center and benches around, also an entrance to the park. No.9 is another entrance to the park, and there is a children's playground just in the north (Fig.5-5-3).



Fig.5-5-3 Boston Columbus Waterfront Park Site Analysis

(Source: Modified based on Google Map)

Boston Columbus Waterfront Park has few people after 20:00. One reason for this is that the wind makes the place a little cold even during summer, the lighting system makes the place more like a dating place, and some homeless people stay in observation point 8 during the night. All of these factors make Boston Columbus Waterfront Park feel less safe.

### 5.5.3 Results

People's distribution is shown in Fig.5-5-4, which suggests most people are around the entrances and the corner in the park. Data such as the number of people in each observation point, age distributions, and people's activities are presented in Fig.5-5-5, 5-5-6, and Fig.5-5-7.

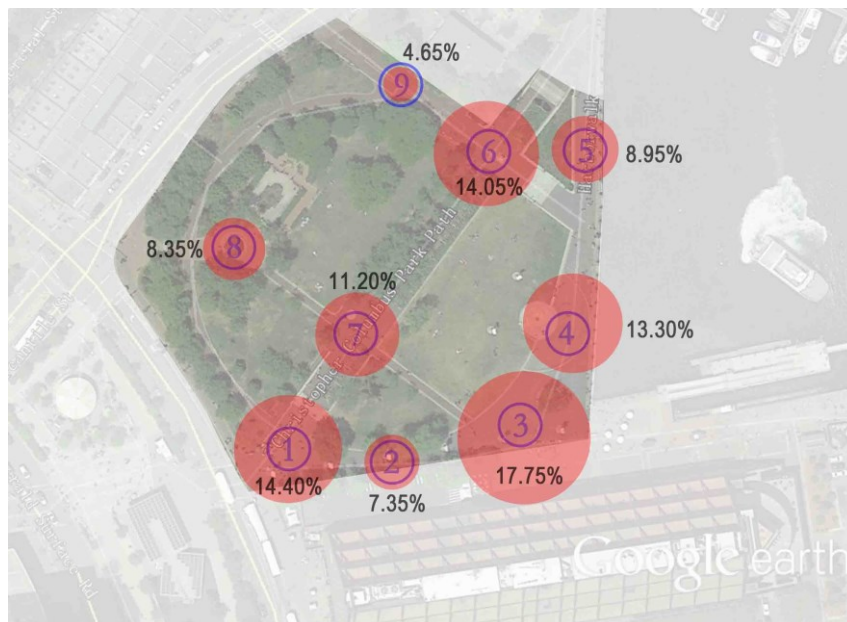


Fig.5-5-4 Distribution of People been Observed in Boston Columbus Waterfront Park

(Source: Modified based on Google Map)

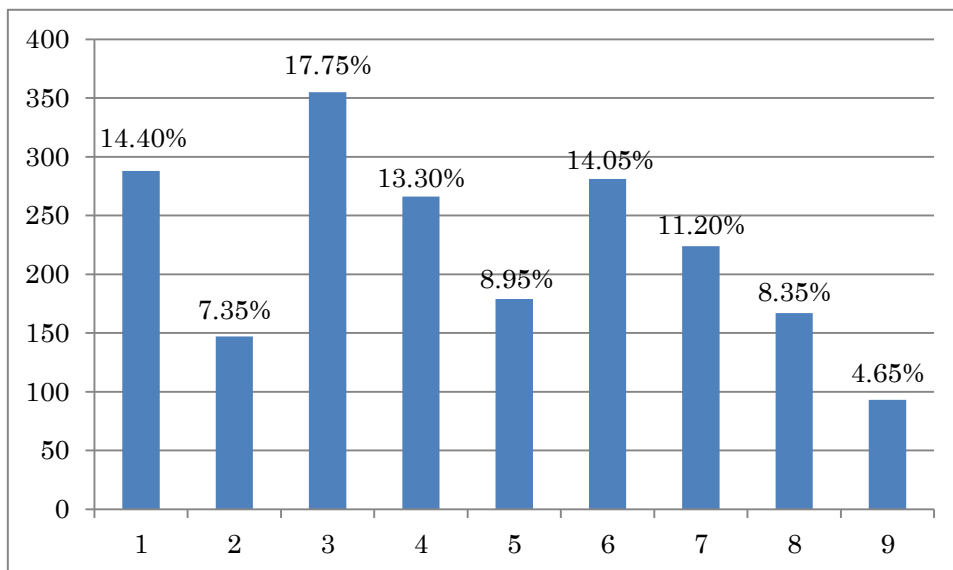


Fig.5-5-5 Number of People been Observed in Boston Columbus Waterfront Park at Each Observation Point

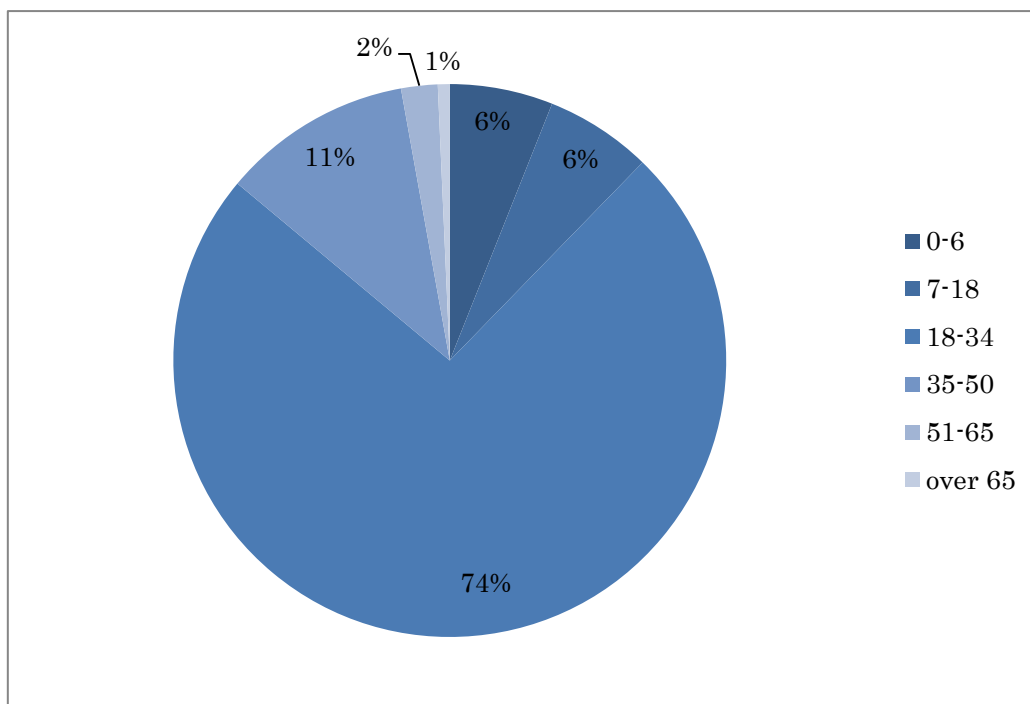


Fig.5-5-6 Columbus Waterfront Park Age Distribution

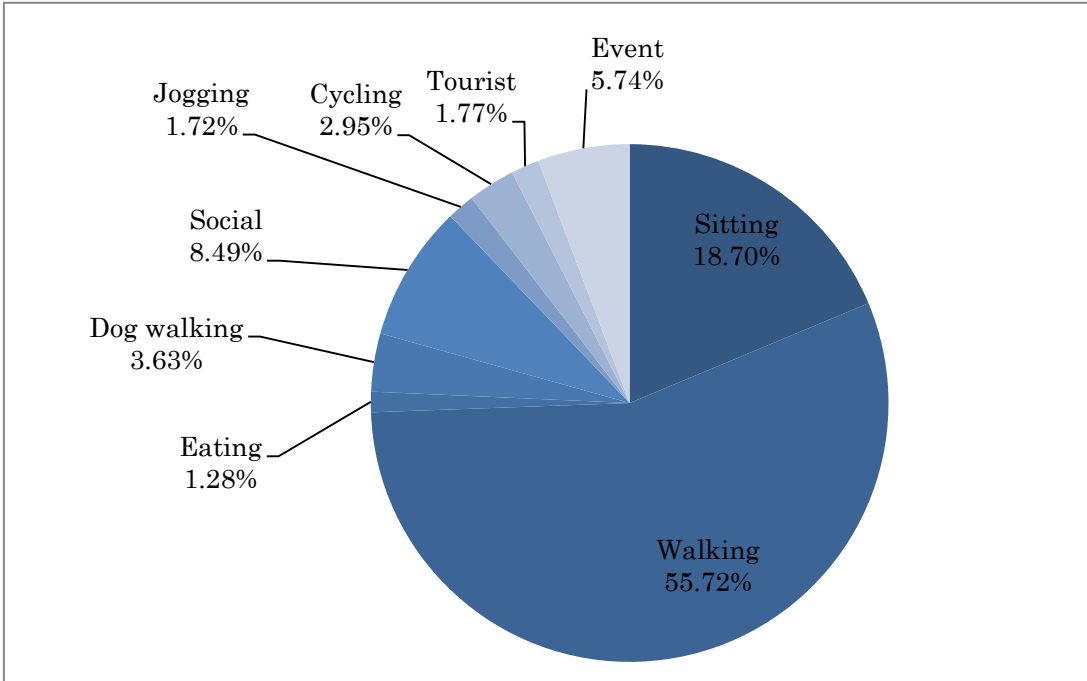


Fig.5-5-7 Water Front People's Activities

The Boston Columbus Waterfront Park is next to the ocean, has a ferry terminal and is close to commercial areas, and attracts tourists. There is only one store inside Boston Columbus Waterfront Park, and it sells T-shirts (Fig.5-5-8), so people cannot get any food or beverages inside the park. This environment makes the entrance, and two intersections have the highest number of people.

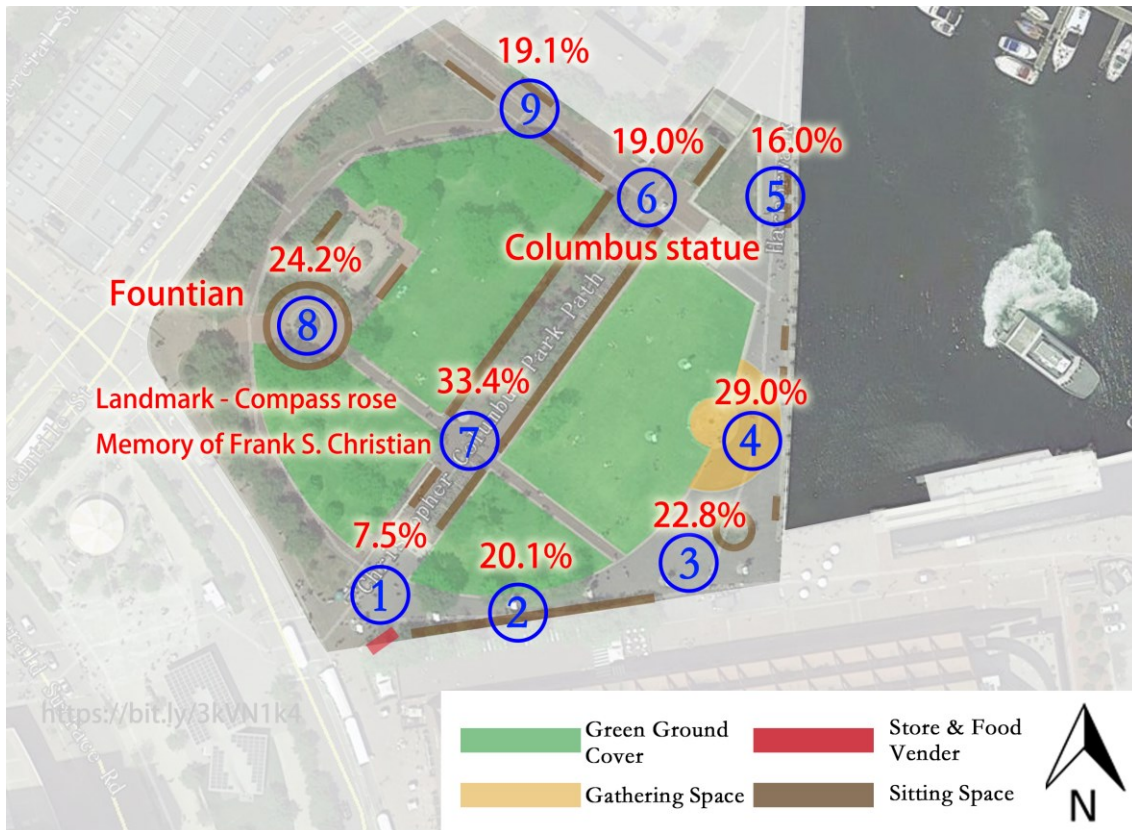


Fig.5-5-8 Percentage of People are Sitting in Water Front

(Source: Modified based on Google Map)

The percentage of people in each observation point shows in Fig. 5-5-8. Most people are sitting around observation points 4, 7, and 8. Point 4 is near the sea with a gathering space, and point 8 has a fountain in the middle with benches around. Point 7 is the intersection and center of the park with a landmark on the ground, which is the memory of Frank S. Christian, a banker in Boston who spent money to reform the Columbus Waterfront Park. With benches around, the corner effect also makes the intersection have more people sitting. Interestingly, there are not many people sitting in Point 6, where the statue of Columbus is located. During the Black Lives Matter,

the statue has been damaged. Maybe not everyone likes Christopher Columbus because of the triangular trade.

People cannot get any food inside the park. Set one or two food vendors close to the water could attract more people to the park. The benches on the south edge of the park are in front of a restaurant's outdoor eating space. Most people prefer not to have other people walk by at their back, making these benches less popular. As such, those benches could move to a place closer to water. Since the strong wind blows over the sea, people walking in the park's main corridor feel cold, especially during winter. Putting some shrubs along the walkway could reduce this wind speed.



Fig.5-5-8 The Only Store in Boston Columbus Waterfront Park

## 5.6 Chapter Conclusion

Although the change in level is not one of William H. Whyte's seven elements, it hugely affects people in open space. Level change in open public spaces seems to make the place less accessible and cuts connections between areas. Boston City Hall Plaza is an example in which a different level forms a different area. Most people use this place as a corridor to Faneuil Hall Marketplace as the stairs keep people from the sitting space under tree canopies. It is difficult to attract people into a plaza with significant elevation changes unless the designer has a good reason behind them; making the level changes a creative part of the plaza is an excellent way to solve this problem.

Food vendors in Boston are usually well organized, and they are always in the same place. More shops and food vendors in plazas close to the commercial area and public plazas should have food vendors and stores inside the place. The sitting space in plazas is designed for people to rest and enjoy their food from food vendors. Stores around the plaza can work with food vendors, attract tourists and sell local products.

There are plenty of sitting spaces. Movable tables and chairs in Boston Faneuil Hall Marketplace provide seats for people to rest and enjoy their lunch. Stone benches have also been provided around trees. People could find

their seats most of the time, and when seats are not enough, people have to sit on stairs.

Events in the United States usually show with performers in the center with people around. Most of those events in the United States are well organized or programmed by specific organizations or authorities. People in the United States also dance together, but they usually conduct these events inside buildings called “The Third Place.” The third place is a space outside of work and home and creates connections among people who live in a community (Jeffres, Bracken, Jian, & Casey 2009). As such, Americans have indoor spaces that function as a third place to conduct the group dance. Large open space in the plaza is usually used for events. As time goes by, people begin to think these spaces are only for events. When there are no events, no people use the large open spaces, so these spaces in a plaza should be designed to be multi-usage to conduct their activities and make full use of the space.

## **Chapter 6: Cases in China**

## **6.1 Regional analysis and site selection**

Chongqing is a major city in Southwest China and one of the five national central cities (the other four are Beijing, Guangzhou, Shanghai, and Tianjin) in China, and is also one of China's four direct-controlled municipalities (the other three are Beijing, Shanghai, and Tianjin). On March 14, 1997, the municipality was created as a sub-provincial city administration part of Sichuan Province (China's Provincial Level Administrative Units). The 2015 population of Chongqing was just over 30 million with an 18.38million urban population, and about 8.5 million people living in Chongqing city proper (2015 Chongqing 1% population sample survey main data bulletin, n.d.). With the high Population, Chongqing becomes the most populous Chinese municipality and the largest direct-controlled municipality in China. The history of Chongqing has served as an economic center of the upstream Yangtze basin and as a major manufacturing center and transportation hub (Fig.6-1-1).

Chongqing's center is on the eastern edge of the Sichuan Basin. The city has two rivers; the Yangtze River meets its primary tributary stream, the Jialing River in the central Chongqing, so the city is surrounded by water and located on a big syncline valley (Fig.6-1-2). Due to the surrounding water, there are 20 bridges on the Yangtze River and 28 bridges on the Jialing River, so the city is called the Chinese Capital of bridges. River ports in Chongqing work with numerous luxury cruise ships that end at Chongqing, cruising

downstream along the Yangtze River to Yichang, Wuhan, Nanjing, and even Shanghai. Also, due to the construction of the Three Gorges Dam, the port has been improved access by large cargo vessels, which makes the transport of goods along the Yangtze River possible. Raw minerals, containerized goods, and coal provide most traffic plying this section of the river (Fig.6-1-3). Several port handling facilities exist throughout the city, including many important river bank sites (Chongqing City Information, n.d.).

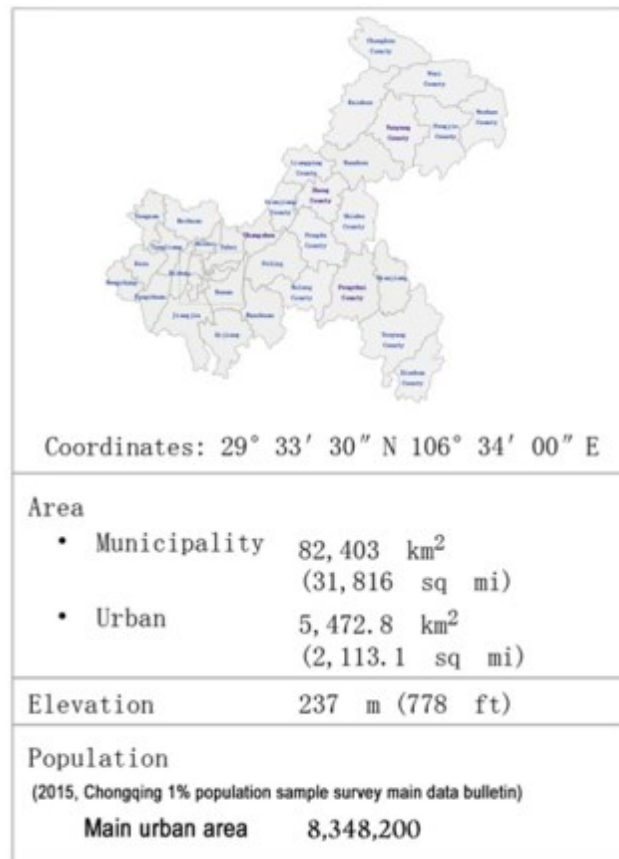


Fig.6-1-1 Chongqing Regional Data

(Source: Wikipedia)

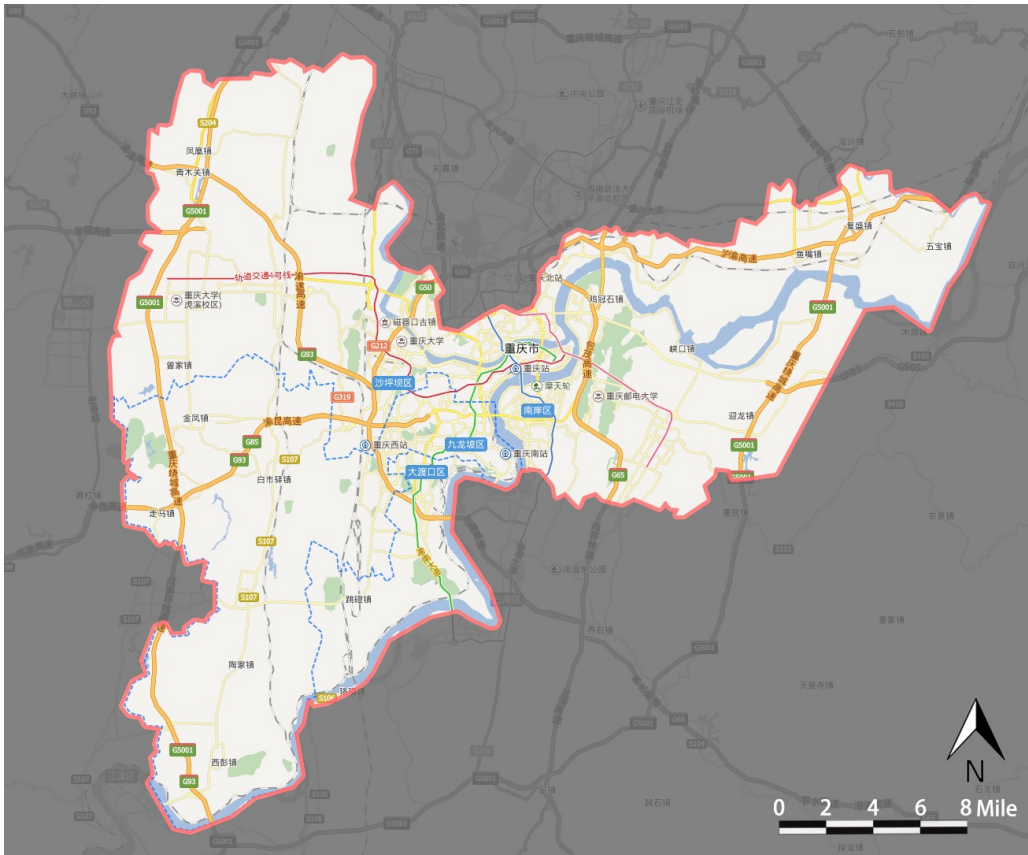


Fig.6-1-2 Main Chongqing Urban  
(Source and modified based on Baidu Map)



Fig.6-1-3 A Overview of Chongqing  
(Source: Wikimedia Commons, Author: Oliver Ren)

Chongqing's public transportation has three primary forms: CRT metro, intercity railway, and the bus system. Due to the natural landforms of the city, which have extreme hills and mountains, the road network is narrow, winding, and limited to smaller vehicles. Motorbikes, electric scooters, or bicycles are rarely found on the road. However, Chongqing is a center of manufacture for these types of vehicles. (Rough Guide to Chongqing Travel, n.d).

Three sites have been selected in Chongqing (Fig.6-1-4). They are Chongqing People's Square which is in front of Chongqing People's Auditorium. Guanyinqiao Commercial Pedestrian Streets is located in a central commercial area, and Chongqing Chaotianmen Square has a view of two rivers joined together.



Fig.6-1-4 Three Sites in Chongqing

(Source and modified based on Google Map)

## 6.2 Observation in Chongqing

The observation conducted in Chongqing is similar to the study in Boston.

One huge difference is that since China has more people and a higher density of population in the city, there are more observation points in China's sites, making the collected data more reliable and correct.

## 6.3 Chongqing People's Square

|                       |   |
|-----------------------|---|
| Name                  | Chongqing People's Square   |
| Location              | 173 Renmin Rd, Daxigou, Yuzhong District, Chongqing, China  |
| Date Designed/Planned | The Square was built in 1997, while the Great Hall was designed by architect Jiade Zhang, constructed from 1951-1954. |
| Size                  | About 30,000 m <sup>2</sup>   |
| Managed by            | Chongqing People's Auditorium Management Office   |

Chongqing People's Auditorium (重庆市人民大礼堂), which can be translated as Great Hall of the People, is behind the Chongqing People's Square and located in central Chongqing (Fig.6-3-1). The Great Hall of People was established in September 1951, completed in January 1954, and its exterior resembles the Temple of Heaven in Beijing. The Square and the Auditorium were designed by Jade Zhang, the vice chief general engineer of the China Academy of Building Research. At first, the site was surrounded by walls, and the Auditorium was only for official use. The Square, however, was built

in June 1997, the same time when Chongqing became a municipality directly under the central government. From then on, the site became a public place, and the Auditorium also holds public performance. The square is surrounded by green, and due to Chongqing's mild climate, flowers bloom all year round (Chongqing People Square, n.d.). Almost every evening, citizens self-organize hundreds of people in the square to dance and do exercise.



Fig.6-3-1 People's Square

(Source: <http://goo.gl/9Hr1Ph>)

There are some limitations of this case study, such as the site has Chongqing People's Auditorium, which works as a sightseeing spot, and the Three Gorges Museum on the other side makes the square a must-visit site for travelers. The site also has a large area of flat space for people to conduct



coverage (Fig.6-3-2). Many people would get together and hold events such as concerts and public dance.

### **6.3.2 Observation and Spatial analysis**

Because People's Square has so many more people than Boston City Hall Plaza, there are 15 observation points in total in order to cover the site.

Observation points No.1-4 are along the driveway close to the Great Hall of the People. Furthermore, many tourists like to take photos of the Great Hall along the street. No.5 is a space for a small amphitheater. No. 6 and No.12 have stores with benches under a tree canopy. No.7, No.8, No.10, and No.11 are points around the largest open space in the site where events and dances are held. No.9 is in front of the China Three Gorges Museum Chongqing. No.15 is at the second open space close to the Great Hall of the People. No.13 and No.14 are in an area with a green cover and tree canopies with benches (Fig.6-3-3). In People's Square, public dances usually will not end until 21:00, so more people in the site make these two sites are safe for people even during the evening.

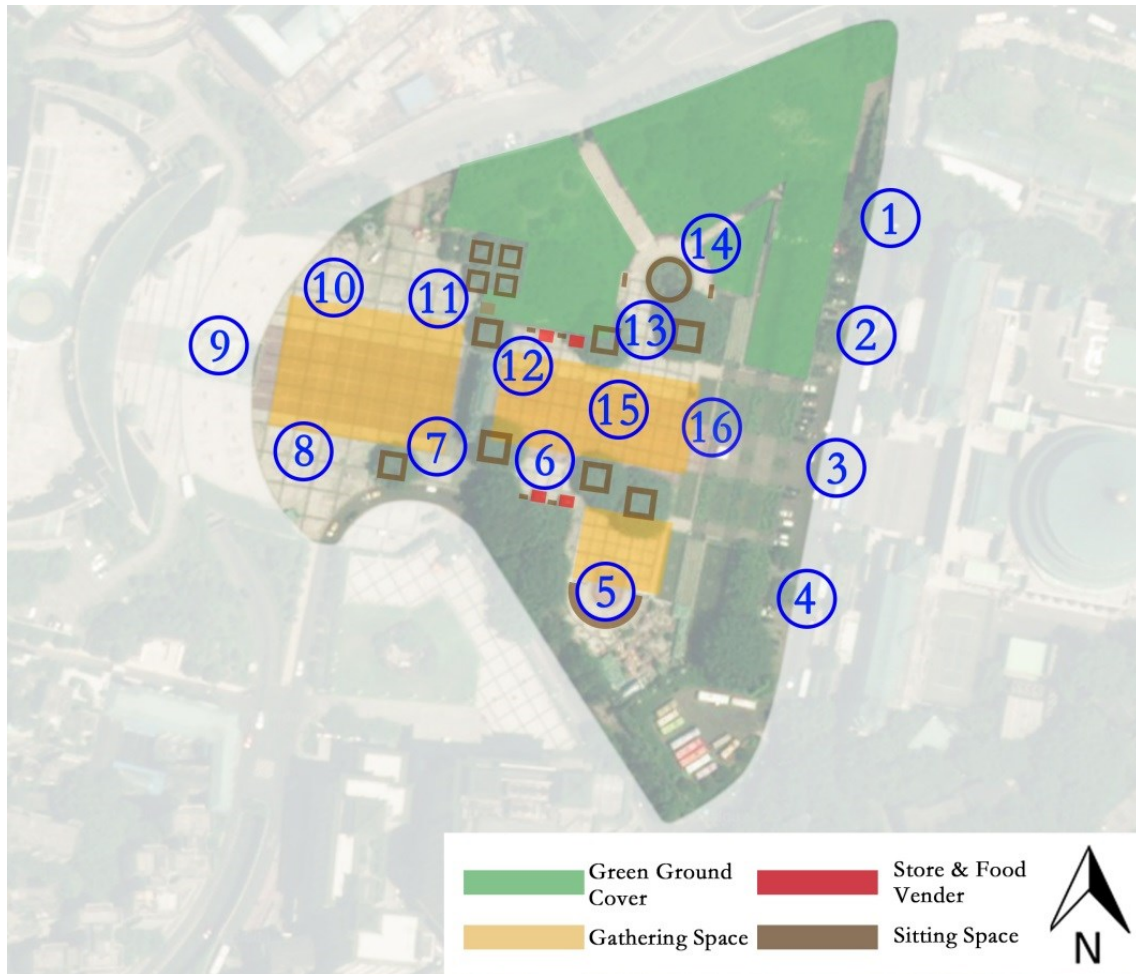


Fig.6-3-3 Chongqing People's Square Site Analysis

(Source and modified based on Google Map)

### 6.3.3 Results

Chongqing People's Square has 3726.4 people counted per day during the six time periods measured. In Chongqing People's Square, points No.13 and No.14 are near trees (Fig.6-3-3), and people preferred to stay and conduct other activities under the tree canopy (Fig.6-3-10). Other data such as the number of people observed and people's activities are presented in Fig.6-3-4, Fig.6-3-5, and people's distributing in the site also reflected in Fig.6-3-6.

People in Chongqing People’s Square hold their events every day, such as sword dance or tai chi in the morning and dance together after the sunset (Fig.6-3-9).

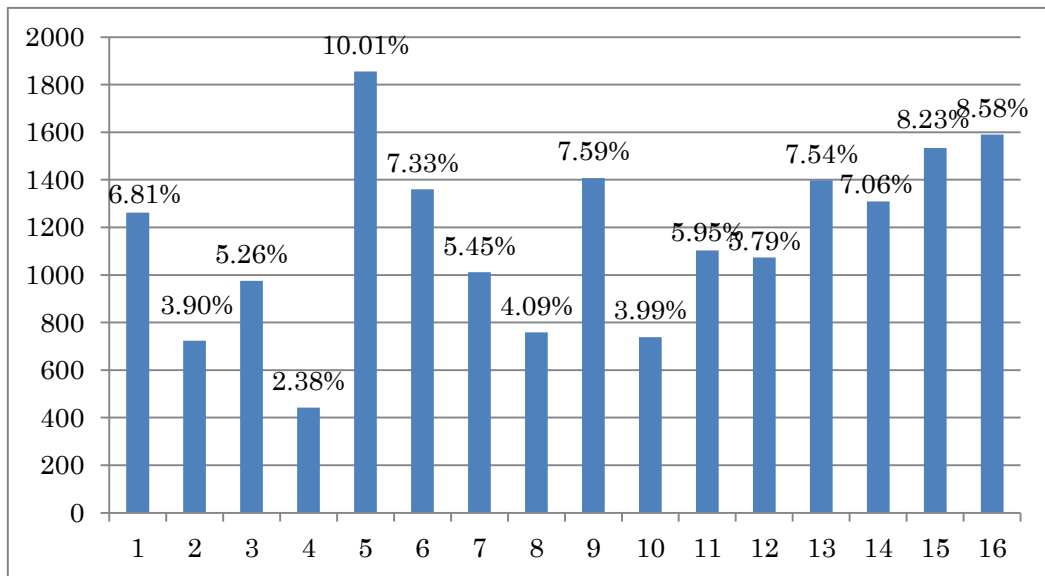


Fig.6-3-4 Number of People been Observed in People’s Square at Each Observation Point

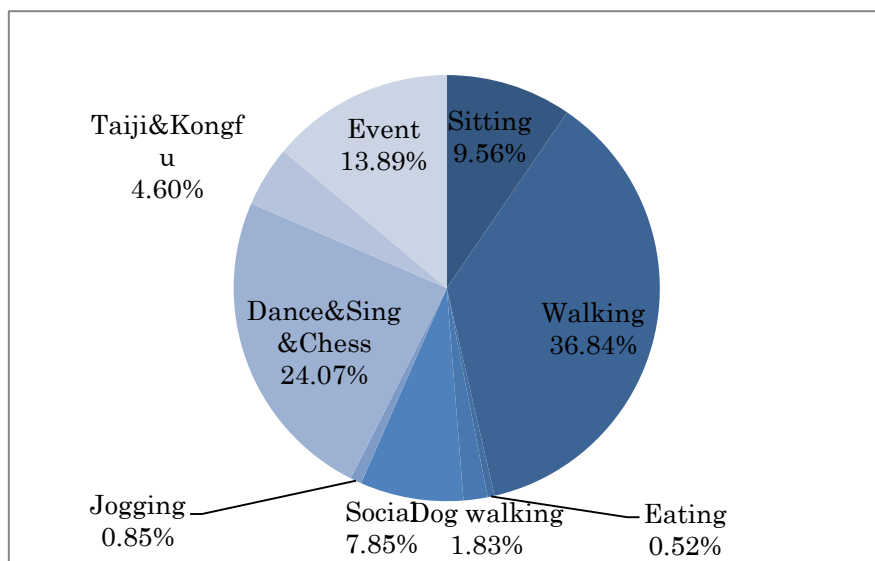


Fig.6-3-5 People’s Activities in People’s Square

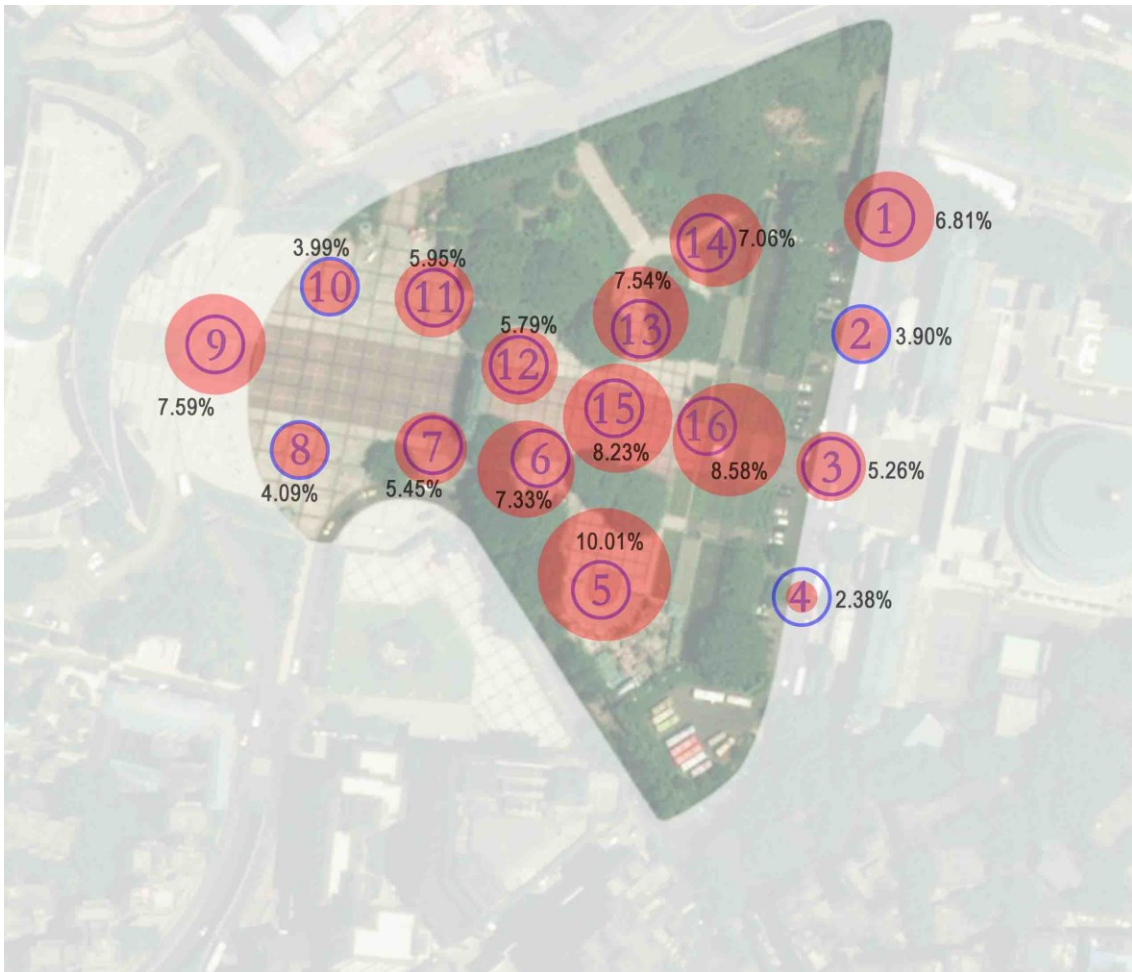


Fig.6-3-6 Distribution of People been Observed in People’s Square  
 (Source and modified based on Google Map)

Table 6-3-1. Data Collected in Chongqing People's Square

| Observation Point | Gender |       | Age  |      |       |       |       | Activities |      |      |           |     |              |     |            |               |                |
|-------------------|--------|-------|------|------|-------|-------|-------|------------|------|------|-----------|-----|--------------|-----|------------|---------------|----------------|
|                   | Man    | Woman | 0-6  | 7-18 | 18-34 | 35-50 | 51-65 | over 65    | Sit  | Walk | Eat/Drink | Jog | Stand/Social | Jog | Dance/Sing | Taichi/Kongfu | Tourists/Other |
|                   |        |       |      |      |       |       |       |            |      |      |           |     |              |     |            |               |                |
| 1                 | 593    | 669   | 66   | 38   | 330   | 400   | 288   | 148        | 97   | 910  | 65        | 36  | 57           | 0   | 0          | 0             | 90             |
| 2                 | 353    | 370   | 18   | 5    | 227   | 219   | 180   | 85         | 0    | 554  | 8         | 15  | 62           | 0   | 0          | 0             | 75             |
| 3                 | 521    | 454   | 33   | 17   | 239   | 249   | 291   | 147        | 30   | 275  | 2         | 4   | 65           | 0   | 0          | 61            | 538            |
| 4                 | 219    | 223   | 26   | 4    | 115   | 110   | 128   | 59         | 7    | 334  | 1         | 33  | 33           | 0   | 0          | 0             | 34             |
| 5                 | 895    | 961   | 324  | 64   | 267   | 404   | 479   | 318        | 333  | 257  | 0         | 2   | 140          | 32  | 1019       | 80            | 5              |
| 6                 | 568    | 792   | 94   | 31   | 126   | 239   | 532   | 344        | 137  | 622  | 0         | 33  | 107          | 0   | 369        | 0             | 92             |
| 7                 | 424    | 587   | 89   | 52   | 189   | 201   | 315   | 165        | 113  | 386  | 8         | 18  | 94           | 16  | 248        | 19            | 86             |
| 8                 | 365    | 394   | 100  | 58   | 119   | 154   | 165   | 163        | 56   | 279  | 3         | 15  | 55           | 6   | 28         | 230           | 82             |
| 9                 | 728    | 680   | 65   | 167  | 319   | 372   | 353   | 132        | 109  | 224  | 0         | 1   | 111          | 14  | 90         | 26            | 113            |
| 10                | 389    | 350   | 39   | 18   | 174   | 184   | 224   | 100        | 9    | 381  | 0         | 24  | 42           | 28  | 55         | 44            | 0              |
| 11                | 585    | 518   | 22   | 0    | 50    | 180   | 506   | 345        | 151  | 182  | 1         | 13  | 90           | 2   | 560        | 99            | 4              |
| 12                | 447    | 626   | 59   | 113  | 143   | 227   | 383   | 150        | 45   | 279  | 0         | 19  | 83           | 15  | 295        | 22            | 233            |
| 13                | 630    | 768   | 156  | 31   | 163   | 283   | 490   | 273        | 192  | 775  | 2         | 37  | 95           | 22  | 120        | 35            | 120            |
| 14                | 585    | 724   | 88   | 41   | 100   | 221   | 513   | 347        | 290  | 344  | 1         | 32  | 97           | 13  | 419        | 12            | 101            |
| 15                | 658    | 876   | 121  | 21   | 304   | 286   | 508   | 295        | 3    | 328  | 0         | 19  | 110          | 0   | 534        | 66            | 458            |
| 16                | 636    | 955   | 167  | 14   | 238   | 308   | 548   | 316        | 94   | 279  | 0         | 17  | 124          | 0   | 572        | 129           | 458            |
| 17                | 24     | 58    | 9    | 5    | 18    | 8     | 27    | 15         | 0    | 0    | 0         | 0   | 0            | 0   | 0          | 0             | 0              |
| Total             | 8620   | 10005 | 1476 | 679  | 3121  | 4045  | 5925  | 3402       | 1666 | 6409 | 91        | 318 | 1365         | 148 | 4309       | 823           | 2489           |

In Chongqing People's Square, activities that are considered triangulation have been observed from No.5 to No.16 (Table 6-3-1). The most popular place is No.4, which is close to the Great Hall of the People. Since People's Square is a famous sightseeing place, there are many tourists at No.3 to get photos with the front face of the structure. Other popular places are No.11, 15, and 16, No. 15 and No.16 are in two places that the centerline of the place with a good view of the Great Hall, and No. 11 is very close to sitting space which provides a place for people to rest after they finished their activities. Other popular areas such as No.14 are a little deep inside the site with low bushes surrounded and some sitting space where people usually sing and play traditional instruments. People prefer to practice Taichi and Kongfu around No.8, a large flat area suitable for some urban sports.

Tourists always like to visit special places with unique structures. Chongqing People's Square has the aesthetically pleasing China Three Gorges Museum in the front and Chongqing People's Auditorium in the back (Fig.6-3-7). Many foreign tourists also come to visit the site (Fig.6-3-11). These two facilities might explain that the place has so many visitors; people love the buildings and structures around Chongqing People's Square, even the stores are built in the traditional Chinese style (Fig.6-3-8).



Fig.6-3-7 Chongqing People's Auditorium



Fig.6-3-8 Chinese Traditional Building Style Store in Chongqing People's  
Square



Fig.6-3-9 People Dancing in Chongqing People's Square



Fig.6-3-10 People Playing Traditional Instruments in Chongqing People's  
Square



Fig.6-3-11 Foreign Tourists in Chongqing People's Square

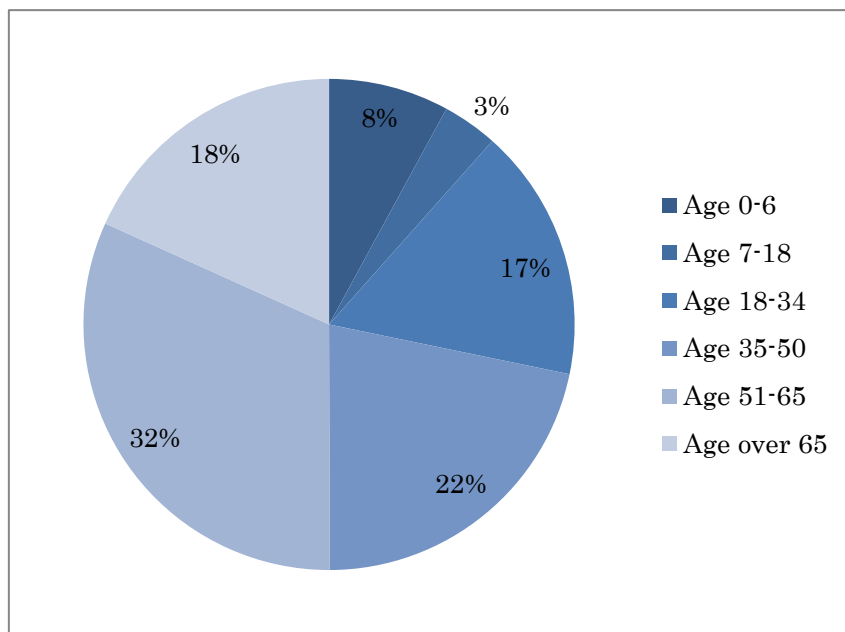


Fig.6-3-12 Chongqing People's Square Age Distribution

Almost half of the people in Chongqing People's Square are over 50 (Fig.6-3-12). Most of them are retired, so they have plenty of time to enjoy their life. Moreover, the elder may care more about their health and have many kinds of exercise in China, many of which are outdoor activities.

Because of the number of people, though, the available sitting space never seems to meet the need. Many people sit on the tree planting bed, and some sit on the concrete post, which prevents vehicles from entering. Adding more sitting spaces, especially around the subway entrance, could be an improvement.

## 6.4 Guanyinqiao Commercial Pedestrian Streets

|                       |   |
|-----------------------|---|
| Name                  | Guanyinqiao Commercial Pedestrian Streets   |
| Location              | Guan Yin Qiao Shang Quan, Jiangbei Qu, Chongqing Shi, China                                     |
| Date Designed/Planned | The commercial area start construction in 2003  |
| Size                  | 2,000,000 m <sup>2</sup> for pedestrian street, 30,000 m <sup>2</sup> for commercial buildings. |
| Managed by            | Jiangbei Kwan-yin Bridge Shangquan Management Office  |

Guanyinqiao Commercial Pedestrian Street is in the Jiangbei District. Construction work in April 2003 by Longfor(龙湖) Real Estate, and it is the only business district with a city park in Chongqing. The place was a commercial area and had a big mall and old residential buildings around. To build the new commercial center in Jiangbei District, the government

demolished hundreds of old buildings and built several huge malls along the street (Fig.6-4-1). The commercial area consists of Jialing City Park, Guanyingqiao Plaza, and Guanyingqiao Commercial Pedestrian Street. The resulting area is intended to combine natural beauty, tourism, shopping, and entertainment. The pedestrian street and food stores provide seating space that allows around 2000 people to sit and enjoy their food (Guanyinqiao Commercial Pedestrian Streets, n.d.).



Fig.6-4-1 Guanyingqiao Commercial Pedestrian Streets

(Source: <http://goo.gl/i9PIF2>)

Limitations for this site could be the number of shopping malls around. More malls are around the pedestrian street, compared to two commercial sites selected in Tokyo and Boston. Moreover, the site also has a large flat space

for people to conduct events and activities. The observation date selection also preferred days that with comfortable weather without rain.



Fig.6-4-2 Guanyinqiao Commercial Pedestrian Streets Neighborhood

### Analysis

(Source and modified based on Google Map)

#### 6.4.1 Neighborhood analysis

The site is a commercial Pedestrian Street. The subway/LRT (Light Rail Transit) entrance is on the site, so most people access it by the subway.

Stores and restaurants all along the pedestrian streets and sitting space are provided under the tree canopy, and food stores also provide food for people along the street. However, the Pedestrian Streets have one huge pedestrian street in the middle, and those mall buildings are along the street (Fig.6-4-2).

#### **6.4.2 Observation and Spatial analysis**

Guanyinqiao Commercial Pedestrian Streets have seven observation points. No.1 is one of the main entrances to the pedestrian street. No.2 is an open space for events and dancing here. No.3 is an intersection, and the city park entrance is in the west, and another entrance to the pedestrian street in the east. No.4 and No.5 are in the center of the pedestrian street, with stores, food vendors, and sitting space running along the street. The subway station entrance is in the middle of No.6 and No.7, and people will dance with swords there though space not that wide. People can sit on the tree planters in No.6 and No.7, and several stores also provide food and drinks. Public dances also happen in Guanyinqiao Commercial Pedestrian Streets almost every day, but sometimes official events are held on the stage near the north entrance of the street (Fig.6-4-3).



Fig.6-4-3 Guanyinqiao Commercial Pedestrian Streets Site Analysis

(Source and modified based on Google Map)

### 6.4.3 Results

Primarily data that shows people's distribution in the site (Fig.6-4-4), number of people observed in each point (Fig.6-4-5), people's activities (Fig.6-4-6), and aged distributions (Fig.6-4-7).

Commercial areas hold events to attract people to come so that people will shop in their stores. Most of the events in these two sites are scheduled and

programmed, but some are not; on commercial streets in Guanyinqiao, people will organize and hold events themselves. The Pedestrian Streets have open spaces for people, but there are no moveable tables and chairs.



Fig.6-4-4 Distribution of People been Observed in Guanyinqiao Pedestrian Streets

(Source and modified based on Google Map)

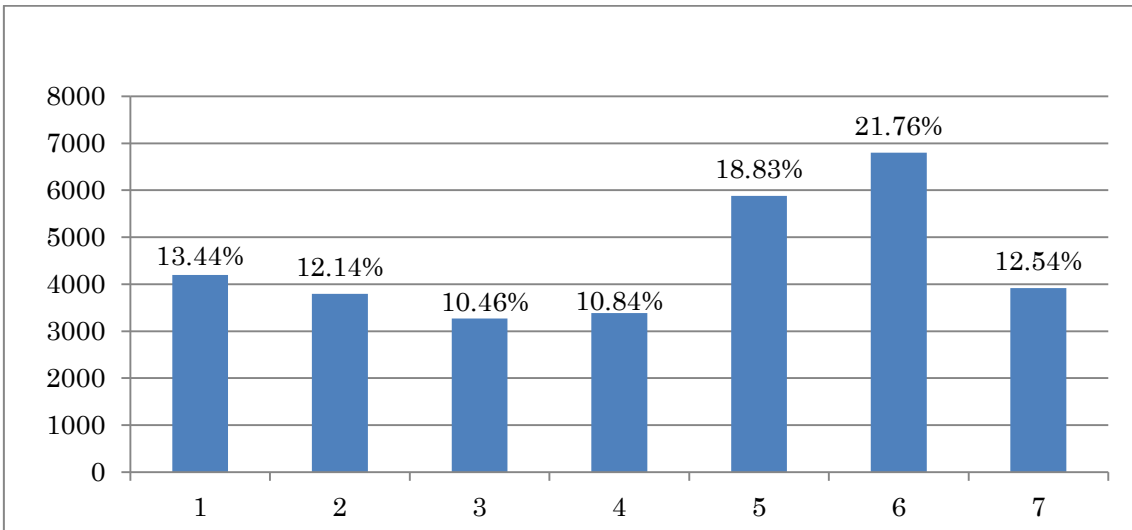


Fig.6-4-5 Number of People been Observed in Guanyingqiao Pedestrian Streets at Every Observation Point

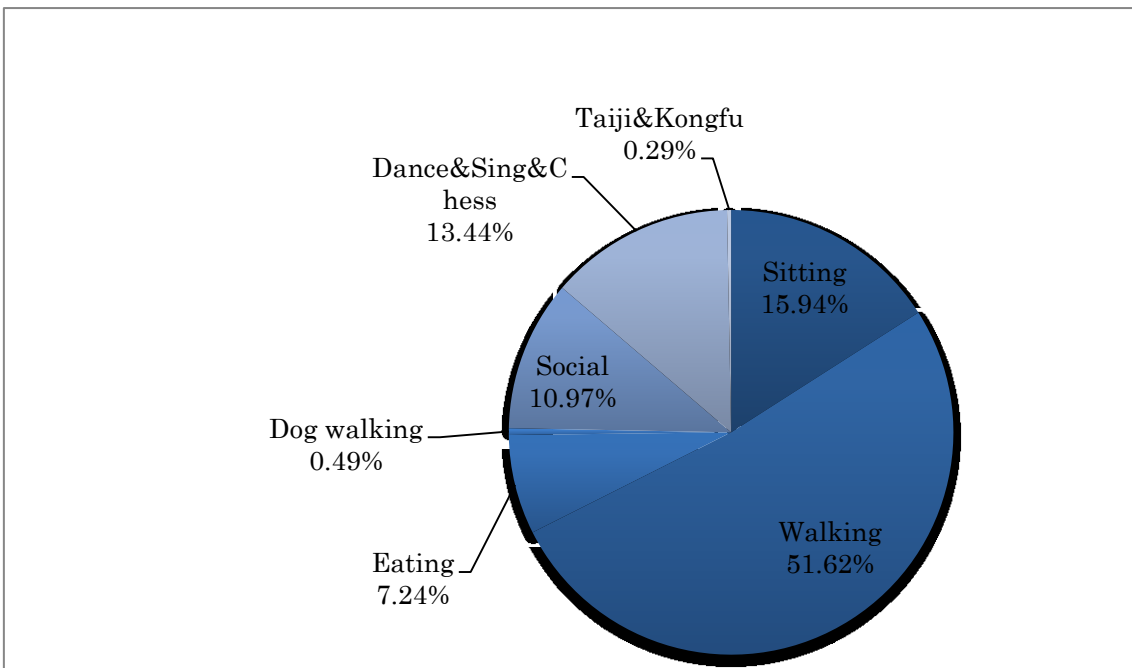


Fig.6-4-6 People's Activities in Guanyingqiao Pedestrian Streets

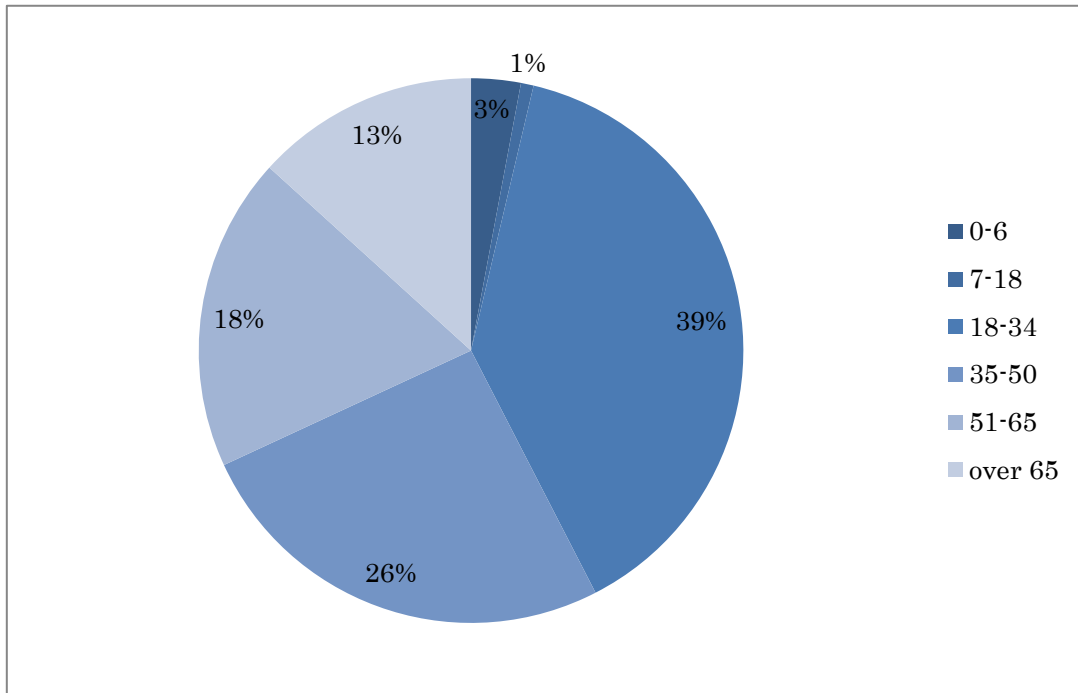


Fig.6-4-7 Age Distribution in Guanyingqiao Pedestrian Streets



Fig.6-4-8 High Buildings with Glass Walls in Guanyingqiao Commercial Pedestrian Streets

There are many tall buildings on both sides of the street. Small stores are outside with seating areas, and malls are inside tall building (Fig.6-4-8). Tall structures can block out the sunlight, but the temperature in Chongqing, especially during the summer, can easily reach 40 °C (104 °F). High buildings can create shadows, and the glass wall outside the building also reflects some light into the street, which is then filtered by trees, lowering the temperature of the sitting space.

More data are presented in Table 6-4-1, and more observation points are mapped in Fig. 6-4-9. The result shows that the number of people who conducted activities that considered triangulations has been observed is 9907, the highest triangulation in Chongqing's three sites.

Table 6-4-1 Data collected in Chongqing Guanyinqiao

| Observation Point | Gender |       | Age  |      |       |       |       | Activities |       |       |           |          |              |     |            |               |                  |
|-------------------|--------|-------|------|------|-------|-------|-------|------------|-------|-------|-----------|----------|--------------|-----|------------|---------------|------------------|
|                   | Man    | Woman | 0-6  | 7-18 | 18-34 | 35-50 | 51-65 | over 65    | Sit   | Walk  | Eat/Drink | Walk Dog | Stand/Social | Jog | Dance/Sing | Taichi/Kongfu | Other Activities |
|                   |        |       |      |      |       |       |       |            |       |       |           |          |              |     |            |               |                  |
| 1                 | 1191   | 1615  | 92   | 45   | 1365  | 743   | 398   | 163        | 119   | 2229  | 161       | 0        | 297          | 0   | 0          | 0             | 0                |
| 2                 | 1442   | 1813  | 133  | 57   | 1413  | 911   | 496   | 244        | 833   | 1639  | 162       | 14       | 413          | 0   | 0          | 0             | 185              |
| 3                 | 1234   | 1350  | 86   | 37   | 1171  | 758   | 378   | 154        | 215   | 1744  | 182       | 7        | 407          | 0   | 0          | 0             | 0                |
| 4                 | 1095   | 1404  | 78   | 34   | 1240  | 661   | 330   | 156        | 213   | 1366  | 162       | 7        | 368          | 0   | 0          | 57            | 326              |
| 5                 | 1377   | 1626  | 116  | 35   | 1317  | 840   | 473   | 222        | 349   | 1540  | 299       | 0        | 376          | 0   | 0          | 0             | 439              |
| 6                 | 1010   | 1440  | 72   | 43   | 1140  | 724   | 333   | 138        | 629   | 1313  | 123       | 33       | 333          | 0   | 0          | 0             | 19               |
| 7                 | 751    | 1582  | 81   | 22   | 1246  | 634   | 275   | 75         | 250   | 559   | 1091      | 0        | 197          | 0   | 0          | 0             | 236              |
| 8                 | 1795   | 2404  | 84   | 33   | 2045  | 1127  | 599   | 311        | 270   | 3039  | 525       | 0        | 365          | 0   | 0          | 0             | 0                |
| 9                 | 1573   | 2220  | 97   | 27   | 1426  | 971   | 756   | 516        | 799   | 1523  | 234       | 21       | 414          | 0   | 768        | 30            | 41               |
| 10                | 1298   | 1970  | 129  | 12   | 1044  | 785   | 737   | 561        | 235   | 1123  | 19        | 21       | 359          | 0   | 1138       | 24            | 308              |
| 11                | 1497   | 1889  | 98   | 19   | 1601  | 910   | 499   | 259        | 247   | 2526  | 252       | 5        | 332          | 0   | 24         | 0             | 0                |
| 12                | 2530   | 3353  | 191  | 43   | 2338  | 1526  | 996   | 789        | 1355  | 2305  | 546       | 12       | 600          | 0   | 1020       | 0             | 0                |
| 13                | 3127   | 3673  | 229  | 65   | 2189  | 1554  | 1484  | 1279       | 1686  | 2231  | 546       | 47       | 914          | 0   | 1174       | 36            | 130              |
| 14                | 1850   | 2068  | 91   | 36   | 1464  | 1144  | 751   | 432        | 300   | 3093  | 99        | 44       | 382          | 0   | 0          | 0             | 0                |
| 15                | 750    | 969   | 25   | 7    | 650   | 563   | 344   | 130        | 77    | 1392  | 85        | 7        | 158          | 0   | 0          | 0             | 7                |
| 16                | 1321   | 1576  | 86   | 20   | 1087  | 776   | 590   | 338        | 505   | 1387  | 48        | 49       | 332          | 0   | 432        | 0             | 124              |
| 17                | 1752   | 2064  | 99   | 7    | 582   | 527   | 1179  | 1423       | 456   | 642   | 14        | 68       | 483          | 0   | 2134       | 14            | 22               |
| 18                | 2807   | 1682  | 123  | 16   | 622   | 683   | 1373  | 1672       | 365   | 897   | 62        | 114      | 875          | 80  | 2001       | 77            | 64               |
| 19                | 1670   | 1713  | 181  | 20   | 986   | 748   | 834   | 614        | 761   | 1531  | 14        | 118      | 530          | 12  | 122        | 342           | 0                |
| 20                | 1771   | 2000  | 190  | 24   | 1387  | 978   | 783   | 411        | 982   | 1526  | 125       | 4        | 557          | 0   | 514        | 0             | 66               |
| Total             | 31841  | 38411 | 2281 | 602  | 26313 | 17563 | 13608 | 9887       | 10646 | 33605 | 4749      | 571      | 8692         | 92  | 9327       | 580           | 1967             |

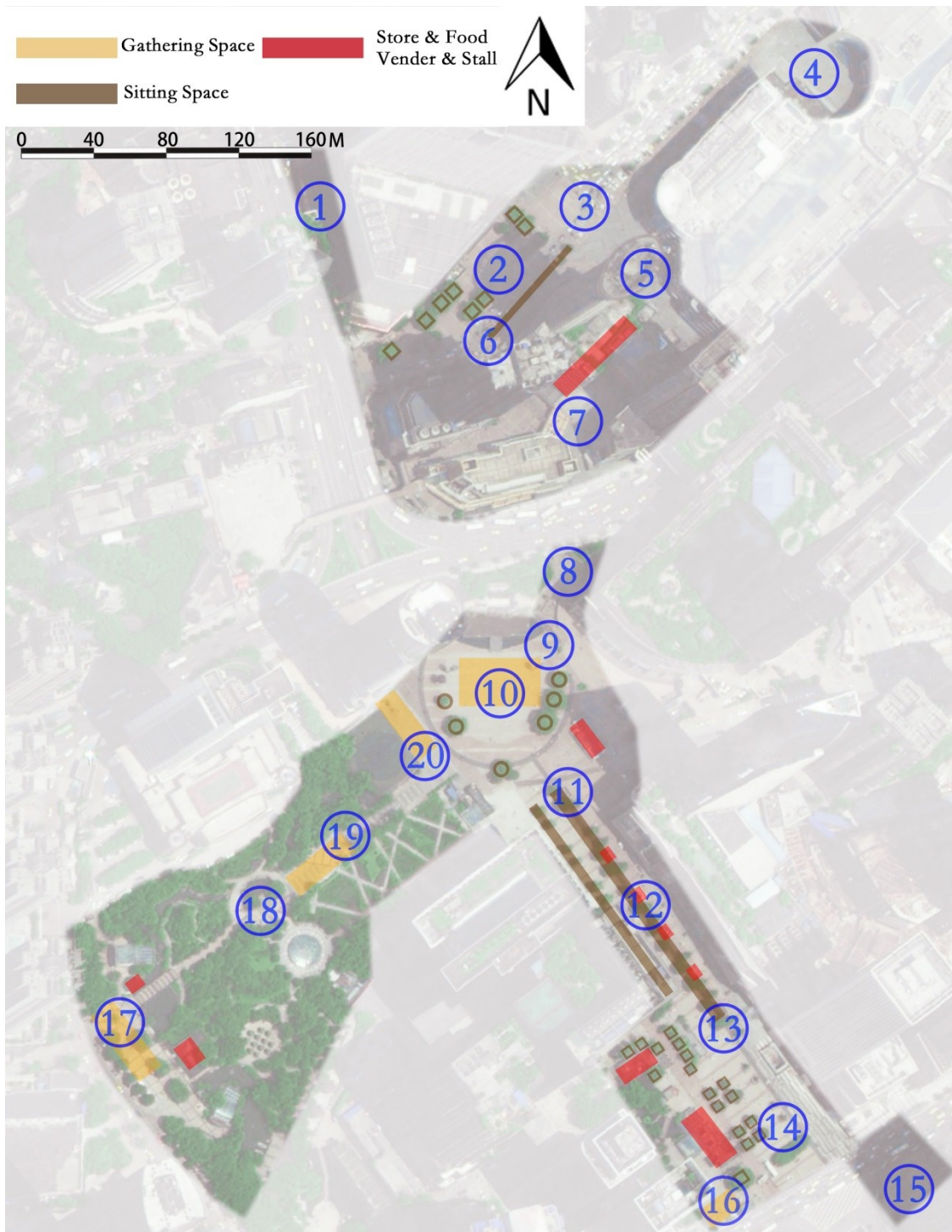


Fig. 6-4-9 Observation Points in Chongqing Guanyinqiao  
 (Source and modified based on Baidu Map)

Places that are popular for square dance and sing are No.10, 12, 13, 16, and No.18. Since the north part of Pedestrian Street entrance is next to No.8, place around No.9 also have some people dance, but the number is less than other area mentioned before. Next to No.10 is a flat square with sitting space, which also works as a gathering space for several entrances. No.12 and No.13 are two places close to food stores on the street with sitting space. No.11 is a place that works as the entrance to the street, which has few people who choose to perform a square dance or other activities. The most popular areas are around No.17 and No.18, located in the park connected to the commercial street. No. 18 is the park's center, and No.17 is the park entrance on the west side with flat square spaces and two food stores around. Sitting space could be found in the park, but they are short benches and not enough, so people would bring their plastic chairs to create sitting space (Fig. 6-4-10).

Based on the data, more than half of the people been observed are over 35, and most of them participated in the square dance, sing, Taichi. Many of them are retired with much free time, and they come to urban public spaces to exercise, play instruments, and sing. The data with dance/sing have been selected to conduct regression analysis to find out dance/sing's relationship between gender and age (Table 6-4-2).



Fig. 6-4-10 Dance at the Entrance of the Park

Table 6-4-2 Regression analysis of Dance/Sing in Guanyinqiao

|        | Model   | Unstandardized Coefficients |            | Standardized Coefficients | t       | Sig.   | R      | R Square |
|--------|---------|-----------------------------|------------|---------------------------|---------|--------|--------|----------|
|        |         | B                           | Std. Error | Beta                      |         |        |        |          |
| Gender | Man     | 0.8084                      | 0.0874     | 0.6616                    | 9.2533  | 0.0000 | 0.6615 | 0.4376   |
|        | Woman   | 0.8535                      | 0.0596     | 0.8066                    | 14.3125 | 0.0000 | 0.8066 | 0.6506   |
| Age    | 0-6     | 4.9840                      | 1.5450     | 0.3530                    | 3.2260  | 0.0020 | 0.3533 | 0.1250   |
|        | 7-18    | 6.8650                      | 3.7600     | 0.2650                    | 1.8257  | 0.0750 | 0.2654 | 0.0704   |
|        | 19-34   | 0.7744                      | 0.1609     | 0.4171                    | 4.8128  | 0.0000 | 0.4171 | 0.1739   |
|        | 35-50   | 1.7158                      | 0.1926     | 0.6475                    | 8.9106  | 0.0000 | 0.6475 | 0.4192   |
|        | 51-65   | 1.4858                      | 0.1202     | 0.7626                    | 12.3642 | 0.0000 | 0.7626 | 0.5815   |
|        | Over 50 | 0.7419                      | 0.0585     | 0.7708                    | 12.6914 | 0.0000 | 0.7708 | 0.5942   |
|        | Over 65 | 1.0172                      | 0.1148     | 0.6454                    | 8.8619  | 0.0000 | 0.6454 | 0.4166   |

The result shows that except age range from 7-18, the regression is significant. The regression for gender pointed out that the R is 0.6615, and

for women, R is 0.8066, which means the woman's data matches the model more (Fig. 6-4-11). The regression for age shows that age over 50 best matches the regression model with an R of 0.7708 (Table 6-4-2).

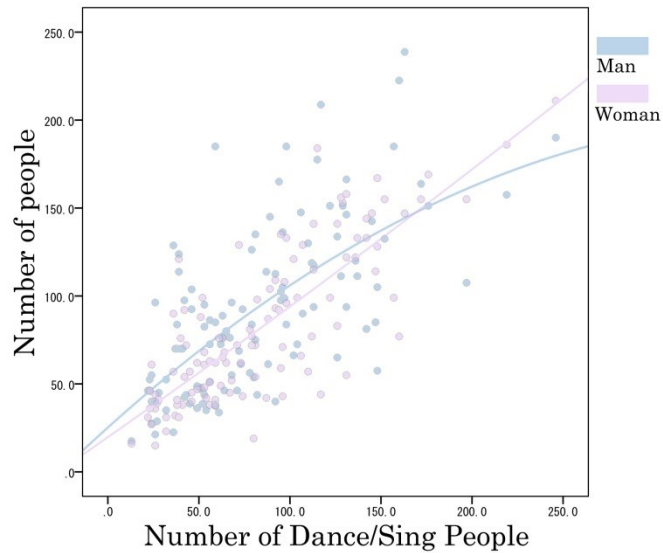


Fig. 6-4-11 Regression of Number of people and Dance/Sing  
(Gender, Quadratic)

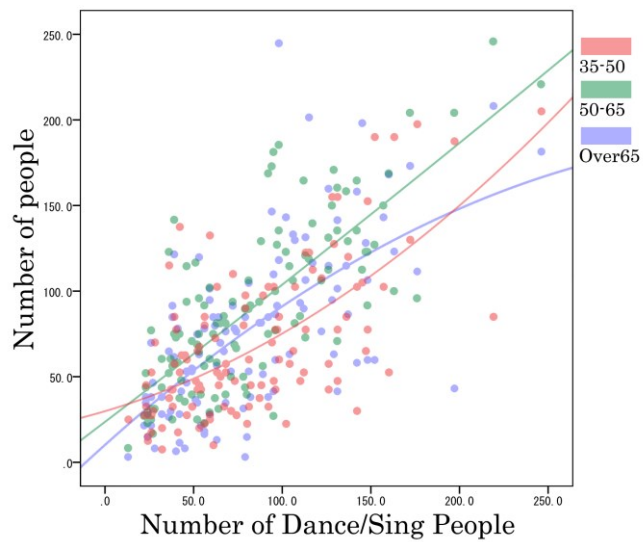


Fig. 6-4-12 Regression of Number of people and Dance/Sing  
(Age, Quadratic)

Guanyinqiao Commercial Pedestrian Streets is a thriving commercial area that is always crowded. As a result, the sitting spaces are always full of people, especially around the subway station entrance. One improvement could be a greater tree canopy size. Since the site was constructed less than 15 years ago, the tree canopy is still growing and will create more shadows.

## 6.5 Chaotianmen Square

|                       |  |
|-----------------------|--|
| Name                  | Chongqing Chaotianmen Square   |
| Location              | Changjiang Binjiang Rd, Chao Tian Men, Yuzhong District, Chongqing, China  |
| Date Designed/Planned | In 189, Chaotianmen become Chongqing's customs, and the square was built in 1998, one of the largest roofed squares in China |
| Size                  | About 150,000 m <sup>2</sup>   |
| Managed by            | Yuzhong People's Government Chaotianmen Square Comprehensive Management Office   |

Chaotianmen Square is in the Yuzhong District, where Yangtze River meets its tributary Jialing River. Around 314 BC, Ba County's city gate was located in Chaotianmen, which was later transformed into a wharf and extended in 1927. The Square, which Yazhi He commissioned, was constructed in 1998 (Tu, 2016). The site becomes a scenic spot because there is only a 5 minutes ride from the most prominent CBD (Central Business District). It is also where the two rivers meet, carrying different amounts of sand, which creates a line on the water surface (Fig.6-5-1).

Unlike waterfront parks in Tokyo and Boston, Chaotianmen Square is at the influx of two rivers. The space also has a large area of flat space for people to conduct activities, and people would have many kinds of activities other than public dance. There are limited numbers of stores around the site, leading to many food stalls and stalls selling local souvenirs around the site. Then the data collection work is also conducted on days that have comfortable weather without rain.



Fig.6-5-1 Chaotianmen Square

(Source: <http://goo.gl/d4WnaD>)



Fig.6-5-2 Chongqing Chaotianmen Square Neighborhood Analysis

(Source and modified based on Google Map)

### 6.5.1 Neighborhood analysis

Chaotianmen Square is close to the water, with a ferry terminal nearby. Many stores are on the west side, and several restaurants and food stalls are around the place. However, most people access Chaotianmen Square by bus, and tourists, especially foreigners, come from the ferry terminal in the north (Fig.6-5-2). One interesting thing is that Chaotianmen Square has far more “stores.” They are “pop-up” stalls or street vendors, so their number is affected by weather and the time of year. Similarly, more food vendors will appear during the morning, lunchtime, and dinner time. It is hard to count

them because they change every day, but they play a vital part around and in the space.

### **6.5.2 Observation and Spatial analysis**

Though Chongqing Chaotianmen Square also has public dances, the number of people who dance is much less than the other two sites in Chongqing. The space is entirely open in the middle, so the sight view is good, and the lighting is also bright enough. There is also a small police station at the square entrance, designed for the square and ferry terminal with the driveway.

Chongqing Chaotianmen Square has 20 observation points. No.1-3 are entrance areas with stores. No.4-10 is a driveway with many stalls where tourists leave the ship, and some performers also play the guitar or traditional instruments here. No.11 and No.12 are a one-floor level lower than the square, and No.11 is the best position to appreciate the spot where the two rivers meet. No.3, No.14, No.17, and No.18 are points on the walkway around the green space, and there are some food vendors at No.13 and No.4 points. No.15, No.16, and No.20 are open spaces where events and dances happen. No.15 is in the center of the entrance with a stone tablet with the history of Chaotianmeng inscribed on it (Fig.6-5-3).

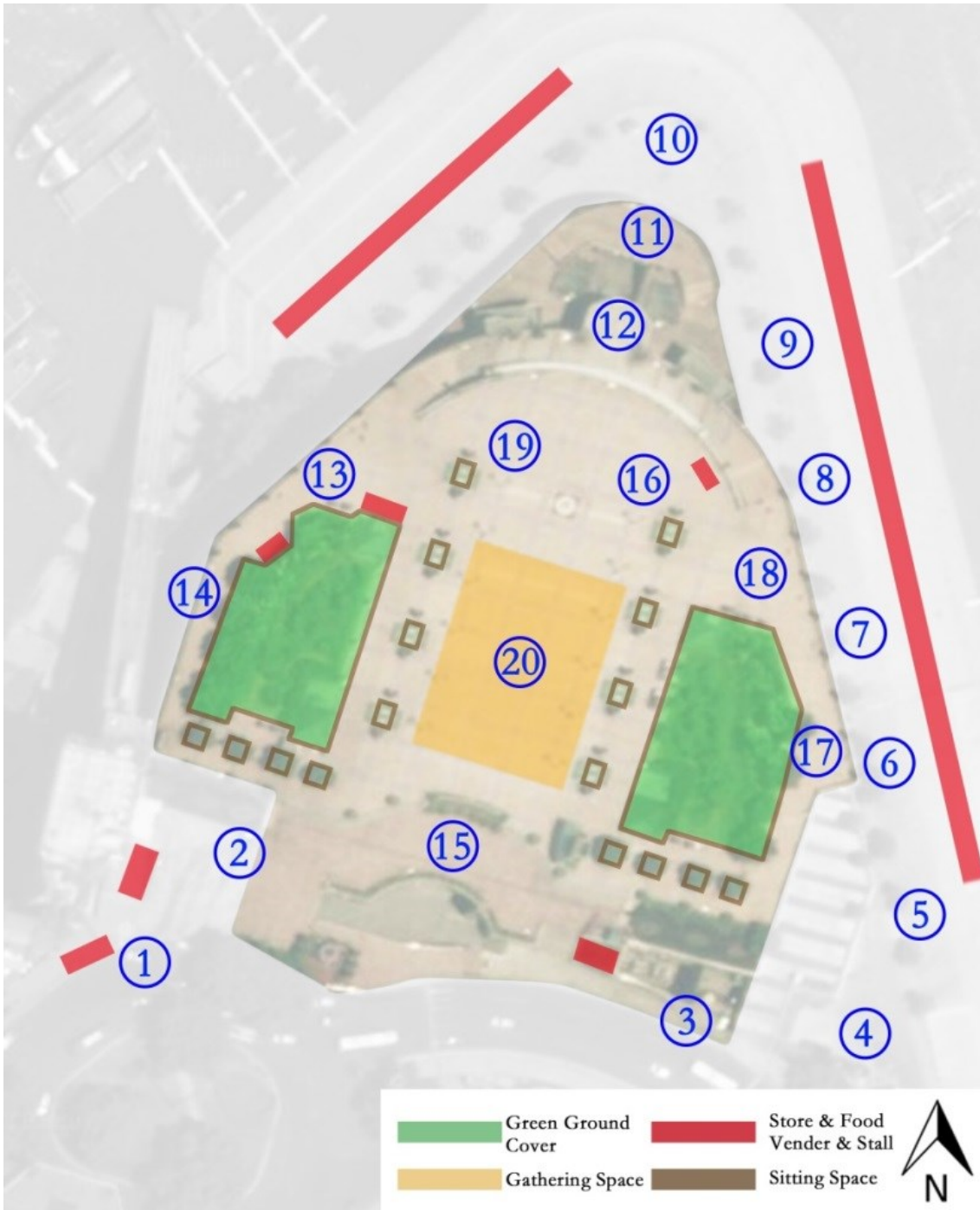


Fig.6-5-3 Chongqing Chaotianmen Square Site Analysis

(Source and modified based on Google Map)

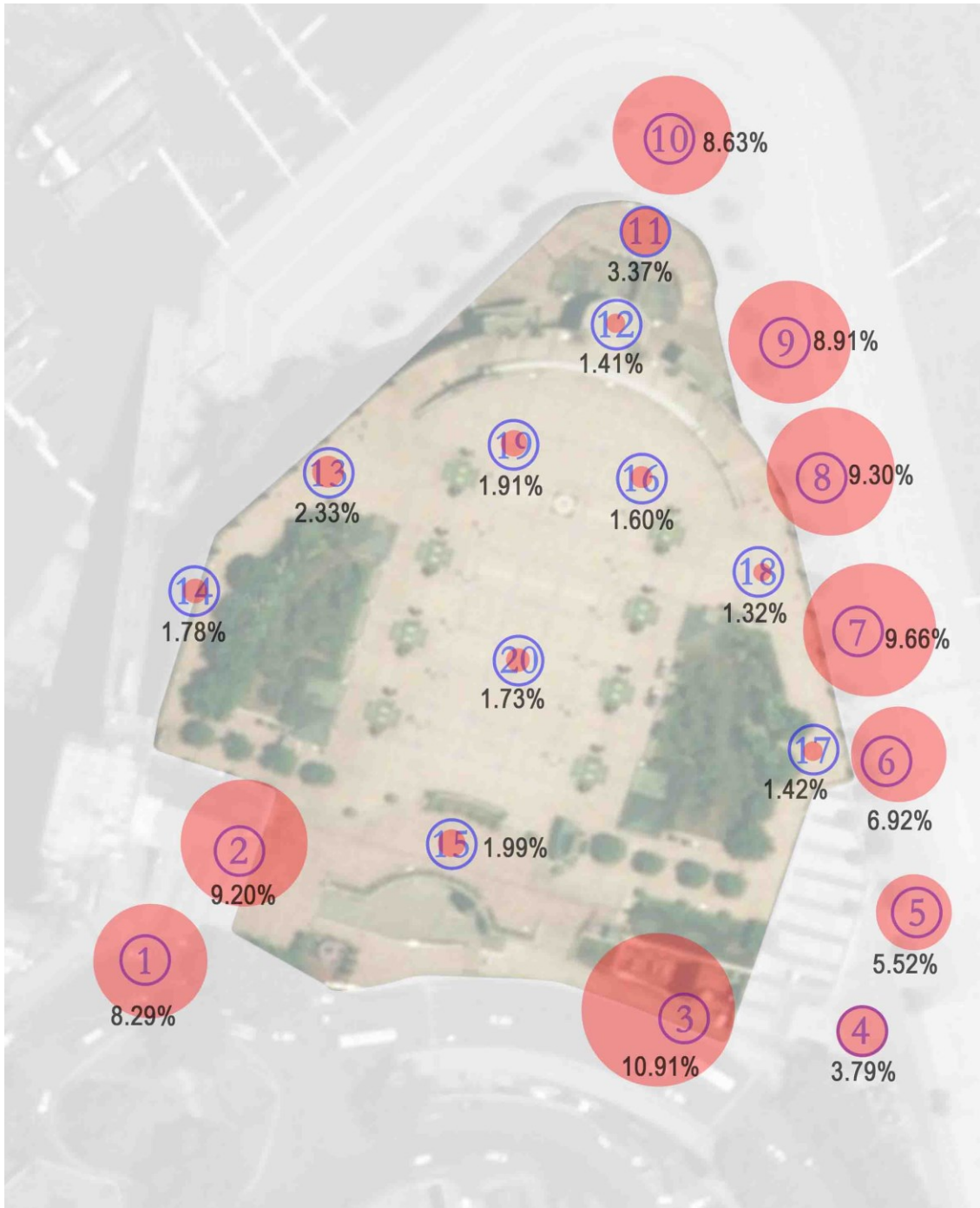


Fig.6-5-4 Distribution of People been Observed in Chongqing Chaotianmen

Square Population at Every point

(Source and modified based on Google Map)

### 6.5.3 Results

Chongqing Chaotianmen Square is in between the Yangtze River and the Jialing River. Chongqing Chaotianmen Square, however, has a driveway in the east with food vendors and stalls (Fig.6-5-3). Tourists disembark from ships and ferries then walk into the driveway, where they can be attracted by stalls selling local products, and performers also prefer a place close to the river. There are also several food vendors in Chongqing Chaotianmen Square around point No.13. They serve noodles, ice-creams, and other food, making point No.13 have many people inside the square (Fig.6-5-4).

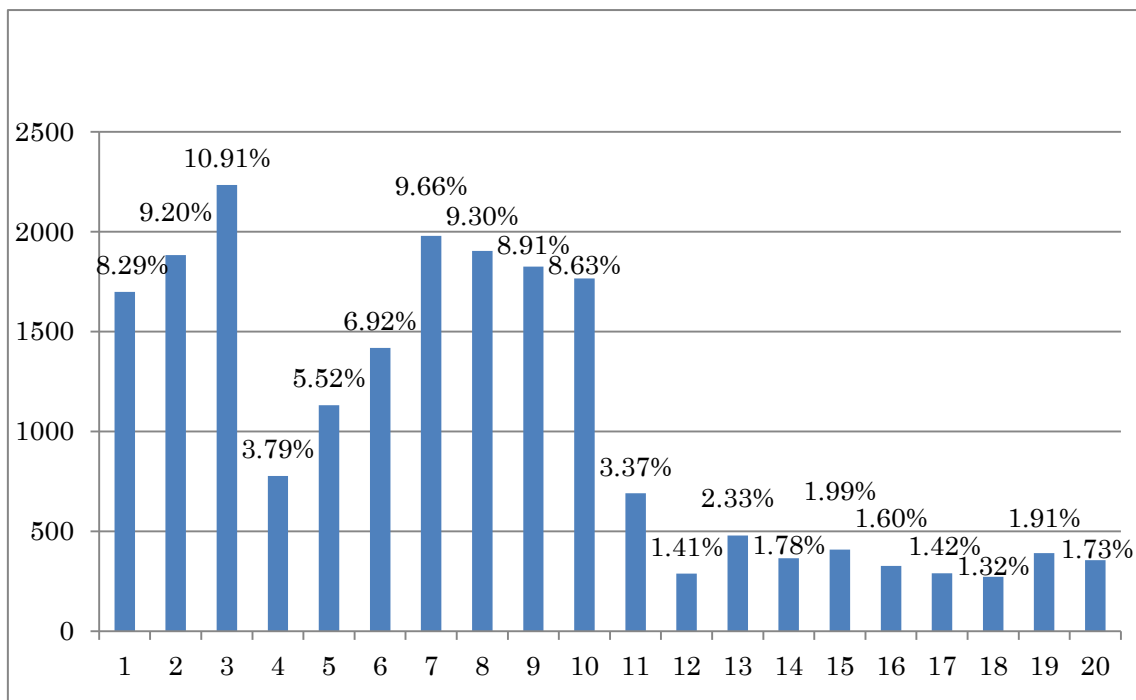


Fig.6-5-5 Number of people been observed in Chongqing Chaotianmen Square Population at Every Observation Point

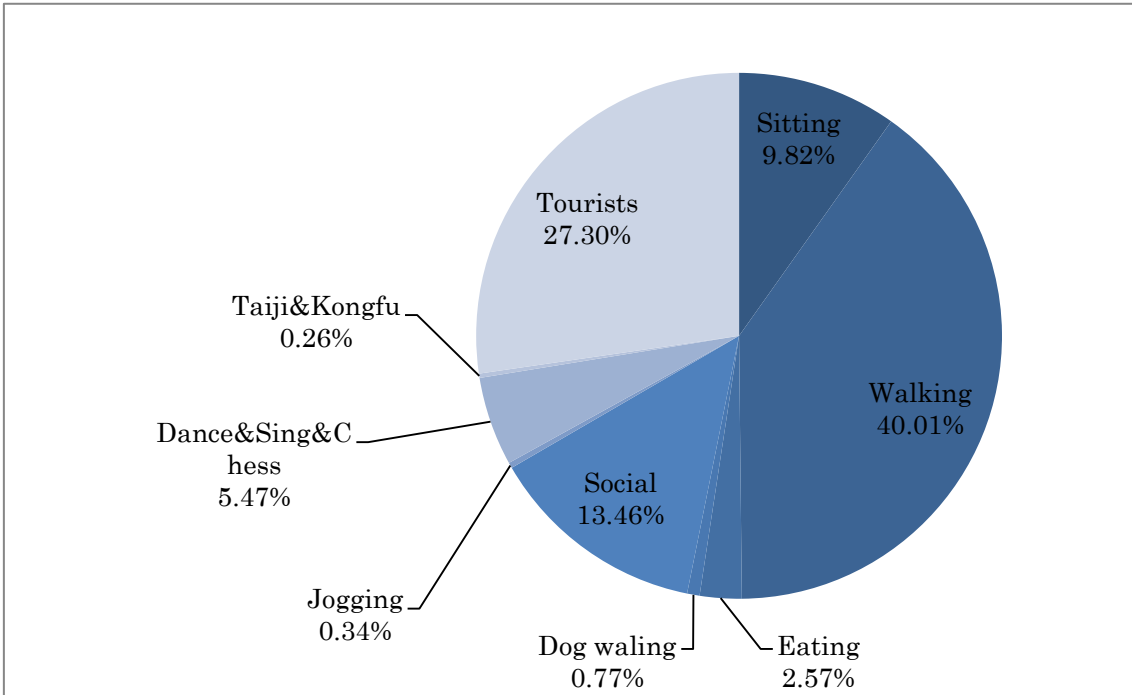


Fig.6-5-6 People's Activities in Chongqing Chaotianmen Square

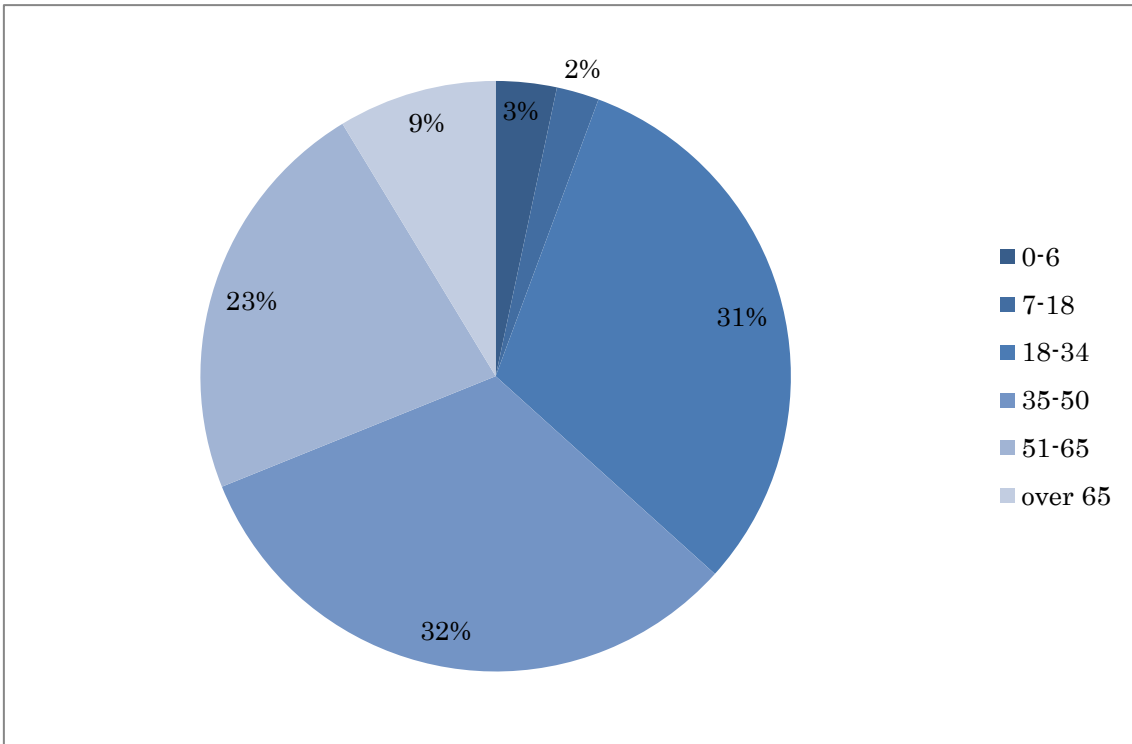


Fig.6-5-7 Age Distribution in Chongqing Chaotianmen Square

The number of people in each observation point (Fig.6-5-5), people's activities (Fig.6-5-6), and age distributions (Fig.6-5-7) are presented in figures. Most of the tourists in Chongqing Chaotianmen Square come to view where the two rivers meet and points. No.12 and 11 are the best positions to have a view. Stalls vendors are along the street close to the water (Fig.6-5-8), and many foreign visitors also disembarked around the place (Fig.6-5-9).

The data in Chongqing Chaotianmen Square shows that people dance/sing around No.8, 9, 19, and 20. No.19 and No.20 are in the main square area; people could conduct square dance and fly their kites in this area. The square has trees and sitting space around, and several food stalls would come to the place during lunchtime.

More people would like to get downstairs and conduct their activities closer to the river around No.9 and 8 (Table.6-5-1). In these two areas, food stalls and souvenir stalls are along the river, stairs create sitting spaces down to the river, some small outdoor concerts also come to this area, and the stairs to the square start here. All these make these two areas have four spatial elements: water, sitting space, food, and triangulation.

Table 6-5-1 Data Collected in Chongqing Chaotianmen Square

| Observation Point | Gender       |             | Age        |            |             |             |             | Activities  |             |             |            |            |              |           |             |               |                |
|-------------------|--------------|-------------|------------|------------|-------------|-------------|-------------|-------------|-------------|-------------|------------|------------|--------------|-----------|-------------|---------------|----------------|
|                   | Man          | Woman       | 0-6        | 7-18       | 18-34       | 35-50       | 51-65       | over 65     | Sit         | Walk        | Eat/Drink  | Walk Dog   | Stand/Social | Jog       | Dance/Sing  | Taichi/Kongfu | Tourists/Other |
|                   | 1            | 884         | 814        | 53         | 55          | 546         | 614         | 325         | 94          | 86          | 1262       | 60         | 0            | 163       | 0           | 0             | 0              |
| 2                 | 990          | 893         | 58         | 82         | 738         | 498         | 401         | 105         | 171         | 1322        | 117        | 0          | 179          | 0         | 0           | 0             | 94             |
| 3                 | 1175         | 1059        | 74         | 40         | 717         | 729         | 479         | 195         | 281         | 1367        | 77         | 0          | 330          | 0         | 0           | 0             | 179            |
| 4                 | 417          | 359         | 24         | 10         | 207         | 275         | 203         | 60          | 0           | 372         | 15         | 3          | 148          | 0         | 0           | 0             | 240            |
| 5                 | 570          | 561         | 36         | 35         | 348         | 399         | 249         | 64          | 83          | 562         | 4          | 0          | 183          | 0         | 0           | 0             | 223            |
| 6                 | 804          | 613         | 36         | 32         | 351         | 537         | 329         | 122         | 122         | 670         | 25         | 0          | 190          | 0         | 0           | 0             | 121            |
| 7                 | 1084         | 894         | 38         | 39         | 450         | 574         | 666         | 211         | 99          | 615         | 11         | 0          | 287          | 0         | 0           | 0             | 552            |
| 8                 | 987          | 917         | 80         | 24         | 600         | 596         | 464         | 150         | 131         | 582         | 35         | 0          | 187          | 0         | 514         | 0             | 313            |
| 9                 | 925          | 900         | 74         | 44         | 700         | 564         | 358         | 95          | 161         | 524         | 50         | 24         | 195          | 0         | 432         | 0             | 364            |
| 10                | 919          | 847         | 83         | 23         | 543         | 532         | 403         | 186         | 361         | 312         | 43         | 0          | 210          | 0         | 0           | 0             | 498            |
| 11                | 366          | 324         | 22         | 12         | 219         | 243         | 137         | 60          | 116         | 114         | 6          | 0          | 158          | 0         | 0           | 0             | 296            |
| 12                | 164          | 124         | 6          | 8          | 95          | 77          | 86          | 16          | 21          | 76          | 1          | 0          | 45           | 0         | 0           | 0             | 145            |
| 13                | 258          | 220         | 9          | 11         | 96          | 164         | 145         | 51          | 44          | 87          | 12         | 4          | 102          | 8         | 0           | 2             | 219            |
| 14                | 212          | 152         | 4          | 5          | 92          | 99          | 103         | 61          | 119         | 36          | 8          | 0          | 54           | 6         | 0           | 0             | 141            |
| 15                | 212          | 196         | 11         | 10         | 141         | 111         | 94          | 41          | 67          | 56          | 50         | 4          | 48           | 23        | 0           | 29            | 131            |
| 16                | 179          | 148         | 16         | 0          | 92          | 113         | 74          | 32          | 28          | 51          | 0          | 13         | 66           | 4         | 0           | 2             | 163            |
| 17                | 189          | 101         | 4          | 9          | 66          | 88          | 82          | 41          | 34          | 50          | 2          | 13         | 46           | 8         | 0           | 0             | 137            |
| 18                | 157          | 114         | 8          | 18         | 79          | 65          | 65          | 36          | 5           | 66          | 0          | 11         | 62           | 3         | 0           | 0             | 124            |
| 19                | 209          | 182         | 13         | 5          | 88          | 117         | 117         | 52          | 9           | 55          | 0          | 31         | 79           | 5         | 32          | 0             | 180            |
| 20                | 144          | 211         | 19         | 6          | 53          | 66          | 137         | 70          | 74          | 12          | 10         | 54         | 23           | 13        | 141         | 21            | 3              |
| <b>Total</b>      | <b>10845</b> | <b>9629</b> | <b>668</b> | <b>468</b> | <b>6221</b> | <b>6461</b> | <b>4917</b> | <b>1742</b> | <b>2012</b> | <b>8191</b> | <b>526</b> | <b>157</b> | <b>2755</b>  | <b>70</b> | <b>1119</b> | <b>54</b>     | <b>4252</b>    |

Since there is no sitting space designed around point No.11 or No.12, people have to sit under railings (Fig.6-5-10). The sitting spaces are designed around trees and green areas in Chongqing Chaotianmen Square, and people cannot see the river clearly if they sit on those benches.



Fig.6-5-8 Vendors and Stalls around Chongqing Chaotianmen Square



Fig.6-5-9 Foreign Tourists Disembark from a Cruise Ship



Fig.6-5-10 People sit under railings in Chongqing Chaotianmen Square

In Chongqing Chaotianmen Square, more people prefer a place close to water, so fewer people stay inside the square. While several food vendors are in the park, most stalls are around the entrance and riverside, where people disembark from ships. Those stalls are not official stores as they are not really under the designer's or supervisor's control. One possible way to attract more people into the square would be to build several "official" stores.

## **6.6 Chapter Conclusion**

China is a fast-developing country, so most public plazas are very "young" and have less history than those in the United States. The history of a site is a factor that attracts people, so to make the place more attractive, the plaza should tell people about how these places come out. Every place has its own story, and people can better understand the site when they sit near a food vendor or rest under tree canopies. The site's story becomes a part of the site's history, making the plaza unique and helps people remember the place, and creating the link between people and place known as place attachment.

The age distribution shows that more elder people use public plazas in China, and their activities also differ from those that American people participate in. Senior citizens prefer public dance, sword dance, and Taichi as their exercise. Sword dance and Taichi are morning exercises, and public dance is so popular that it takes over almost all main open spaces in plazas every afternoon. Not all of the open spaces in plazas are designed for dancing.

However, some pavements have less of a frictional coefficient, which results in a higher risk of people falling. Choosing materials with a higher frictional coefficient could prevent injury and accidents during people's dancing.

Sitting space in public space allows people to rest, eat and participate in other activities such as chess. Moveable tables and chairs allow people to decide where to sit in designed sitting areas. Unfortunately, though, furniture in public plazas could be stolen by people during the night; Cafés such as Starbucks will move all their table sets into their store upon closing. Big, heavy, low-value stone tables and chairs could be a solution to prevent or reduce theft. The stone chairs would allow people to move a short distance but would be too heavy to be stolen. At the same time, people have their solution, which could create their own sitting space by bringing their chairs to the site; plastic chairs and folding chairs are lightweight and easy to move around. So there are much more sitting spaces in China's public plazas than the plaza's master plan. Places under trees, near green vegetation, or other factors that attract people could be potential sitting spaces. This sitting space is located where people prefer to have events, and those chairs only appear. After the event, the place is restored and serves its original purpose, making the space multi-usage during the day.

Stores located in main commercial areas are static and well managed. However, some food vendors and stalls in non-commercial public plazas are very transient and not well managed. Some of these stalls only appear in an

area where more people walk by, and some food vendors only come to the site during mealtime. These stalls and food vendors are unstable; it is not guaranteed that the good stalls will be selling on any given day, and the food is not very hygienic. Official stores should be built, and food vendors should operate under management. Having food vendors and stores in the plaza could constantly attract people and keep them in the plaza.

Food vendors and stalls in China will sometimes create a “food street” along a driveway. For example, the driveway near Chaotianmen Square is a combination of food vendors and stalls. People in China have become comfortable walking and eating because the food street provides limited sitting spaces for tables and benches. There are also several problems in China’s food street when the management is insufficient. People drop food on the ground when they walk and eat, making the surface slippery, especially since most Chinese snacks are fried. The food street also needs more trash bins, and those trash bins need to be cleaned several times a day to keep the air in the street from smelling bad.

Events such as dance, sword dance, and Tai Chi in China are usually conducted in groups, and tons of people dance simultaneously. Most events such as Tai Chi and dance in China are self-organized. People who dance will come in groups, and the group leader will decide where to dance on the site. They bring their audio player, speaker, and power supply in several trolleys. These kinds of events also become a kind of problem that disturbs people

because of their loud music.

Lawns in China are usually surrounded by low shrubs two feet higher than the ground to keep people from stepping on them. The population density could be one reason why public spaces in China are not encouraging people to step on lawns. There would be many people on the grass if the lawns area were open to the public, damaging the grass or making the lawn area hard to maintain.

# Chapter 7: Reflecting on Spatial Elements

In this chapter, spatial elements in three countries have been discussed with photographs. Since sitting space is an essential spatial element and have been observed in every site, spatial elements that work with sitting space have been mainly discussed

## **7.1 Food and Sitting Space**

Sitting space is a crucial element in public space. People's seat preference may change based on the number of people and the amount of sitting space be provided on the site. When there is enough sitting space, people sit close to the edges, as results are shown in Tokyo Dome City. When the sitting space is not enough for people, people will sit where they could take a seat, such as tables, planter's edges, and stairs.

In China, many people could create their own sitting space, and the sitting space usually also works with other elements, make the public space multifunction. And not only for sitting space, but people in China could also utilize public space in more creative ways than Japan and The United States. In China, people may bring their seats. Plastic chairs usually have been selected for this purpose. Furthermore, the sitting areas usually function as an area for people to sit. It also works with other elements such as food and events (Categorized as triangulation by William Whyte).



Fig.7-1-1 Food Vendors and Stalls in Chongqing Chaotianmen Square



Fig.7-1-2 Fruit Selling on Wooden Cart in Chaotianmen



Fig.7-1-3 Street Food on Selling on Movable Cart in Chaotianmen



Fig.7-1-4 Food Car in Boston Columbus Waterfront Park



Fig.7-1-5 Food Cars in Toyosu Park

People in China could eat while they walk, but table sets may require depending on the food stalls' type of food. Food vendors in Chaotianmen Square would provide plastic chairs and foldable tables for people since they serve noodles, dumplings that get soups in the bowl (Fig.7-1-1). Other food such as rice crust and Stinky tofu (a Chinese form of fermented tofu) sells on a tiny moveable car (Fig.7-1-3), fruits selling on wooden carts since it does not require heating (Fig.7-1-2). Many of these food carts and stalls are without a permit, so they are not under the city's management and do not have food and beverage licenses.

In Japan and The United States, people usually get food and drinks from stores, food carts, or vending machines. The city or related organizations are

well organized and managed (Fig.7-1-4, Fig.7-1-5). Food cars and vending machines also exist in China. They are usually in popular and recently developed commercial areas, which are usually designed in western style. There are food stores in the public space that are well managed in China. Food stands in Chongqing People's Square selling drinks and snacks (Fig.7-1-6), and the tea shop in Guanyinqiao Commercial Pedestrian Street serves milk tea and tapioca tea (Fig.7-1-7). These structures cannot move around, making it easier to be managed, and the price is also higher than food carts on the street. In the future, there would be more food cars in China's public space, and current food carts are a substitute for food cars based on the cost.



Fig.7-1-6 Food Stand in Chongqing People's Square



Fig.7-1-7 Tea Shop in Guanyinqiao Commercial Pedestrian Street

## 7.2 Water and Sitting Space

Water attracts people, and usually, sitting space is also designed close to water. People in Ueno Park would sit around the fountain, and children would get closer and play with water (Fig.7-2-1). Guanyinqiao Commercial Pedestrian Street people also would like to sit on the stairs in front of the music fountain (Fig.7-2-2). In Columbus Waterfront Park and Harumibashi Park, people's sitting and lawn areas are designed (Fig.7-2-3, Fig.7-2-4). Visitors could sit on the bench or rest on the grass and enjoy their food and drinks. With some gathering space, people also would have some activities next to the water. Young people would gather and practice dancing in front of the fountain in Ueno Park (Fig.7-2-5). While in Chongqing Chaotianmen Square, people could hold street concerts next to the river (Fig.7-2-6).



Fig.7-2-1 People Sitting around the Fountain in Ueno Park



Fig.7-2-2 People Sitting in Front of Music Fountain in Guanyinqiao



Fig.7-2-3 People Sitting in Boston Columbus Waterfront Park



Fig.7-2-4 People Sitting in Harumibashi Park



Fig.7-2-5 Young People Dance in front of The Fountain



Fig.7-2-6 Small Band Playing and Stalls around Chongqing Chaotianmen Square

Water as a spatial element has similar effects on Japan, The United States, and China. It works with sitting space, food cars around, and people may also have some activities close to the water if there is enough space.

### **7.3 Tree, Sun, and Sitting Space**

There are many sitting spaces under trees. Trees could create shelters that people may prefer to sit under trees with a lower temperature in summer. The percent of tree canopy coverage could affect the amount of sunlight in the area. Results in Ueno Park show that people may not prefer to stay in high canopy coverage areas (Fig.7-3-1), and benches in Boston City Hall Plaza also have few people sitting on them (Fig.7-3-2).



Fig.7-3-1 High Tree Coverage Area in Ueno Park



Fig.7-3-2 Benches under Trees in Boston City Hall Plaza



Fig.7-3-3 People Sitting under Trees in Chongqing People's Square

Other elements such as food also work with trees and sitting space. Many people sit under trees with a stall selling food and drinks in Chongqing People’s Square (Fig.7-3-3). This result shows that food as a spatial element may substantially affect people and attract them to sit under heavy tree canopies.

### 7.4 Triangulation and Sitting Space

As William H. Whyte’s definition, triangulation is a stimulus that provides a social bond between people, which has a wide range, and many kinds of activities could be considered triangulation. Because of the cultural difference, triangulations in the three selected countries are reflected in different ways.

Table 7-4-1 Activates Observed as triangulations in Study Sites

| Japan                     | United States             | China   |
|---------------------------|---------------------------|---|
| Events held by the city   | Events held by the city   | Events held by the city   |
| Invited Street Performers | Invited Street Performers | Events held by community organizations or neighborhood committees |
| Skateboard                | Single Street Singer      | Kite-flying   |
| Dance                     |                           | Spinning top  |
| Soccer                    |                           | Badminton   |
|                           |                           | Chinese Writing with Water  |
|                           |                           | Play Cards/Chinese Chess  |
|                           |                           | Square Dance/Sword Dance  |
|                           |                           | Taichi/Kongfu   |
|                           |                           | Outdoor Concert   |

One of the noticeable points is the diversity of triangulations in three countries (Table 7-4-1). In Japan and the United States, organizations and committees could hold triangulations by the city or street performers. Other activities such as skateboard, dance practice, and soccer have been observed in Japan. While in China, events not only could be held by official organizations or the city, they could be held by local neighborhood committees. Activities such as kite-flying, spinning top, and badminton are activities conducted by friends who know each other could attract people's eyes.

Former studies have also pointed out some half self-organized activities such as an outdoor concert, square, sword dance, Taichi, and Kongfu. Some triangulations are self-organized, such as Chinese chess, play cards, and Chinese writing with water on the ground. These self-organized activities, unlike other events, strangers could join these activities and become a part of them. Public space is known as the "Third place," which allows people to rest in public, meet familiar people, and make new friends (Oldenburg, 1999).

The city or official organizations have held most events held in Japan and The United States. Street performers in Ueno Park (Fig.7-4-1) and Faneuil Hall Marketplace (Fig.7-4-2) are well programmed. People could find event information on official homepages, where people could find events and performances listed with time schedules. Events in Ueno Park could attract many people, folding chairs, and more people just standing while enjoying

the event (Fig.7-4-3). Guanyinqiao Commercial Pedestrian Street also holds events on its main stage (Fig.7-4-4). Considering the density of population and age structure, most of the events do not provide sitting space.



Fig.7-4-1 Street Performer in Ueno Park



Fig.7-4-2 Street Performer in Boston Faneuil Hall Marketplace



Fig.7-4-3 Event in Ueno Park



Fig.7-4-4 Event in Guanyinqiao Commercial Pedestrian Street



Fig.7-4-5 Event in Boston Faneuil Hall Marketplace

The event could attract many people, and when there are no benches or space on stairs, people in Boston Faneuil Hall Marketplace will choose to sit on the ground (Fig.7-4-5). This behavior could be a cultural background difference since people in Japan and China are rarely observed sitting on the ground.

Nonofficial organizations in China also hold many events. Many of them are hold by community organizations or neighborhood committees. These events could be sing and dance events. People usually bring their plastic chairs and create a circle where performers stay inside (Fig.7-4-6).



Fig.7-4-6 Sittings Area Create by Events in Guanyinqiao Pedestrian Street

Other activities such as sward dancing (Fig.7-4-7) and square dance (Fig.7-4-8) in Guanyinqiao Pedestrian Street make the place always have people. Any organization or committee does not organize these activities, just groups of people excise in public space. People could write Chinese on the ground with water (Fig.7-4-9), play Chinese chess (Fig.7-4-10), and use the bench as a table to play cards (Fig.7-4-11). Anyone could participate in these activities, comment on the Chinese written on the ground, play Chinese chess or cards.



Fig.7-4-7 Morning Sward Dance in Guanyinqiao Pedestrian Street



Fig.7-4-8 Night Square Dance in Guanyinqiao Pedestrian Street



Fig.7-4-9 Writing Chinese with Water on Ground in Guanyinqiao



Fig.7-4-10 Playing Chinese Chess in Guanyinqiao Ground in Guanyinqiao



Fig.7-4-11 Playing Cards on Bench in Guanyinqiao

Activity type could only be limited by people's creativity, not the physical environment and spatial elements. However, these activities are not being observed in Japan and The United States since people's gatherings and performances in public spaces may need permission. While in China, people may not need permissions to conduct these activities. Indeed, people take charge and manage these public spaces, and the management is more based on common sense and moral basis in China. Photos presented in this study show that many of these activities are organized and joined by middle-aged and senior citizens. One of the problems is about square dance's noise issue. Many people prefer to dance to music and will bring their speakers with them. News reports show that residents around may get noise harassment and create conflicts (成, 2018).

## **7.5 Other Factors**

There are several factors that also significantly affect people in public spaces. One is elevation change, and it could be stairs, ramps, or stairs with ramps. Stairs work more like a segment of space (Fig.7-5-1), while ramps could connect spaces more softly, and people would prefer to use ramps if there are stairs and ramps. Place separated by stairs also makes the space more difficult to hold events and other activities. Boston City Hall Plaza and Ueno Park are both in cities' center area, and there are many more events scheduled in Ueno Park compare to the plaza in front of Boston City Hall (Fig.7-5-2).



Fig.7-4-1 Stair in Boston City Hall Plaza



Fig.7-5-2 Event in Ueno Park-2

Another factor could be lawn areas, usually with trees in public spaces. People could rest and walk their dogs on the grass in Boston Columbus Waterfront Park (Fig.7-5-3, 7-5-4). People in Toyosu Park would have their tent as a shelter and play on the lawn area (Fig.7-5-5, Fig.7-5-6). The park also has a dog park under management for dogs play without dog chain (Fig.7-5-7). The lawn area has its unique function and attracts people to conduct certain activities. While in China, many public spaces prefer to have low bushes or fences around to avoid people get into the green space (Fig.7-5-8, Fig.7-5-9 Fig.7-5-10). The reason could be the density of people in the city and an easier way to manage and maintain the green space in public space. Fences and shrubs limited people in public space, but this might change with time. More and more people in China get high education, and people may care more about the environment.



Fig.7-5-3 People Rest on Grass in Boston Columbus Waterfront Park



Fig.7-5-4 People with Their Dogs on Grass in Boston Columbus Waterfront Park



Fig.7-5-5 Small Tents in Toyosu Park



Fig.7-5-6 Children Play with Their Parents on Grass in Toyosu Park



Fig.7-5-7 Dog Park in Toyosu Park



Fig.7-5-8 Low Bushes in Guanyingqiao Commercial Pedestrian Street



Fig.7-5-9 Fence around Flowers in Guanyingqiao  
Commercial Pedestrian Street



Fig.7-5-10 Lawn Area Surrounded by Bushes in Chongqing People's Square

# **Chapter 8: Thesis Discussions and Conclusions**

This final chapter would discuss and build conclusions. The study focused on spatial elements and collected data from Japan, United States, and China. Elements have similar primary effects on how people behave and act in public spaces; they are not stand-alone and usually work together.

## **8.1 Conclusions about Spatial Elements**

Based on cultural differences, spatial elements in different countries could work differently. Moreover, the same spatial element in different countries could be utilized in different ways. Table 8-1-1 shows the general and regional results of spatial elements in three selected countries.

Since this study includes three countries, Japan and The United States are developed countries, and China is developing. The United States is a western country, Japan is also considered a western country in Asia, and China is an oriental country. In these three countries, Japan is unique and heavily influenced by China in history and quickly westernized after World War II. This background makes public space in Japan may have elements from both western and oriental countries.

Table.8-1-1 General and Regional Results

| Results          | General Results | Regional Results   |  |  |   |
|------------------|-----------------|--|--|--|---|
|                  |                 | Japan  | The United States  | China  |   |
| Spatial Elements | Sitting Space   | Provide space for people to take a seat. For example, people could choose to sit under trees, close food vendors, or sit in front of performances. | Usually, people would sit at an emotional distance. When too many people were on the site, people would sit wherever they could take a seat. | The situation is similar to Japan. People in the United States could sit on the ground and grass in lawn areas without blankets or any protection. | When the sitting space is not enough, people could create a sitting space by themselves. Activities such as playing cards and Chinese chess could also happen on benches.   |
|                  | Food            | Food attracts people and could be provided by restaurants, food carts, and many other food providers.  | Similar to General Results   | Similar to General Results   | In more developed areas such as commercial centers, food is provided by restaurants and food stores. While in other places, food could serve by stalls and carts.   |
|                  | Water           | People's nature gets close to water, and children would like to play and touch the water.  | People would like to sit around the water, and some activities such as dancing have been observed.   | Similar to General Results   | Water in China also attracts people, and stalls would also stay close to the water. In addition, activities such as small live concerts could take place next to the water surface.   |
|                  | Trees           | Trees attract people; create shade and shelters in public space.   | Trees could attract people, but few people would prefer to stay when the shade created by the canopy covered a large area.                   | Similar to Japan's regional results  | Trees in China is facing similar challenges. However, when other spatial elements such as food may reduce the heavy shade created by trees.   |
|                  | Sun             | Depends on the weather condition and temperature, people would sit under the shade and avoid the sun on warm days.                                 | Similar to General Results   | Similar to General Results   | Similar to General Results  |
|                  | Triangulation   | Events, performances, and all kinds of activities people would draw more people to come.   | Usually, performances and events are well organized and scheduled. Sometimes chairs and benches have also been provided for elders.          | Similar to Japan, but additional chairs and benches are not provided based on observation.   | Official events in China are well organized. However, community organizations and neighborhood committees' events are more casual. Other activities such as square dance and sword dance are also popular in public spaces. |

Lots of former research is conducted in developed western countries. William H. Whyte and Kevin Lynch are from the United States of America, Jan Gehl is from Denmark, and their ways to study public space also have been introduced by Japanese researchers (Rui, Taku, & Haruna, 2016). At the same time, the shape and form of urban public space in Japan make many researchers focus on streets and places near the railway stations, such as Ikeda and Yoshitsugu's research. Researches with new technologies such as GIS bring a new way to analyze while the data source is still from observation (SUGITA, DOHI, & MATSUI, 1997) (Marušić, 2010). In recent years, research in American focused on the injustice in public space (Helmuth, 2019) (McCann, 1999), which few similar studies were conducted in Japan and China. Since the United States is a country of immigrants, people with different cultural backgrounds and more conflicts could be found related to race or gender. While in Japan, justice of public space may represent homeless people in Ueno Park. Teenagers play skateboard, ignoring park's rules, similar to food stalls in China's public space that have no permit. Moreover, the variety of activities observed in China may become a factor in evaluating public space justice.

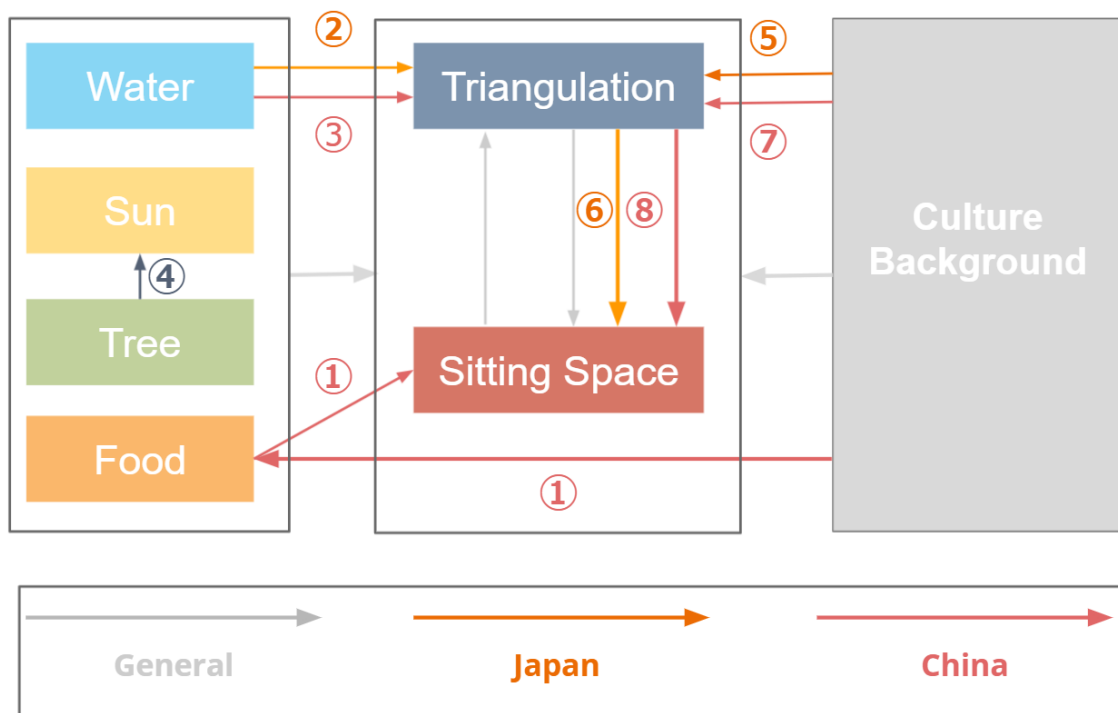


Fig.7-1-1 Spatial Elements and Culture Background

Case studies in three countries show spatial elements and cultural background. Sitting space and triangulation in the center affect each other, and other spatial elements with local cultural backgrounds significantly influence them. Former studies are in the western single culture frame. While in this theses, cases with different cultural backgrounds show that the food and triangulation elements are affected more and could become major factors that influence people's behavior in urban public space. The following paragraphs would explain the spatial elements and lines connecting them, showing their influence in Fig.7-1-1.

### 8.1.1 Sitting Space

When there is enough sitting space, people sit close to the edges. Moreover,

the edge effect applies to physical edges, such as edges created by billboards behind benches. Psychological edges also work similarly to physical edges, which could be two benches, corners created by benches, and phone boxes that cut the bench into different pieces. There is not enough space for people to take seats, such as days with City hold or self-organized events. People would sit where they could take a seat, including secondary seating, such as tables, planter's edges, and stairs.

Cultural background also influenced how people behave. In the United States, people could sit on the ground or in lawn areas when there is run out of sitting space and secondary seating. While in Japan, people would put sheets on the ground when people are in similar situations then sit on them. Small tents have also been observed in parks that people bring their tents into the park and set on the grass to create some private rest space and leave their belongings. Parks in Japan do not allow people to have regular or big size tents which could damage the ground, but small tents that do not require nails to keep secured are allowed based on rules in parks created by management organizations. In China, when there is not enough sitting space, people would bring their plastic chairs to create seats, which would be discussed with more details in the Triangulation part

### **8.1.2 Food and Sitting Space**

Food as a spatial element is closely related to sitting space since many people prefer to enjoy their food with tables and chairs. People could get their food

from shops around the site and food cars in the space.

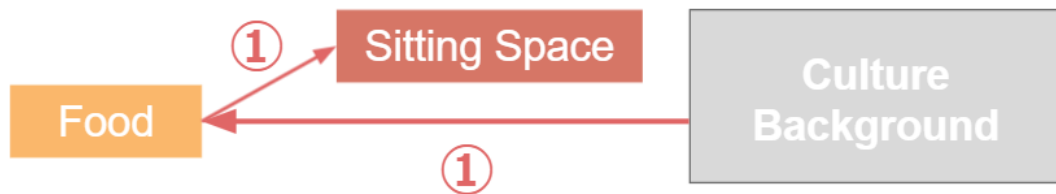


Fig.8-1-2 Food and Sitting Space influenced by Culture Background

①The food is also heavily influenced by local cultural backgrounds. The type of food and how people serve food could be different in different countries. This leads to the different forms of the spatial element of food and builds their unique relationship with sitting space (Fig. 8-1-2).

People could get food as take-out from restaurants, and in Japan and the United States, people could also get snacks and drinks from food cars. While in China, food is provided by food stores and food stalls, which usually do not have the license to sell food. Sometimes they would have conflicts with law enforcement because of the license issue.

### 8.1.3 Water, Sitting Space, and Triangulation

Water as a spatial element could be found in many case studies in this research, and as a result, almost all the water elements could attract people in three countries. Usually, sitting space is also designed close to water. This could be an example of generalizability that the water as a spatial element

works similarly in three selected countries with different cultural backgrounds.

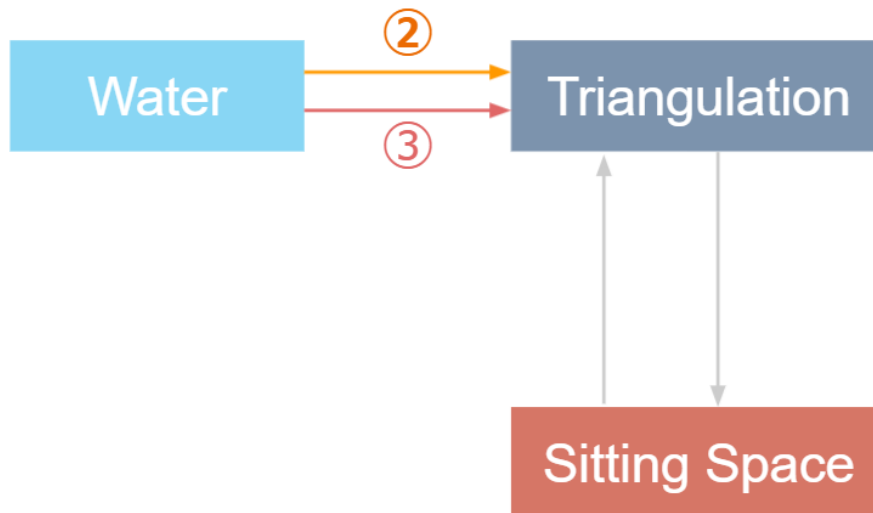


Fig.8-1-3 Relationships of Water, Sitting Space, and Triangulation

Line ② and ③ show that the water also affects where people would like to have activities. Dance practices have been observed conducted close to the Ueno Park's fountain, the outdoor concert held close to the water in Chaotianmen Square (Fig.8-1-3). These observation results suggest that people would like to have stationary activities close to water, no matter whether the water is in the form of a fountain or river.

#### 8.1.4 Tree, Sun, and Sitting Space

It is easy to understand the relationship of spatial elements between the tree and the sun. The tree canopy provides shade that could attract people to rest under it, and this also affects where people prefer to take a seat (Fig.8-1-3).

Though the data collection was conducted in spring and autumn when the weather is comfortable, the observation results suggest that people prefer to sit under the shade. ④ At the same time, the data from Ueno Park point out that people's density would reach the maximum percent when the tree canopy coverage is around 45%. After that, the density of people would decrease quickly.

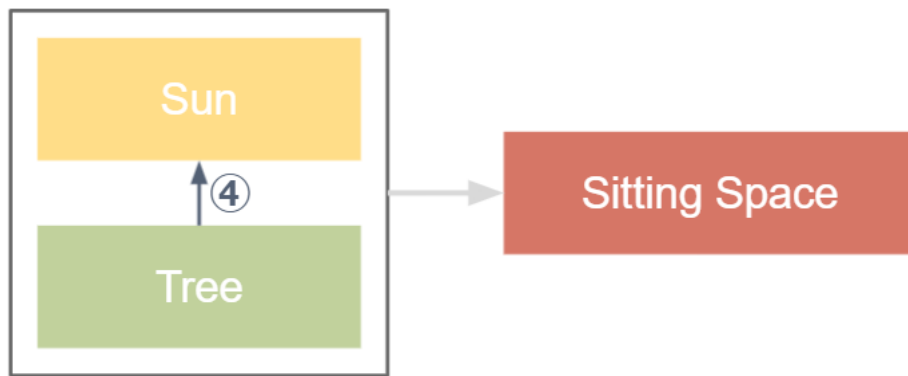


Fig.8-1-4 Relationships of Tree, Sun and Sitting Space

### 8.1.5 Triangulation and Sitting Space

Since one of the significant factors to evaluate public space is the variety of people's activities and the social bond created by activities, events usually require sitting space, which could also be considered as stationary activity. So the spatial element of triangulation could be one of the essential elements in urban public space.

The cultural backgrounds in selected countries are different, affecting the activities and events held in public space. The city or official organizations

hold most events and activities in Japan and the United States. Based on the observation, ⑤ young people in Japan would practice dance and play skateboard in public space. ⑥ Official Events In Japan usually provide chairs for senior people. ⑦ While in China, community organizations and neighborhood committees also organize events. People in China also hold events by themselves, such as public dance, sword dance, play Chinese chess, and cards. ⑧ People in China would bring their plastic chairs to create sitting space (Fig.8-1-5).

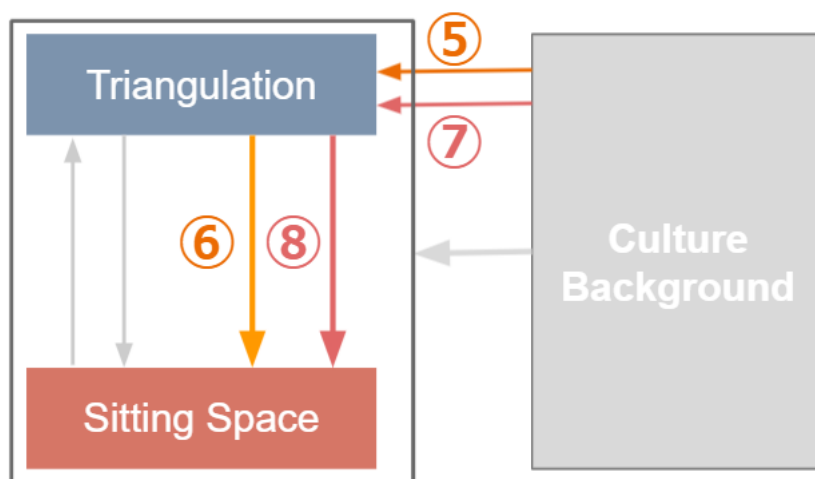


Fig.8-1-5 Relationships of Tree, Sun and Sitting Space

## 8.2 Reflecting on Contemporary Urban Public Space

People's lives evolve with the city's development, and the urban public space also changes with urbanization and globalization. Since the spatial elements that have been selected in this study are based on William H. Whyte's research, which is back in 1980. More recent studies such as Placemaking, Tactical Urbanism, and erosion of public space and public life as a part of

insurgent public space also should be discussed.

The first is about tactical urbanism, and it is a low-cost way to temporarily change the environment to improve people's lives on the neighborhood scale. It is more like a social experiment to conduct short-term commitment as the first step to renovating the place towards long-term changes. The technique allows the project potentially high rewards with low risk and builds the social capital between citizens. The social capital, which is also connected to the definition of triangulation proposed by Whyte, that stimulus provides social bound between people, could be considered triangulation in public space. Then the phrase "Lighter, Quicker, Cheaper" described the characteristic of tactical urbanism and implied that the method is more suitable for places with some basic infrastructure. It is to improve the situation, not build a new public space, mainly applied to developed countries. In many developing countries, the process of urbanization has just started for several years. A county like China also has many lands consisting of second and third-tier cities with suburban areas in the urbanization process. The infrastructures in such areas are not well designed or exist, far from the stage to apply tactical urbanism. There are some experiments of tactical urbanism in China (Jiang, Ware, & Gao, 2019), and the concept is relatively new which may need feather researches and implementation to fit in the local culture. In such an environment, the evaluation system based on research such as Whyte and Gehl's may need to be first introduced just like researchers in Japan did in Ikebukuro (Rui, Taku, & Haruna, 2016).

Public space management could be observed worldwide, which also forms a phenomenon that the management itself may follow the capital (Hou, 2010). Moreover, the public spaces always require actions and vigilance to gain and maintain freedom and openness (Mitchell, 2003). Struggle “is the only way that the right to public space can be maintained and the only way social justice can be advanced” by Mitchell’s word suggests that there would always conflict when people use public space. People would always struggle to get their rights to achieve social justice. The erosion of public space could be the urban agriculture movement in Los Angeles and Seattle (Mares & Peña, 2010), the Niwa-roju in Japan, which could serve the public realm with private gardens (Kinoshita, 2010), and Yangko dance in Beijing (Chen, 2010). While in this study, similar phenomena have also been observed, such as people dancing in Ueno Park, Japan, and all kinds of popular public dance in China, with food stalls around. The privatization would be developed with capitalization, which would raise issues and conflicts between people and the capital. The types of triangulation been observed in this study show that most activities and events are held by the city or official organizations in the United States. This phenomenon could be because of strict public space management, also a result of capitalization and privatization. Some self-organized activates have been observed in Japan, but official originations hold most events and activates. While many more activities have been observed in Chongqing’s public space, most of them are elderly citizens since young people are working and do not have that much time to

conduct weekdays.

The urban public space provides places for people to rest, conduct activities, and build a social bond. At the same time, the management of the public space could be controlled and limited by the capital, which requires people to get licenses and applications to conduct activities. This could limit people's creativity and damage social justice. In contrast, most urban public spaces in China are managed by the city without relying on private sectors. Moreover, based on the cultural background in China, the society has a common consensus that older citizens should be respected. When some activities were not allowed by the elder in China, they would only get oral warnings.

Moreover, for places with loose management, people would have more freedom to conduct various activities. As a result, public space management may not be appropriate to be controlled by private sectors, which could lead the management to become profit-oriented rather than citizens' benefits. The management of urban public space needs to be flexible to make the place become multiuse and serve the general public.

The triangulation proposed by William H. Whyte is part of spatial elements and the base of placemaking. The spatial element of triangulation has been expanded in this thesis based on case studies in different countries, and tactical urbanism is a modern way to implement on a small scale with immediate benefits (Fig.8-2-1).

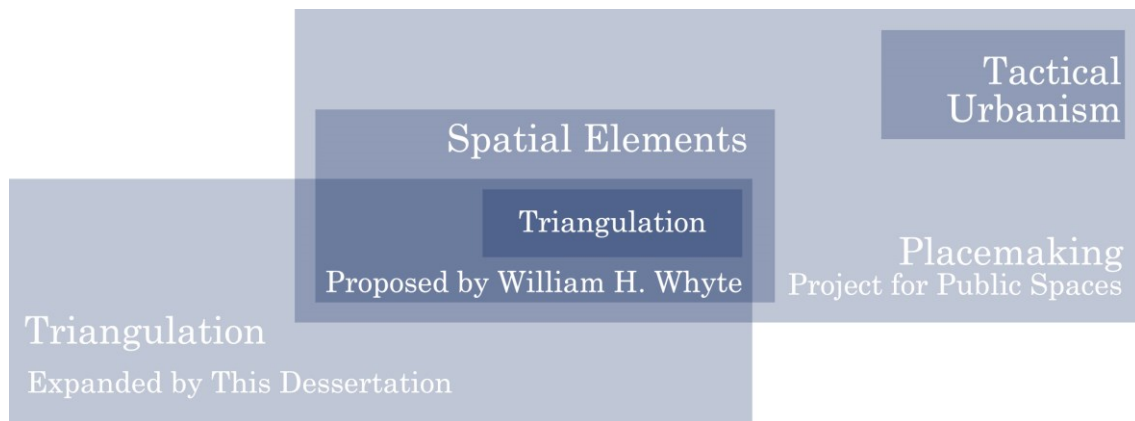


Fig.8-2-1 Relationship between Triangulation and Placemaking

The placemaking concept is not a new idea based on the Project for Public spaces (Project for Public spaces, 2007), built on theories by William H. Whyte, who focused on public spaces, and Jane Jacobs, which focused on streets. Moreover, tactical urbanism is an implementation strategy that costs less, is quick and easy to carry out. The spatial elements proposed by Whyte represent urban public space in 1980, and triangulation is one of the elements in his theory. Since most of his researches are conducted in the United States started in New York City, the result and conclusions could be out of data and limited within western countries. In this dissertation, the case studies were studied in three different countries, including typical western county the United States, westernized country Japan, and oriental country China. So that conclusions in this dissertation could have more coverage.

## **8.3 Recommendations**

The recommendation for this thesis could be two parts, general recommendations, and recommendations for each elected country.

### **8.3.1 General Recommendations**

Spatial elements could work with each other within a certain distance. Such as food and sitting space, water, and triangulations, these elements could work together and attract more people to stay and conduct stationary activities. Since the main factors to evaluate public space are stationary activities, secondary seating, and the variety of people's activities. Providing sitting space and secondary seating should be encouraged, and the management of urban public space should give people the freedom to conduct activities that are allowed by local laws and supported by cultural background. With globalization, major cities would have more and more residence from other countries with different cultural backgrounds. Urban public space design may need to consider multi-culture backgrounds based on residents to achieve social justice.

### **8.3.2 Recommendations for Japan**

Most of the urban public spaces in Japan are well managed. There is plenty of sitting space and secondary seating in most cases. However, Japan's social and cultural background is kind of limiting people's activities in public spaces. Many people in Japan care about manners and social rules; only

teenagers have been observed conducting self-organized activities with courage in public space. To make better and multi-functions of urban public space, events and activates should be held by organizations and management of public space, encourage people to conduct half-organized activities then gradually shift to sustainable self-organized activates.

### **8.3.3 Recommendations for the United States**

Based on the observation in this study, problems such as the segments created by stars in Boston City Hall Plazas could be should by renovations which now are under construction lead by Sasaki. The essential issue could be the management of urban public space. Since the society of the United States is highly capitalized, some urban public spaces are managed by private real estate companies. These public space's priority functions may not serve citizens and guarantee social justice but maximize profit. Spatial elements such as food and triangulations are limited by licenses and permissions, which need to be applied, sometimes cost time and money to get such an opportunity. This way of management makes almost everything in order; simultaneously, it limited people's freedom and undermined social justice in urban public space.

### **8.3.4 Recommendations for China**

Because of the population and density in China's major cities, some urban public spaces could run out of sitting space and secondary seating, even on days without official events. The city manages all the urban public space,

and the loose management encourages people to conduct all kinds of activities. When People attend half and self-organized activities, they may bring their plastic chairs and then create sitting spaces in urban public spaces. This kind of initiative could ease the high demand for sitting space, at the same time, make public space management difficult. Similar things also happened to the spatial element of food. Some food tents also provide plastic chairs with foldable tables to caret food corners. These phenomenons may need to be regulated in the future to keep the place in order and ensure food safety in public.

## **8.4 Limitations**

There are several limitations to this study. The first is about the limitation of the Case Study method. There is a limited number of case studies have been researched in selected cities and countries. So the results and conclusions in this dissertation may not apply everywhere. Moreover, one of the factors is the weather condition. All the data collection and observation are conducted in spring or autumn, with comfortable weather without rain. A city such as Chongqing could have a high temperature over 40 Celsius during the summer, and people's behavior could be dramatically changed based on the high temperature. More researches conduct in winter and summer may need to get more complete conclusions. At the same time, people's behavior may also be affected by other elements that do not exist in public spaces observed in this study.

China could be a unique, developing country. China's GDP (Gross Domestic Product) has been increased for decades and is higher than many other developing countries. This economic development also contributes to China's fast urbanization process and has its problems in urban public space. The research methodology of observation has its limitation in this study. The observation could provide quantitative data, but qualitative data have not been involved. Quantitative data could tell numbers of people in a particular area, percentage of gender, but observations cannot collect people's perceptions.

## **8.5 Future Research and Applications**

More researches could be conducted in many other countries and other types of places in the urban area. Most sites that have been selected in this research are popular and favorite by visitors. Urban public spaces that do not have many visitors may have their reasons. Unpopular sites could be included in future researches and find out factors that make the place unattractive. Interviews and questionnaires could collect qualitative data to understand how people think of the current spatial elements in urban public space. Since video recording also takes part in this study, recorded videos analyzed by designed computer programs might be more efficient and scientific, may provide more objective results.

Since the last part of this study's data collection (data from Harumibashi Park and Toyosu Park) was conducted after the COVID-19 pandemic. Though the data are collected when the government of Tokyo announced the state of emergency was lifted, it may affect the collected data. The situation of COVID-19 may continue, and it changed people's daily life. People's behavior and activities may be severely influenced by it and need more studies focused on the Post-COVID-19 world.

Urban public space is designed by people and for people. This study includes Japan, The United States, and China, and regulations in different countries could be different and limited public space design and how people utilize the space. This study's results and discussion could provide instruments for policymakers and a theoretical base for designers when they have projects in international cities or urban areas with multicultural residents. The management of the current public space may enhance users' experience based on this study's results and make full use of interactions of spatial elements to attract more people and make good use of urban public space.



# Appendix

## AN EXAMPLE OF BEHAVIOR MAPPING FORM

| Location        |                                 |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |       |
|-----------------|---------------------------------|---|---|---|---|---|---|---|---|---|----|----|----|----|----|----|-------|
| Date            |                                 |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |       |
| Time            |                                 |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |       |
| Day of the week |                                 |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |       |
| Temperature     |                                 |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |       |
| Point           |                                 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | Total |
| Sex             | M                               |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |       |
|                 | F                               |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |       |
| Age             | 0-6                             |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |       |
|                 | 7-18                            |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |       |
|                 | 18-34                           |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |       |
|                 | 35-50                           |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |       |
|                 | 51-65                           |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |       |
|                 | over 65                         |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |       |
| Activities      | Sitting                         |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |       |
|                 | Walking                         |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |       |
|                 | Eating                          |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |       |
|                 | Social                          |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |       |
|                 | Public dancing & Singing        |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |       |
|                 | Taichi, Soward dancing & Kongfu |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |       |
|                 | Chinese Chess                   |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |       |
|                 | Tourist                         |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |       |
|                 | Event                           |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |       |

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