URBAN MORPHOLOGICAL STUDY AS A METHOD OF URBAN DESIGN ASSESSMENT IN THE HISTORIC CONTEXT OF IRANIAN CITIES: A CASE STUDY ON URMIYA

A THESIS SUBMITTED TO THE GRADUATE SCHOOL OF NATURAL AND APPLIED SCIENCES OF MIDDLE EAST TECHNICAL UNIVERSITY

BY
MEYSAM SOLEIMANI

IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE OF DOCTOR OF PHILOSOPHY IN ARCHITECTURE

SEPTEMBER 2020
Approval of the thesis:

**THESIS TITLE**

submitted by MEYSAM SOLEIMANI in partial fulfillment of the requirements for the degree of Doctor of Philosophy in Architecture, Middle East Technical University by,

Prof. Dr. Halil Kalıpçılăr
Dean, Graduate School of Natural and Applied Sciences

Prof. Dr. Cânâ Bilsel
Head of the Department, Architecture

Prof. Dr. Cânâ Bilsel
Supervisor, Architecture, METU

**Examining Committee Members:**

Prof. Dr. Celal Abdi Güzer
Architecture, METU

Prof. Dr. Cânâ Bilsel
Architecture, METU

Prof. Dr. Ayşe Sema Kubat
Urban and Regional Planning, ITU

Prof. Dr. Namık Günay Erkal
Architecture, TED University

Assoc. Prof. Dr. Ela Aral
Architecture, METU

Date: 25.09.2020
I hereby declare that all information in this document has been obtained and presented in accordance with academic rules and ethical conduct. I also declare that, as required by these rules and conduct, I have fully cited and referenced all material and results that are not original to this work.

Meysam, Soleimani :

Signature:
ABSTRACT

URBAN MORPHOLOGICAL STUDY AS A METHOD OF URBAN DESIGN ASSESSMENT IN THE HISTORIC CONTEXT OF IRANIAN CITIES: A CASE STUDY ON URMIA

Soleimani, Meysam
Doctor of Philosophy, Architecture
Supervisor: Prof. Dr. Cânâ Bilsel

September 2020, 357 pages

A controversial large-scale project at the historic core of the city of Urmia in Iran, has been the starting point of the present study. The Imam Square project was enthusiastically proposed as a solution for the revitalization of the decayed areas in the historic city center. However, the failure of the first phase of the project has given rise to serious doubts about its progress for approximately eight years. The present study argues that without understanding the morphological logic of a city and its evolution through time in relation with its socio-cultural structure, any interventions on the historic urban context can be problematic. Urban morphology is used as a tool to analyze the traditional urban structure of Urmia and its transformation up to the present time. The analyses are done based on four periods of time and in different scales from the city level to the scale of the urban block. The analytical methods of Space Syntax are used to better understand how the morphological characteristics of the traditional town of Urmia have changed. A comparative study is conducted on the current Imam Square and the traditional Bugda Meydan located next to the project area. The Axial Map, Segment Map and Visual Graph analyses are used to prepare the models of measures: Integration HH and R3, Choice, Step Depth, Visual Integration and Visual Clustering Coefficient. The comparison of models and
numerical values illustrates that the traditional urban structure of Urmia has been radically transformed since the early 20th century as a result of urban modernization. While the traditional Bugda Meydan possessed a unique place in the historic city, what are the reasons that Imam Square cannot achieve the same success in the contemporary Urmia? The methodology proposed in the thesis has been rarely applied to study an urban design project in the Iranian context. In order to provide the consistency and reliability of the results, the methods are applied to evaluate seven case studies from the Iranian cities. Meaningful results have been achieved particularly by the correlation between the measures of Visual Integration and Visual Clustering Coefficient by which the areas with maximum centrality and the potential for a place to be a node where activities concentrate can be identified. It is demonstrated that the methods can also be applied to other Iranian cities. The case studies have contributed to further development of the methodology of the research and to identify two configuration patterns according which the traditional meydan were organized. These patterns guaranteed the success of meydan as a multifunctional urban space in the traditional cities of Iran that needs to be considered in any contemporary intervention. The present study reveals the significance of urban morphology for a traditional city and provides a methodological approach to evaluate new urban design projects in the historic context.

**Keywords:** Traditional Iranian City, Intervention on Historic Urban Context, Space Syntax, Urban Morphology, Meydan
ÖZ

İRAN ŞEHİRLERİNİN TARIHİ BAĞLAMINDA BİR KENTSEL TASARIM DEĞERLENDİRME YÖNTEMİ OLARAK KENTSEL MORFOLOJİ: URMİYE ÜZERİNE BİR ÖRNEK ÇALIŞMA

Soleimani, Meysam
Doktora, Mimarlık
Tez Yöneticisi: Prof. Dr. Cânâ Bilsel

Eylül 2020, 357 sayfa


Anahtar Kelimeler: Geleneksel İran Şehri, Tarihi Kent Bağlamına Müdahale, Mekân Dizimi, Kentsel Morfoloji, Meydan
To Urmia, my hometown
ACKNOWLEDGMENTS

This thesis was a long journey that could not achieve the purpose without the instructions, advices and patience of Prof. Dr. Cânâ Bilsel, my supervisor. I would like to express my deepest gratitude to her sincere support, inspiring ideas and motivating attitude that assisted me to do my best. I feel indebted and I wish this study would compensate a little piece of her trust.

I owe sincere thanks to my thesis committee members, Prof. Dr. Namık Günay Erkal and Assoc. Prof. Dr. Ela Aral who contributed in the development of this study by their valuable comments. I am also grateful to Prof. Dr. Celal Abdi Güzèr, the member of examining committee, for proposing new perspectives to see other aspects of the issues. I would like to express my special thanks to Prof. Dr. Ayşe Sema Kubat for her kindly support and unique remarks that provided the opportunity for a deeper understanding of the thesis for me.

I would like to thank Assist. Prof. Dr. Ersan Koç for his great comments that make me believe in myself. I am so thankful to my friend, Assist. Prof. Dr. Saeid Khoshniyyat, for his generous support in providing the key documents and references. I would also thank to Taher Shafipour, the documentarist, who accepted my request for three interviews and provided significant information for the history of Urmia. I wish to thank to Assist. Prof. Dr. Asutan Sarp Yalçin, Assist. Prof. Dr. Didem Güneş Yılmaz, Esma Yüzgeç, Saleh, Reza and Hassan Golabi, Mohammad Javad Shahri and Yaser Bahrami for their precious friendship and support.

I am so thankful to my parents Manije, Akbar and my sister Somayye for their unceasing supports during my life. I also owe to my parents-in-law, Madar and Pedar, for their compassionate cares. I would express my gratitude to my classmate, colleague, companion and beloved wife, Maryam Golabi, to be my best friend in the challenge of life. I feel so lucky to have her and my dear twins, Nil and Nora.
# TABLE OF CONTENTS

ABSTRACT ................................................................. v
ÖZ ................................................................. vii
ACKNOWLEDGMENTS .................................................. x
LIST OF TABLES ......................................................... xviii
LIST OF FIGURES ......................................................... xx
LIST OF ABBREVIATIONS ............................................. xxxiv

## CHAPTERS

1 INTRODUCTION ........................................................... 1
1.1 Problem Statement ...................................................... 1
1.1.1 The Main Discussion and the Contribution to the Literature .... 4
1.1.2 The Objectives of the Study ........................................ 7
1.2 Methodology of the Research .......................................... 8
1.3 The Structure of the Thesis ........................................... 10

2 APPROACHES AND STUDIES ON URBAN FORM AND URBAN CONSERVATION ................................................. 13
2.1 Approaches to Study the Historic City; A Theoretical Framework ................. 13
2.1.1 Studying the Historic City to Derive an Urban Design Approach ............. 13
2.1.2 Studies of Urban Form in Architectural History .......................... 15
2.1.3 Urban Geographical Approach to the Study of Urban Form ............... 16
2.1.4 Studies on urban form in Iran and the Islamic cities ....................... 17
2.1.5 Studying of Urban Form by Computational methods ..................... 20
2.2 Conservation and Designing in the Historic Urban Context; the Conflicting
Issues of Old and New ................................................................. 21

2.2.1 From Modernist Urbanism to Area-Based Conservation; the Progress of
Policies ......................................................................................... 25

2.2.2 Urban Architecture; the Significance of Relationship Between Urban
Spaces ........................................................................................... 31

  2.2.2.1 The City as A Work of Art; Camilo Sitte ......................... 32

  2.2.2.2 The Art of Relationship as the Townscape; Gordon Cullen ..... 41

  2.2.2.3 A Typological Study of Historic Urban Elements; Rob Krier ... 45

  2.2.2.4 The Study of Iranian Historic Cities: Mahmud Tavassoli ....... 53

2.2.3 Space Syntax; an Analytical Approach to Study Urban Form ........ 61

  2.2.3.1 The Theoretical Foundation .............................................. 61

    2.2.3.1.1 The Criticism Toward Space Syntax ......................... 64

  2.2.3.2 The Process of Space Syntax Analysis by Depthmap .......... 66

    2.2.3.2.1 Axial Map Analysis ................................................. 66

    2.2.3.2.2 Convex Map Analysis .......................................... 67

    2.2.3.2.3 Segment Map Analysis ......................................... 69

    2.2.3.2.4 Visual Graph Analysis .......................................... 70

  2.2.3.3 The Measures of Space Syntax as the Means of Analysis .... 71

  2.2.3.4 Space Syntax as a Method of Studying Historic City .......... 75

    2.2.3.4.1 Evaluating the Integration of Historic Core with the
                Contemporary City ...................................................... 76

    2.2.3.4.2 Assessing Spatial Qualities of Urban Space .............. 79

    2.2.3.4.3 Space Syntax in Combination with GIS Data Sources .... 81

2.3 The Significance of this Chapter .............................................. 83
3 THE IRANIAN CITIES; TRADITION, MODERNIZATION AND RENOVATION .................................................................................................................. 85

3.1 The Urban Structure of Traditional Iranian Cities ........................................ 85

3.1.1 The Origin and Rules of Formation ............................................................. 86

3.1.2 The Pre-Islamic Cities of Ancient Iran ......................................................... 89

3.1.3 The Model of Traditional Iranian Islamic City .......................................... 90

3.1.3.1 Islamic Beliefs and Its Impacts on the Urban Structure ........... 91

3.1.4 The Physical Characteristics of Traditional Iranian city....................... 93

3.1.4.1 The Organic Pattern of Islamic City ......................................................... 94

3.1.4.2 The Hierarchical Structure from Public to Private Realms ...... 95

3.1.5 The Open Public Spaces in The Traditional Iranian City ....................... 98

3.1.5.1 Meydan; An Important Urban Element of Traditional City ..... 99

3.1.5.1.1 Public Meydan ............................................................................. 101

3.1.5.1.2 Commercial Meydan ................................................................. 103

3.1.5.1.3 Governmental Meydan ............................................................... 105

3.1.5.1.4 Military Meydan .................................................................... 106

3.1.5.1.5 Neighborhood Meydan ............................................................. 109

3.1.5.1.6 Linking Meydan ..................................................................... 110

3.1.5.1.7 Sportive Meydan ..................................................................... 111

3.1.5.2 The Notion of In-Between Space .......................................................... 112

3.1.5.2.1 Hosseiniyeh; a Turning Point Between Public and Private Realms ................................................................. 115

3.1.5.2.2 Jelokhan; Designation of Private Property for the Public Use.. ................................................................. 117

xiii
3.1.5.2.3 Sahn; An Architectural Element with the Quality of an Urban Space .................................................118

3.2 The Urban Modernization of Iran and the Transformation of Traditional City .......................................................................................................................................................................................... 122

3.2.1 The Initial Intervention in the First Pahlavi Period ................................................................. 124

3.2.1.1 The Establishment of Municipality and the Legislative Base of Changes .......................................................................................................................................................................................... 125

3.2.1.2 The Haussmannian Paris as a Pattern for Urban Transformation ................................................................. 127

3.2.2 The Acceleration of Changes; the 1960s and 1970s .......................................................... 128

3.2.3 The Urban Development After the Islamic Revolution of 1979 ........................................ 130

3.3 The Change of Approach Toward the Historic Urban Context in Iran ................................ 132

3.3.1 The Development of Conservation Policies in Iran ................................................................................................................................. 132

3.3.2 A Framework to Study Different Aspects of Designing in the Historic Urban Context .......................................................................................................................................................................................... 136

3.3.2.1 The Political and Economic Aspects ................................................................................................. 137

3.3.2.2 The Socio-Cultural Aspects .............................................................................................................. 138

3.3.2.2.1 The Issue of Identity in the Islamic Republic of Iran ......................................................................................... 138

3.3.2.3 Urbanism Aspects ........................................................................................................................... 140

3.4 The Significance of this Chapter .............................................................................................. 141

4 THE TRANSFORMATION OF A HISTORIC CORE; IMAM SQUARE PROJECT OF URMIA .......................................................................................................................................................................................... 143

4.1 The Origin and Formation of Urmia .......................................................................................... 143

4.1.1 The Geographical Features of the Settlement .............................................................................. 145

4.1.2 A Brief History of Urmia and Its Demographic Characteristics .......................................................... 149
4.1.3 The Historical Maps and Documents .......................................................... 153
4.1.4 The Evolution Process of Urmia ................................................................. 157
4.1.5 The Main Urban Elements of Traditional Urmia ....................................... 159
   4.1.5.1 The Covered Bazaar ................................................................. 160
   4.1.5.2 The Jame Mosque ................................................................. 162
   4.1.5.3 The Neighborhoods ........................................................................ 164
   4.1.5.4 The Castle and Fortification Wall .................................................. 168
4.2 The Morphological Analysis of Urmia ......................................................... 170
   4.2.1 Analysis of Urban Transformation in the City Level ............................ 171
   4.2.2 The Changes of Street Network ............................................................ 173
      4.2.2.1 The Global and Local Integration Measures by Axial Map Analysis .............................................................................................................. 178
      4.2.2.2 The Global and Local Choice Measures by the Segment Map Analysis ........................................................................................................ 183
   4.2.3 The Urban Structure of Traditional Urmia .......................................... 186
      4.2.3.1 The Hierarchical Spatial Organization of Urmia ........................... 187
      4.2.3.2 The Interrelation Between Urban Elements .................................. 189
         4.2.3.2.1 The Commercial Axis of Traditional Urmia ....................... 192
         4.2.3.2.2 The Administrative Axis of Traditional Urmia ................. 194
   4.2.4 Sabze Meydan; the Transformation of the Commercial Axis ................ 196
   4.2.5 Bazarbash; the Transformation of a Neighborhood .............................. 201
   4.2.6 Bugda Meydan; the Transformation of City Center .............................. 210
4.3 Imam Square Project; an Intervention on the Historical Center of Urmia .... 218
   4.3.1 A comparative analysis between the spatial qualities of Imam Square and traditional Bugda Meydan .......................................................... 226
4.5 The Significance of this Chapter ................................................................. 238

5 THE CONTEMPORARY MEYDANS IN THE CHANGING HISTORIC
CORES OF IRANIAN CITIES ........................................................................... 241

5.1 The Renovation Project of Sahibabad Meydan in Tabriz ....................... 242

5.1.1 Sahibabad Meydan; an Initial Pattern for the Governmental Meydans in
Iran .................................................................................................................... 243

5.1.2 From a Glorious Meydan to a Daily Marketplace .................................. 246

5.1.3 Evaluation of the Renovation Project of Sahibabad Meydan ................. 247

5.2 Saadetabad Meydan in Qazvin ................................................................. 257

5.2.1 The Traditional Urban Structure and Its Transformation ..................... 257

5.2.2 Saadetabad Meydan; the Formation of a Governmental Center ............. 260

5.2.3 Azadi square; the new public space of modern Qazvin .......................... 262

5.3 The Renovation Project of Atigh Meydan in Isfahan ............................... 263

5.3.1 The Transformation of Atigh Meydan in the Challenge with Nagsh-e Jahan
Square .............................................................................................................. 265

5.3.2 Evaluation of the Renovation Project of Atigh Meydan (Imam Ali Square) 268

5.4 Zand Meydan of Shiraz ............................................................................ 278

5.4.1 The Traditional Developmental Axes of the City .................................. 279

5.4.2 Zand Meydan; Configuration of the Governmental Center ................. 280

5.4.3 The Transformation of Zand Meydan with Urban Modernization ........ 282

5.4.4 Evaluation of the renewal project of Karim Khan complex ................. 285

5.5 Sabze Meydan of Kermanshah ................................................................ 292

5.5.1 The Traditional Sabze Meydan of Kermanshah .................................. 292

5.5.2 The destruction of Sabze meydan by urban modernization ................. 294

5.5.3 Planning of the New Meydan on the Sabze Meydan Street .................. 297
5.6  Tirandaz Meydan of Semnan .................................................................303
5.6.1  The Traditional Urban Complex of City Center ....................................304
5.6.2  The Transformation of Traditional Meydan by the Urban Modernization 305
5.6.3  Tirandaz Meydan; A Traditional Meydan in The Modernized City ..........307
5.7  A Modern Square on the Historic Urban Context of Hamadan ..................312
5.7.1  The Plan of Karl Frisch and Its Comparison with the Haussmannian Paris .................................................................314
5.7.2  Evaluation of the Pedestrianization Project of Modern Central Square as the New Public Space .................................................................319
5.8  The Significance of this Chapter ...............................................................324
6  CONCLUSION .........................................................................................327
6.1  The Contributions of the Present Study to the Contemporary Urban Design Practice in Historic Context .................................................................329
6.2  The Final Evaluation of the Studied Cases ...............................................334
6.2.1  The Configuration Pattern of Traditional Meydans as the Design Diagram .........................................................................................337
6.3  A Methodological Approach to Evaluate Urban Design Projects ...............340
REFERENCES .........................................................................................345
CURRICULUM VITAE .............................................................................356
# LIST OF TABLES

## TABLES

Table 3.1 The institutions, organizations and legislative frameworks employed in the conservation between 1850-2004. (Kermani, 2017) .................................................... 133
Table 3.2. The process of the legislation and policies in Iran after the foundation of the Urban Development and Regeneration Company in 1997 (Kermani, 2017)..135
Table 4.1 The numeric values of global Integration (HH) measure in the four maps of Urmia.................................................................................................................. 181
Table 4.2 The numeric values of measures by Axial and Segment map analyses in the four maps of Urmia.................................................................................................................. 186
Table 4.3 The numeric values of measures by VGA to compare the traditional Bugda Meydan and Imam Square project ................................................................. 234
Table 5.1 The numerical values of measures by Axial Map analysis for the traditional and current maps of Tabriz ................................................................. 250
Table 5.2 the comparison between the values of Integration measure for the whole Tabriz and the site of Sahibabad meydan........................................................................ 251
Table 5.3 The numerical values of measures by VGA in different states before and after the completion of the renovation of Sahibabad Meydan ......................... 254
Table 5.4. The numerical values of morphological parameters .................. 273
Table 5.5 The numerical values of syntactic measures for the two states of Atigh Meydan ............................................................................................................. 276
Table 5.6 The numerical values of measures by Axial Map analysis for the main elements of Karim Khan complex of Shiraz ............................................................. 289
Table 5.7 The numerical values of measures by VGA for Zand Meydan of Shiraz before and after the renovation ................................................................. 290
Table 5.8 The numeric values of measures by VGA for the traditional and new form of Sabze Meydan in Kemanshah ................................................................. 301
Table 5.9 The numeric values of measures by VGA for the Tirandaz Meydan of Semnan ................................................................. 310
Table 5.10 The numeric values of measures by Axial Map and Segment Map analyses for the Imam Square project of Hamadan ............................................... 321
LIST OF FIGURES

FIGURES

Figure 1.1. The expropriation process of land parcels and the development of Imam Square project ................................................................. 2
Figure 2.1. Piazza del Duomo in Ravenna, Italy ................................................. 35
Figure 2.2. Piazza Roma and Piazza del Domenico in the city of Modena, Italy ... 36
Figure 2.3. Piazza Roma and the military academy and Piazza del Domenico with its church ........................................................................ 36
Figure 2.4. Michelangelo’s statue of David in Singoria plaza, Florence, Italy ...... 37
Figure 2.5. The bird view of Singoria plaza (google earth) and a view of Palazzo Vecchio ........................................................................ 38
Figure 2.6. A grouping of plazas around the Cathedral of Slazburg, Austria and its bird view (google earth) ......................................................... 38
Figure 2.7. The plan and the view of free-standing Votive Church and the project designed by Sitte .............................................................. 39
Figure 2.8. The arch as a gateway generate two worlds & the existence of church spire creates here and there ................................................. 43
Figure 2.9. The sketches as the frames of townscape experienced by movement .. 44
Figure 2.10. The transformation of a basic form through various alterations & The typology of intersection between street and square ..................... 46
Figure 2.11. Orthogonal squares angled, divided, added and superimposed & Different types of street-square intersections ...................................... 47
Figure 2.12. The orthogonal plans for square with free-standing buildings and monuments ............................................................................. 47
Figure 2.13. The circular squares, triangular squares and the geometrically complex ones .............................................................................. 48
Figure 2.14. The large-scale composite plans of urban complexes .................. 48
Figure 2.15. Locations of the sites of project on a current aerial photo of the city and Krier’s designed plan ................................................................ 49
Figure 2.16. The plan and model of Krier’s design and a view of the bird view of the site in the current time (google earth) ................................................................. 50
Figure 2.17. The the proposed plans for the U-shaped courtyard of Rotebuhlplats 51
Figure 2.18. The location of urban elements in the current aerial photos .................. 52
Figure 2.19. Design alternatives proposed by Krier for the project ....................... 52
Figure 2.20. The two final plans depicting the reorganization of plazas and the areas between them .................................................................................................. 53
Figure 2.21. a: Shahtahmasb meydan, Yazd and d: Vali Soltan meydan, Kashan; the high degree of enclosure – b: Haji Mahalleh alley, Kashan; an enclosed space on the way of alley – c: the covered entrance of urban spaces to increase the sense of enclosure – e: Persian garden; enclosing of space by the trees – f: the changes of level to separate two spaces – g, h and i: the narrow alleys and their different directions to close the line of sights (Tavassoli, 2016) ...................................... 54
Figure 2.22. The quality of enclosure in Vali Soltan meydan in Kashan & a neighborhood center in Gorgan (Tavassoli & Bonyadi 1992) ......................... 54
Figure 2.23. The various proportion of alleys in the cities located in different climatic zoon of Iran (Tavassoli, 2016) ................................................................. 55
Figure 2.24. The various methods by which Tabayon-e Fazaee can be formed in the urban structure & a, b, c, d: Haji Mahalle alley, Kashan; an open and closed spaces in different levels configured on the way of an alley as a simple neighborhood center (Tavassoli & Bonyadi 1992) ........................................... 56
Figure 2.25. The neighborhood center of Darb-e Bagh, Kashan & the spatial sequence of dynamic and static elements (Tavassoli, 2016) ......................... 56
Figure 2.26. The articulated entrance of Sa’at meydan and the spatial continuity to Rokn Addin Shrine in Yazd ........................................................................ 57
Figure 2.27. The flowing space between two neighborhood centers which were defined by their particular elements ......................................................... 57
Figure 2.28. The main structure of Tehran in the mid-nineteenth century, and the location of its five main squares; a: Hasan Abad. b: Ferdowsi. c: Mokhber al Dowlla. d: Baharestan. e: Sabze meydan ........................................................................ 58
Figure 2.29. Hasan Abad Square in 1960s and the 1970s after construction of the modern bank .................................................................58
Figure 2.30. Hasan Abad Square in a: the 1950s to b: the 1960s. Construction of a modern building on the square and the transformation of land parcels from large courtyard building to apartment blocks .........................................................59
Figure 2.31. The architecture of old building in Hasan Abad Square & the modern bank constructed on its southern side .................................................................59
Figure 2.32. The analysis of historic façade to propose a new design for the modern building ........................................................................................................60
Figure 2.33. The implemented project that is a skin of historic building constructed in front of the modern building to conceal its glazed facade & the proposition of Tavassoli to change the modern building (Tavassoli, 2016) .............................................60
Figure 2.34. The relation between movement and space in linear and convex form .................................................................................................................................68
Figure 2.35. The axes for movement in the environment and the convex spaces for resting ......................................................................................................................68
Figure 2.36. Convex and Axial maps of Eliat Residence, Mies van der Rohe (Bafna, 2003) .........................................................................................................................................69
Figure 3.1. The historical commercial roads of Iran and the important cities located on their way (Habibi, 2000). ......................................................................................87
Figure 3.2. The formation and development process of an Iranian commercial city. R: religious buildings – H: Hammam (Bath) – C: Caravanserai (Kheirabadi, 1991) .................................................................................................88
Figure 3.3. The schematic models of Parsi and Parti styles as the pre-Islamic urban patterns in Iran (Habibi, 2000) ..................................................................................89
Figure 3.4. The schematic models of Khorasani and Razi styles and the formation of Islamic city in Iran (Habibi, 2000) ...........................................................................91
Figure 3.5. The map of old Naeen (Tavassoli & Bonyadi, 1992) the texts are written by the author ................................................................................................................97
Figure 3.6. The transformation of a gridded Roman city to an Islamic urban structure (Kostof, 1991). ................................................................. 98
Figure 3.7. The location of Sabze meydan and Meydan-e Ark in the 1889 map of Tehran ............................................................................................................ 102
Figure 3.8. Sabze meydan of Tehran in the 19th century .................................. 102
Figure 3.9. The various forms of public meydan from different Iranian cities .... 103
Figure 3.10. The urban structure of traditional Keman & Ganjali Khan square developed on the way of linear bazaar ..................................................... 104
Figure 3.11. Amirchaghmaq and Shahtahmasb squares in Safavid period, and Khan square in Qajar period were constructed in connection with the linear bazaar..... 104
Figure 3.12. Amirchaghmaq and Khan meydans and the public facilities around them ................................................................................................. 105
Figure 3.13. An official ceremony held in Ark meydan in the 19th century ........ 105
Figure 3.14. The development of Isfahan in Safavids and construction of Nagsh-e Jahan square (Arefian et al. 2014) ................................................................. 106
Figure 3.15. Topkhane meydan of Urmia constructed in the 19th century inside the castle of Chaharborj .......................................................... 107
Figure 3.16. The two military squares of Tehran which their functions have changed after the city expansion .......................................................... 107
Figure 3.17. The plan of Meydan-e Tupkhane based on the 1889 map of Tehran and one of its gateways ........................................................................ 108
Figure 3.18. The transformation of Meydan-e Tupkhane of Tehran; the 19th century, the early 20th century and the 1970s ....................................................... 109
Figure 3.19. The Hosseiniyeh of Kalvan neighborhood and its public facilities in Naeen .......................................................................................... 109
Figure 3.20. The morphological features of neighborhood meydans in various traditional Iranian cities; the red color indicates the visually important building and the grey color presents the public facilities .................................................. 110
Figure 3.21. The different types of meydan in the urban structure of Meybod.... 111
Figure 3.22. A linking meydan in one of the neighborhoods of Meybod .......... 111
Figure 3.23. A miniature depicts the playing of Chowgan in Nagsh-e Jahan square and a wrestling competition in one of the neighborhood centers of Yazd ...........112
Figure 3.24. The covered and open Hosseiniyeh in Zavareh (Tavassoli & Bonyadi, 1992) ...........................................................................................................116
Figure 3.25. The arches at the entrances of Hosseiniyeh of Cheheldokhtar neighborhood in Naen .............................................................................117
Figure 3.26. The entrance of Imam Mosque in Nagsh-e-jahan square of Isfahan 118
Figure 3.27. The recession of entrance that generates a threshold in front of the door .............................................................................................................118
Figure 3.28. The Jame mosque of Isfahan and its quality of permeability & the location of Grand Jame mosque in the historic structure of Isfahan .............120
Figure 3.29. The isometric view and plan of Jame mosque of Yazd; the interwoven of relationship between open space are illustrated by the red arrows ................120
Figure 3.30. Malek mosque in the compacted urban tissue of Kerman and the accessibility of its Sahn ......................................................................................121
Figure 3.31. The schematic model of Iranian traditional city and its transformation after the modernization (Ehlers & Floor, 1993) ............................................124
Figure 4.1. The plan of the Mound of Hasanlu (http://www.iranicaonline.org) ...144
Figure 4.2. The aerial photo of the city and Urmia lake at the present time (source: Google Earth) ...........................................................................................................146
Figure 4.3. Aerial photos of Urmia in 1956 (source: Iran National Cartographic Center) 1984 and 2018 (source: Google Earth) .................................................146
Figure 4.4. The Silk Road map (source: https://en.unesco.org/silkroad) & The map known as Iran & Turan drawn by Adolf Stieler in 1875 ............................147
Figure 4.5. A schematic drawing illustrating the geographical position of Urmia and its relation with the Silk Road .................................................................148
Figure 4.6. The topographical map of the region and the traditional border of city with the intercity roads (source of the topographic map: Iran National Cartographic Center http://www.ncc.org.ir/) .........................................................149
Figure 4.7. The first map of Urmia prepared by Asadollah Khan in 1850 (source: West Azerbaijan Cultural Heritage Administrative http://www.urmiachto.ir/) ............................................ 154
Figure 4.8. The first technical map of Urmia in 1933 (source: West Azerbaijan Cultural Heritage Administrative http://www.urmiachto.ir/) .............................................. 155
Figure 4.9. The aerial photo and the cartographic map of Urmia in 1956 (source: the archive of West Azerbaijan Cultural Heritage Administrative) the assembling of map parts by the author ............................................................................................................... 156
Figure 4.10. The comprehensive plan of Urmia prepared in 2017 (source: Urmia Municipality) ............................................................................................................................... 156
Figure 4.11. The present situation of Urmia; the layers of buildings and natural features are overlaid ....................................................................................................................... 158
Figure 4.12. The evolution process of Urmia through the time (source: Urmia Municipality) ............................................................................................................................... 159
Figure 4.13. The traditional bazaar of Urmia at the present time ...................... 161
Figure 4.14. The present state of traditional bazaar of Urmia .............................. 162
Figure 4.15. The historical Jame Mosque of Urmia and the ornamentation of its Mihrab (source: hamshahrionline.ir) ............................................................................................ 162
Figure 4.16. The Sahn of Jame mosque before the interventions and the entrance of mosque from the traditional covered bazaar (Anzali, 2000) .................................................. 163
Figure 4.17. The neighborhoods divisions of Urmia and the important public buildings ................................................................................................................................. 165
Figure 4.18. The great St. Mary Church (Naneh Maryam) in Yurdshah neighborhood and the small synagogue in Hindu neighborhood ........................................ 167
Figure 4.19. The dwelling areas of non-Muslims in Urmia (Nagsh-e Piravash, 2008). ........................................................................................................................................................................ 167
Figure 4.20. the fortification walls, the gateways and the main urban elements of traditional Urmia .................................................................................................................. 168
Figure 4.21. Two pictures of Urmia’s traditional gateways which no longer existed (Anzali, 2000) .................................................................................................................. 169
Figure 4.22. Chaharborj Castle and its courtyard known as Topkhane Meydan
where a ceremony was held.................................................................170
Figure 4.23. The evolution of Urmia regarding the natural features; the side length
of square is 10 km........................................................................172
Figure 4.24. The transformation of street network in the historic core of Urmia; the
side length of square is 3 km ..............................................................174
Figure 4.25. Ayalat Square of Urmia and its monumental buildings constructed in
the early 20th century .....................................................................175
Figure 4.26. The street network of Urmia in detail with the agricultural land
parcels; the side length of square is 3 km ........................................176
Figure 4.27. The figure-ground analysis of Urmia in 1965 and the present time .177
Figure 4.28. The models of global Integration HH measure by the Axial Map
analysis ............................................................................................179
Figure 4.29. The models of local Integration HH R3 measures by the Axial Map
analysis ............................................................................................180
Figure 4.30. The synergy diagram of traditional Urmia and the current map of
Urmia .................................................................................................182
Figure 4.31. The models of Choice measure by Segment Map T1024 analysis ...184
Figure 4.32. The models of Choice measure R500 Meters by Segment Map T1024
analysis .............................................................................................185
Figure 4.33. The reduction of urban elements to provide a basic map for the
morphological analysis of traditional Urmia ......................................187
Figure 4.34. The model of Integration HH R3 overlaid on the street network of
traditional Urmia ............................................................................188
Figure 4.35. The basic map of Urmia and the superimposition of various functions
as cemetery, public building and meydan; the side length of square is 3 km ......190
Figure 4.36. The superimposition of public buildings and the meydans layers on the
model of Integration HH R3 of traditional Urmia .........................191
Figure 4.37. The superimposition of public buildings with meydans and identifying
of the commercial and administrative axes in the traditional Urmia ..........192
Figure 4.38. Shotorban Alley of Urmia and the ongoing job of kiln production. 193
Figure 4.39. The schematic map of Urmia prepared by Asadollah Khan in 1850. 194
Figure 4.40. The administrative axis of traditional Urmia and the dispersion of administrative buildings in the current map. 195
Figure 4.41. The greeting ceremony of a Qajar King at the entrance and main road of Bazarbash neighborhood (Anzali, 2000). 196
Figure 4.42. Meydan-e Tupkhane constructed in the Qajar period inside the castle of Urmia. 196
Figure 4.43. The dispersion of commercial buildings in the traditional and current Urmia. 198
Figure 4.44. The transformation of Sabze meydan; the traditional urban element of Urmia. 199
Figure 4.45. The land parcels pattern of Bazarbash neighborhood; the side length of square is 1 km. 202
Figure 4.46. The morphological characteristics of traditional Bazarbash and Hazaran neighborhoods. 203
Figure 4.47. Step Depth Analysis of Bughda meydan by Segment Map analysis. 204
Figure 4.48. The aerial photo of Bazarbash neighborhood; the length of square side: 1 KM, printed scale: 1/12500 (source: the archive of West Azerbaijan Cultural Heritage Administrative). 205
Figure 4.49. The land parcel pattern of Darvaze meydan and Bazarbash neighborhood; the side length of square is 300 meters. 207
Figure 4.50. The aerial photo of Darvaze meydan and Bazarbash neighborhood (source: the archive of West Azerbaijan Cultural Heritage Administrative – the present time: google earth). 208
Figure 4.51. A comparison between the land parcels of 1965 and the present time to study the transformation of Bazarbash neighborhood; the side length of square is 100 meters. 209
Figure 4.52. The situation of Bugda Meydan at the intersection of the commercial and administrative axes of traditional Urmia. 210
Figure 4.53. The pattern of land parcels at the center of Urmia; the side length of square is 500 meters ................................................................. 212

Figure 4.54. The aerial photo of Urmia center in 1979; the side length of square is 250 meters (source: the archive of West Azerbaijan Cultural Heritage Administrative) ........................................................................................................ 213

Figure 4.55. The aerial photo of Urmia center in 1957; the side length of square is 250 meters (source: the archive of West Azerbaijan Cultural Heritage Administrative) ................................................................. 214

Figure 4.56. The Nolli map of center of Urmia in 1965; the side length of square is 250 meters ............................................................................. 215

Figure 4.57. Bugda meydan and the wheat crop in the 19th Century & Gapan meydan in the early 20th Century (Anzali, 2000) ................................................. 216

Figure 4.58. The Sahn of Jame mosque in the 1950s (Anzali, 2000)............... 217

Figure 4.59. The aerial photo of Urmia center in 1994 and the bombarded empty area; the side length of square is 500 meters (source: the archive of West Azerbaijan Cultural Heritage Administrative) ......................................................................................... 219

Figure 4.60. The model of first Imam Square project designed by M. Rezazade Ardabili in 1994 ............................................................................. 220

Figure 4.61. The proposed plan and three-dimensional sketch prepared by Nagsh-e Piravash Co. in 2008 .......................................................................... 222

Figure 4.62. The project designed by Behsaz Larze Consulting Engineering Office in 2009 ............................................................................. 222

Figure 4.63. The land expropriation process and the destruction of Bazarbash traditional neighborhood ........................................................................ 223

Figure 4.64. Narvan shopping center constructed as the first phase of the Imam Square ............................................................................. 223

Figure 4.65. A general view of Imam Square and its adjacent buildings........... 224

Figure 4.66. Nagsh-e Jahan Square in Isfahan the capital of Safavids in the 17th century ............................................................................. 225
Figure 4.67. The models of Integration HH R2 measures by the Axial Map analysis; the side length of square is 500 meters ................................................................. 227
Figure 4.68. The models of Choice R 500 meters by Segment Map analysis ...... 229
Figure 4.69. The models of Visual Integration measures by the Visual Graph Analysis (VGA) ........................................................................................................... 231
Figure 4.70. The models of Clustering coefficient measures by VGA............. 233
Figure 4.71. The correlation between the measures of Visual Integration and Visual Clustering Coefficient by the scatter plot diagram ................................. 235
Figure 5.1. The traditional urban structure of Tabriz and the present time map .. 243
Figure 5.2. The sketch and miniature of Tabriz by Jean Chardin in 1673 and Matrakçı Nasuh in the 16th century ................................................................. 244
Figure 5.3. The 1827’s map of Tabriz and the Dar-ol-Saltane map prepared in 1905 ........................................................................................................................................ 245
Figure 5.4. The transformation of Sahibabad meydan through time and the renovation project of it ................................................................. 246
Figure 5.5. The different sites of the project of Restructuring the Historic Silk Axis of Tabriz designed in the 2000s (Bavand Co. 2004). ................................. 248
Figure 5.6. The global Integration Rn models of Tabriz by Axial map analysis (Roshani & Sagafi, 2016) .................................................................................................................. 249
Figure 5.7. The models of local Integration R3 for the historic core of Tabriz in the three periods ...................................................................................................................... 250
Figure 5.8. The enlargement of the Integration R3 model for the site of Sahibabad meydan ...................................................................................................................... 251
Figure 5.9. The traffic master plan of Tabriz and the aerial photo of Daraee street and the site of Sahibabad (Naghsh-e-Mohit Co., 2013) source of right image: google earth ................................................................. 252
Figure 5.10. The models of visual integration measure conducted by VGA for Sahibabad complex of Tabriz ........................................................................................................ 253
Figure 5.11. The models of visual Clustering Coefficient conducted by VGA for Sahibabad complex of Tabriz .................................................................................... 254
Figure 5.12. The correlation between the measures of visual Integration and Clustering Coefficient by scatter plot diagram..............................................255
Figure 5.13. The correlation between the measures of visual Integration and Clustering Coefficient by scatter plot diagram..............................................256
Figure 5.14. The transformation of urban structure of Qazvin through time......258
Figure 5.15. The 1919’s map of Qazvin produced by the Mesopotamian Expeditionary Force, the map of Royal Geographical Society (Karimi, 1998) and the present form of the city (Tarh-e Mohit Paydar, 2017) ...............................259
Figure 5.16. The models of global Integration measure for the maps of 1919 and 1995 of Qazvin (Karimi, 1998) ..............................................................................260
Figure 5.17. The disappearance of traditional Saadetabad meydan (Dizani, 2012) and the formation of a new meydan in modern Qazvin ..............................261
Figure 5.18. Azadi Square of Qazvin in 1930s and at the present time ............263
Figure 5.19. The evolution of Isfahan’s historic core from the 12th to the present time .................................................................................................................264
Figure 5.20. Two historic maps of Isfahan drawn by Pascal Coste in 1840 and Seyyed Reza in 1923 .............................................................266
Figure 5.21. Three states of Atigh meydan from 19th century to the present time 267
Figure 5.22. The models of global Integration by Axial map analysis (Sadeghi et al., 2014)........................................................................................................270
Figure 5.23. The transformation of Atigh meydan through time ......................271
Figure 5.24. The comparison of morphological parameters of Atigh meydan in the 1923’s map and the present time .................................................................272
Figure 5.25. The models of Integration R3 by Axial Map analysis in the Atigh meydan of Isfahan .................................................................................................274
Figure 5.26. The number of buildings in the convex maps and the superimposition of the axial with the convex maps in the 1923 and current maps of Atigh Meydan ........................................................................................................275
Figure 5.27 The aerial view of Sabze (Atigh) meydan before renovation & two views before and after the implementation of Imam Ali square ...............276
Figure 5.28 The social behavior before and after the implementation of project (source: ISNA.ir) .................................................................................................................. 278
Figure 5.29 The process of urban evolution of Shiraz based on the developmental axes (Bonyadi, 1997) ........................................................................................................ 280
Figure 5.30. The traditional map of Shiraz and the axonometric drawing of Zand complex (Tavassoli & Bonyadi, 1992) ......................................................................................... 281
Figure 5.31. The traditional urban structure of Shiraz reconstructed by Tavassoli and Bonyadi (1992) – Plan of Shiraz after the superimposition of an orthogonal grid of streets.................................................................................................................. 283
Figure 5.32 The traditional (Karimi, 1998) and current time state of the historic core of Shiraz; the side length of the square is 1 km ...................................................... 284
Figure 5.33 The global Integration Rn models of Shiraz based on its traditional and the 1990s’ map (Karimi, 1998) .................................................................................................................. 284
Figure 5.34 The comprehensive plan for the historical core of Shiraz and the details of renewal plan for Karim Khan complex Source: (Naghsh-e-Jahan-Pars 1993). 285
Figure 5.35. The new suggestion which were among the documents of competition ................................................................................................................................. 286
Figure 5.36. The models of Integration R3 measure prepared by Axial Map analysis for the historic core of Shiraz .............................................................................. 288
Figure 5.37. The visual integration models by VGA for the Karim Khan complex of Shiraz ............................................................................................................................... 289
Figure 5.38. The models of visual Clustering Coefficient by VGA for the Karim Khan complex of Shiraz .................................................................................................................. 290
Figure 5.39. The correlation between visual integration and visual clustering correlation measures ........................................................................................................... 291
Figure 5.40. The walled city of Kermanshah in the 18th century (Mahyar, et al. 1999) and the map of city century without fortification wall in the late 19th century (Karimi, 1998) .................................................................................................................. 293
Figure 5.41. The military square and the dominant governor's palace & Sabze meydan; the public square of traditional Kermanshah (Jalilvan, 1990) ................. 294
Figure 5.42. The evolution process of Kermanshah and the modern streets added to the traditional structure through time (Pakseresht, 2018) ........................................ 295
Figure 5.43. The traditional urban structure of Kermanshah and its present time status ................................................................................................................. 296
Figure 5.44. The models of Integration Rn measure by Axial Map analysis for the traditional and the 1996’s maps of Kermanshah (Karimi, 1998) ......................... 297
Figure 5.45. The transformation of traditional Sabze meydan in the center of Kermanshah through time ...................................................................................... 298
Figure 5.46. The rehabilitation plan of Kermanshah central core prepared by the municipality in 2006 (Pakseresht, 2018) ....................................................... 298
Figure 5.47. The global integration model of the historic core of Kermanshah in the scale of 500 meters (Karimi, 1998) .............................................................. 299
Figure 5.48. The models of visual Integration by VGA for the center of Kermanshah in the scale of 500 meters ........................................................................... 300
Figure 5.49. The models of visual Clustering Coefficient by VGA for the center of Kermanshah ............................................................................................... 301
Figure 5.50. The correlation between visual Integration and Clustering Coefficient measures by the scatter plot diagram ............................................................ 302
Figure 5.51. The traditional urban structure of Semnan and its important elements (Tavassoli, 1992) ............................................................................................ 303
Figure 5.52. The axonometric drawing of the urban complex at the center of Semnan (Tavassoli, 1992) ..................................................................................... 305
Figure 5.53. The urban structure of Semnan in traditional and present times ...... 305
Figure 5.54. The models of global Integration measure of Semnan for the traditional and 1996’s maps (Karimi, 1998) .............................................................. 306
Figure 5.55. The states of meydan in the traditional and current maps of Semnan ............................................................................................................................. 307
Figure 5.56. Meydan-e Tirandaz in Semnan at the present time ........................ 308
Figure 5.57. The models of global integration of Semnan’s city center in traditional and 1996’s maps ......................................................................................... 309
Figure 5.58. The models of visual integration by VGA for the historic center of Semnan

Figure 5.59. The models of visual clustering coefficient by VGA for the historic center of Semnan

Figure 5.60. The correlation between Visual Integration and Clustering Coefficient measures by the scatter plot diagram

Figure 5.61. The miniature painting of Hamadan by Matrakçı Nasuh and the 1851’s map produced by Russian army (Ebrahim Zarei, 2011)

Figure 5.62. The 1919’s map of Hamadan produced by the Mesopotamian Expeditionary Force, the map of Royal Geographical Society (Karimi, 1998) – The current state of the city and its extent

Figure 5.63. The traditional urban structure of Hamadan and its present time map in 3 km scale

Figure 5.64. The models of global integration measure for the traditional and 1998’s map of Hamadan

Figure 5.65. The central modern square of Hamadan with the statue of Reza Shah and the mausoleum of Avicenna located in the southern square

Figure 5.66. The radial plan of modern streets implemented in Paris by Haussmann in 19th century and Hamadan by Frisch in the early 20th century

Figure 5.67. The traditional and present time state of Hamadan city center

Figure 5.68. The central square of Hamadan after implementation of pedestrianization project

Figure 5.69. The models of global integration HH of the historic center of Hamadan; scale: 3 km

Figure 5.70. The models of Choice measure implemented for the 2016 and 2019 maps of Hamadan

Figure 6.1. The governmental meydans of Tabriz, Qazvin, Isfahan and Shiraz

Figure 6.2. The pattern of configuration of public meydan in Iranian cities
LIST OF ABBREVIATIONS

ABBREVIATIONS

GIS              Geographic Information System
HGIS             Historical Geographical Information Systems
HUL              Historic Urban Landscape
ICHO             Iranian Cultural Heritage Organization
ICOMOS           International Council of Monuments and Sites
IIC              International Institute for the Conservation
MRUD             Ministry of Roads and Urban Development of Iran
UCL              University College London
UDRC             Urban Development and Revitalization Company
UDRO             Urban Development and Revitalization Organization
UNESCO           The United Nations Educational, Scientific and Cultural Organization
VGA              Visual Graph Analysis
WWII             The Second World War
CHAPTER 1

INTRODUCTION

1.1 Problem Statement

A large-scale project in the historic core of Urmia, a traditional city in Iran, is the starting point of the present study. Urmia, located at the northwest of Iran, is the center of West Azerbaijan province. Similar to other Iranian cities, it has undergone an urban transformation, by a new street network superposed on the traditional organic structure. The morphological logic of traditional Urmia has been completely changed by the interventions of urban modernization. Although the city has grown towards its periphery since 1960s, the historic core has preserved its socio-economic importance as the center of the modern city up to the present time. Regarding the changing needs of the society and the socio-economic problems of the context, the Imam square was proposed by the City Council in the 1990s to be the new public space of the city. The project can be considered as the largest urban intervention on the historic core of Urmia after the construction of modern streets. A considerable number of land parcels have been expropriated and many houses have been demolished to provide the large empty area required for the new square and the surrounding shopping center. Located at a unique place near the traditional bazaar and the historic Jame mosque, the Imam square is supposed to take the place of the traditional city center, Bugda (Wheat) Meydan. However, it has become a controversial issue among the city managers, people and the academicians since the beginning of the implementation in the 2000s. The first phase of the project including a shopping center, named Narvan, and the pavement of the square were completed in 2012. Built in front of the historic Jame Mosque, Narvan shopping center has remained unused without attracting people’s attention since its construction. The newly-created square has been used as a parking lot. The streets in and around the
traditional covered bazaar are usually the most crowded area of Urmia, but the paved square has remained no-man lands. The project has been away from fulfilling its goals. As its initial phase was not satisfied the minimum expectations of the managers, questions about the future of the project have been raised since its completion. The financial risks increased and the upcoming phases have been stopped so far. A big empty void at the middle of the traditional fabric of Urmia has remained without any particular function.

In the 1980s, a relatively large part of the neighborhood in front of Jame Mosque was bombarded during the Iran-Iraq war. That part remained empty for a long time and gradually became a notorious place where criminal activities like selling drugs and exchange of stolen stuffs occurred. Following the urban expansion of Urmia in the early 1990s, the traditional neighborhoods in the historic core became more and more abandoned. In order to cope with the uncontrolled horizontal expansion of the city, the regeneration of the historic core was proposed by the Ministry of Roads and Urban Development. The Imam Square project was first brought forward by the City Council that elects the mayor and observe his/her performance in Iran. Concurrent with the debates of recognizing Urmia as a metropolis, the project suddenly attained a great prominence. Urban Development and Revitalization Organization (UDRO) was assigned as the manager of the project, which was now a national plan with a direct budget from the parliament. A well-known consulting engineering office from Tehran, Safamanesh and Associates Architects, was commissioned to design the new square of Urmia in 1998. Regarding the documents, in a meeting between the designer and the city managers, the project of Imam Square was explained as a necessary intervention on the site, which was a worn-out urban texture with several social problems.
The initial questions of the present study are: What are the reasons behind the failure of the Imam Square project in Urmia? Why people have not accepted and used the square as a public space? Urban design in the historic context is subject of a confrontation between the modern social needs and the old structure. How the historic core of a traditional city should be approached in respect to the contemporary requirements? By the first look at the architectural design of Imam Square, several formal references to Nagsh-e Jahan Square of Isfahan (the governmental center of Iran in the 17th century) as the archetype of the magnificent Iranian Islamic architecture can be identified. The rectangular form encircled by shopping stores with two mosques on its both sides recalls the architectural characteristics of Nagsh-e Jahan. The hypothesis is that the Imam Square was designed with no attention to the morphological logic of Urmia, which has been changed through time. In order to test it, an extensive study needs to be done to analyze the traditional urban structure of Urmia and its morphological transformation by the urban modernization. Making an intervention on a historic town could be destructive if the context is not carefully analyzed. The present study aims to understand how an urban design practice as an intervention on the historic urban context should be evaluated and managed.

Urmia has never been an important political or economic center of Iran. It was a middle-size border city with a typical traditional Islamic urban structure. Although the approaches toward the historic city has been considerably changed in Iran from the preservation of monuments to the area-based conservation, the urban fabric of cities like Urmia is still treated as a worthless entity. The structure of the traditional city, which once damaged by the construction of modern streets, is currently under the threat of new urban projects. Which factors force the designers to a kind of plan that has no relation with the context? In this sense, the Islamic identity that has been a strong discourse since the Islamic revolution of Iran is important. Architecture and urbanism are considered as the means by which the lost identity of an Islamic nation can be reconstructed. The search for an identity, which has no clear definition yet, has influenced the architectural practice of the country. The top down program of the government through the last three decades has culminated in the architectural styles,
which give formal references to the traditional architecture. Projects with such references won the competitions and are published in the journals as the good examples of Islamic architecture. Gradually, it has become a trend to put an Islamic motif or a stained glass on the façade of a building to represent it as traditionalist. The impacts of this approach are apparent in the urban design projects of cities like Urmia, a city that is not widely studied and its traditional urban structure is unknown. Urban morphology provides the necessary language to read the built environment and describe the story of a city. As Karl Kropf (2017) stated, “It helps us to understand what makes every city unique and sheds light on the diversity of human culture as expressed through the specific local forms.” The real identity and character of a city is concealed in the story of its urban form, which has been formed, used, transformed and rebuilt by its inhabitants.

1.1.1 The Main Discussion and the Contribution to the Literature

To evaluate the urban structure of Urmia and the Imam Square project, urban morphology and the analytical methods of Space Syntax are used in the present study. Since the 1970s, the Iranian traditional cities have been studied in terms of the morphological characteristics of urban structure and the typology of urban elements (Tavassoli, 1990; Soltanzade, 1988; Habibi, 2000; Pakzad, 2011). Space Syntax has been applied to study the transformation of Iranian historic cities by the urban modernization since the late 1990s (Karimi, 1998; Sadeghi et al. 2014; Roshani & Sagafi, 2016; Abedini et al., 2018). Recently, the methods of Space Syntax have been also used to evaluate people’s behavioral patterns in the urban space (Askarizad & Safari, 2020), to assess the quality and safety in the pedestrian paths (Çamur, et al. 2017) and to evaluate the accessibility of public spaces like parks in the city level and its relation with the pattern of use (Bahrini, et al. 2017). From the wide variety of techniques of Space Syntax, the Axial Map analysis has been the most applied method in the Iranian context. Askarizad and Safari, in their study of the Municipality Square of Rasht, partially used the Visual Graph Analysis to provide
the visibility pattern of the space (Visual Integration) and to evaluate the viewpoint of observers in the square (Isovist Field).

The main focus of the present study is on the Imam Square project of Urmia. The traditional urban structure of Urmia has never been studied from a morphological point of view. Abedini et al. (2018) have already conducted the Axial Map analysis to study the transformation of Urmia without considering its traditional form before the first urban modernization of the 1930s. To understand the morphological logic of a city, the history of its urban form needs to be analyzed as a whole. Therefore, the traditional map of Urmia is reconstructed to be analyzed along with the other three maps (1965, 1979 and 2017) by the methods of urban morphology and Space Syntax. The morphological characteristics of Bugda Meydan in traditional Urmia, and the Imam Square in the present city are analyzed in different scales and compared with each other. Comparing the states of an urban space in the past and present time provide an appropriate base for evaluation. It is discussed that Space Syntax is an effective method to evaluate a new urban project in the historic context. In the city level, Axial Map analysis illustrates the centrality and accessibility of urban spaces in general; and in the scale of urban blocks, the Visual Graph analysis presents the visibility pattern of a space and its potential for social activities. In the context of Iranian cities, a new urban project has not been evaluated by making comparison with its historic form through the models of Space Syntax measures. The correlation between the measures of Visual Integration and Visual Clustering Coefficient is the most meaningful analysis of the present study to identify the areas with maximum visual centrality and the spatial quality of being a public place. The models, prepared to compare the traditional and the current states of urban spaces, reveal how radically the urban modernization has affected the traditional Iranian cities; and how important it is to study an urban element in both the traditional and current context. A very successful historic urban space can fail to have the same importance in the changing urban structure of the contemporary city.

The second part of the thesis is to answer the question whether it is possible to use the methodology applied to evaluate the Imam Square of Urmia in the other Iranian
cities. In order to provide the consistency and reliability of the methods several case studies have been selected from other Iranian cities. Each city has its own story and an urban process through which the spaces have changed and evolved. This necessitates further developing the methodology used in Urmia. The focus is on the meydan as a significant urban element of the traditional city and the subject of intervention on the historic context. The urban transformation of the cases, which have been already studied by other researchers by the use of Space Syntax are used here for the purpose of comparison. The analyses are concentrated on the traditional meydan, its morphological changes and the probable new projects to renovate or replace it. In some cases, like Tabriz, Isfahan and Shiraz, the traditional meydans are aimed to be renovated, in others like Qazvin, Hamadan and Kermanshah a new open space has taken the place of the traditional meydan in the changing urban structure.

The type and method of Space Syntax analyses are needed to be adapted regarding the specific circumstances of the cases. In Hamadan, for instance, the traditional meydan completely disappeared and replaced by the new network of modern streets. Recently, the central modern square of the city has been changed to be a public space. The model of Integration HH measure by Axial Map analysis was already prepared for Hamadan by Kayvan Karimi (1998). However, after the implementation of the new project the integration pattern of the city is changed. In the present study, a new Axial Map analysis is made to analyze the new urban structure of Hamadan. The impacts of functional change of the central meydan from a roundabout to a pedestrian area on the traditional urban fabric is analyzed by the Choice measure of Segment Map analysis. What does it mean to build a new meydan in the traditional tissue of a historic city? To make a morphological comparison between the 19th century state of Atigh Meydan of Isfahan with its renovated present time state, the Convex Map analysis is conducted to examine their socio-physical aspects. What does it mean to renovate a traditional meydan in the urban structure of a contemporary city?

The aim of the present study is to develop a method of urban morphological analysis that enables the evaluation of an urban design intervention in the historic urban context of Urmia, a tool which could be useful for the decision-making process of
the city in the future. It has attempted to evaluate the impacts of a number of urban projects by applying a research method to analyze the spatial qualities of urban spaces in both the traditional and contemporary cities of Iran. Space Syntax provides the necessary technique to make comparisons between the various conditions of an urban space. In the case of Sahibabad Meydan of Tabriz, the amplitude of the impact of a new street on the spatial qualities of a historic urban space is demonstrated. The correlation between the two different spatial qualities of visibility (accessibility) and the potential to be the place of social activities is taken as the main parameter in this result. The traditional urban structure of Urmia demonstrates that there are so many lessons, which can be learned from a small historic town and to make reasonable decisions for the future planning.

1.1.2 The Objectives of the Study

The present research aims to illustrate how morphological study of a small town like Urmia can be a valuable source for urban design practice; and how its neglect may cause irrecoverable results. The objectives of the present study can be summarized in the items below:

- To understand the urban transformation of a traditional Iranian city by the modernization from the early 20th century onwards,
- To comprehend the configuration pattern of traditional meydans by examining the situation and spatial relationships with other urban elements
- To identify the reasons behind the failure of the Imam Square project of Urmia
- To develop a methodology to evaluate new square projects in Iran as large-scale interventions on the historic context
- To analyze the spatial qualities of squares such as centrality, visibility and the potential to be the place of activities in different scales from city level to urban block.
• To study the approaches toward the design in the historic core of Iranian traditional cities.

1.2 Methodology of the Research

The present study benefits from the analytical methods of urban morphology and Space Syntax to analyze the urban fabric and places of historic cities in Iran. Considering the scarcity of textual documents for the Iranian cities, urban form is an appropriate source to study the physical transformation and to trace the socio-economic changes. Urban morphology has been defined as “the systematic study of the form, shape, plan, structure and functions of the built fabric of towns and cities, and of the origin and the way in which this fabric has evolved over time” (Gauthiez, 2004). Without understanding the processes that have produced and transformed the city, “attempts to manage or enhance the built urban environment would be like trying to steer a ship without a rudder. It is precisely the discipline of urban morphology that provides the knowledge, understanding and methodology to steer policy in the right direction” as Barke (2018) puts it. Urban morphology considers the historic city as “a process rather than an object”: not according to established notions of historical or “stylistic periods”; instead, recognizing the evolving relationship between the urban grain, built form, land and building use in cities; thus, their unique socio-economic and cultural identity, their multiple layering and spirit of place (Rodwell, 2009).

The historical documents including maps, drawings, photos, travel books and etc. are gathered for Urmia and the other case studies. The archives of Iranian Cultural Heritage Organization (ICHO), Iranology Foundation (Bonyad-e Iran Shenasi) and internet sites are the sources from which the data has been collected. The historic maps were digitalized to be able to use in different computer programs to make the analyses. Resolution or scale is one of the main principles of morphological analysis (Strappa, 2018). Urmia and the other cases are analyzed in different scales from the city level to districts, urban blocks and urban tissue. The first scale (about
(1/100,000) makes it possible to study the geography of the city and its relation with the natural features around. For the next step, to scrutinize the urban structure of the historic core, the scale is increased to the city level (about 1/30,000) and the analysis is done by a square with the side length of 3 km. The traditional maps of all cases can be properly framed inside this square. The situation of important urban elements, their interrelations with each other, the commercial and administrative axes of the traditional city are identifiable in this scale. By having a closer view, it has been possible to study the urban fabric of neighborhoods and the parceling pattern in high resolution with more details. The scales in the level of neighborhood (about 1/10,000) and the block level (1/5000, 1/3000 and 1/1000) are applied to conduct the morphological analysis.

Space Syntax encompasses a set of ideas, concepts and techniques for analyzing, quantification, calculation and representation of spatial configuration in relation with the human activity patterns. Nowadays, it has been extensively used in the urban morphological studies and other fields such as “modelling urban traffic, predicting air pollution levels, assessing the occurrence of burglaries in different neighborhoods, and estimating the potential for retail development in streets” (Ratti, 2014). Space Syntax provides an appropriate means to have a critical evaluation of urban projects and to test the hypothesis developed in the morphological study. It makes possible to examine the complex interrelations of urban elements in different scales. Space Syntax conducts computational analysis based on the measures, which illustrate the concepts such as centrality, accessibility and visibility for a spatial organization. Each element is attributed with a numeric value and the whole map is presented by a graphical model to comprehend the relationship between elements.

The present study discusses the contribution of Space Syntax in predicting how a designed plan can affect an urban context. Regarding the increasing complexity of urban environment, the use of quantitative analysis can be helpful and practical. However, it is important to consider the shortages and deficiencies of Space Syntax as well. It should be a complementary technique and a tool for assistance used along with the other methods in the urban studies. UCL Depthmap 10th Edition program,
a software package of Space Syntax, is used in the present study to conduct Axial Map, Segment Map, Convex map and Visual Graph analyses. It has become an open source program along with various sorts of information and a descriptive manual to be freely used on a website with the address of http://www.spacesyntax.net/. The digital maps were prepared in AutoCAD program with DXF formats and imported to Depthmap.

1.3 The Structure of the Thesis

Introduction is the first chapter where the problem statement, the methodology of research and the literature review are explained. The aims and scope of the thesis, the similar studies, which have been already done and the contribution of this research to the literature are discussed. The data collection methods, the sources of documentary study, the process of preparing the maps for the analysis and the computer programs used in the research have been explained in this chapter.

In the second chapter, the literature review includes the theories and concepts of urban morphological studies from different points of views, and a brief description of the theoretical foundation of Space Syntax. By giving examples from Iran and other countries, the three different ways in which the analytical methods of Space Syntax have been applied to study historic cities are explained.

The title of the third chapter is The Iranian Cities; Tradition, Modernization and Renovation in which the transformation process of Iranian historic cities is discussed. After a brief description of pre-Islamic ancient city of Iran, the formation of the Islamic city, its significant physical characteristics and the urban elements particularly open public spaces are explained. The process of urban modernization on the traditional Iranian cities that has a devastating impact is described in the three steps. The change of approach toward the historic urban context in Iran is considered by describing the policies and responsible organizations for the area-based conservation. Instead of preservation of individual monumental buildings, the
current concepts of conservation-led regeneration or regeneration through conservation indicate the renovation of historic cities are according to the new requirements are introduced.

In the fourth chapter, the main subject of the present study, the Imam Square project of Urmia is examined. The urban morphological study as the methodology of the research is conducted by analyzing the traditional urban structure of Urmia. The commercial and administrative axes of the city are determined on the maps by overlaying of the functional layers. The transformation of the city by the urban modernization of the early 20th century is studied in three periods of time. The impacts of the modernization on the historic core are analyzed by the methods of Space Syntax including the measures conducted by Axial Map, Segment Map and Visual Graph analyses. The scale of analyses ranges from the scale of the city to the scale of urban block regarding the content and type of the analysis. The site of Imam Square, which was the place of Bugda Meydan in the traditional Urmia, is scrutinized to develop a critical discussion on the new project. The analysis methods of Space Syntax make it possible to evaluate the Imam Square as an urban design project in the historic center of Urmia. The results reveal that the new square has fundamental problems in terms of establishing relationships with the traditional urban elements and integrating with the modern Urmia. In fact, the project has been neither a continuation of the past nor a successful development for the future of the city. The Space Syntax contributes to illustrate the changing morphology of Urmia from a traditional town to a modern metropolitan city. Any intervention on the historic urban context needs to consider the new logic of urban structure and attempts to conserve the historic relationships of urban elements.

The fifth chapter of the thesis comprised of the case studies from other Iranian cities in which the projects of meydan have been planned or implemented. Consistency is one of the quality standards of a research that necessitates the concept of reliability that refers to the adaptability of the research method in other cases with the same condition (Groat & Wang, 2013). The generalization of a method or the result of a research means that it is reliable enough to be used in other cases. In order to
generalize the method of analysis used in Urmia, other cases from Iranian cities are selected and analyzed in the fourth chapter. It is seen that similar experiences like the Imam Square of Urmia have been practiced as “renovation project” for the traditional *meydans* in the cities like Tabriz, Isfahan and Shiraz. The spatial organization of the traditional public squares –*meydans*– in the cities like Semnan and Kermanshah have been changed by these interventions. A comparative study between the traditional and the present forms of *meydans* has revealed how much their morphological characters have been changed in the contemporary city. The traditional urban structure of the cities like Hamadan and Qazvin has been totally transformed. Instead, new public *meydans* have been generated by the pedestrianization of modern urban spaces. These cases provide the opportunities firstly to test the methodology of the present study in other contexts and secondly to have a more comprehensive view on the problem of large-scale interventions on the historic urban areas in Iran.

The Sixth chapter is the final discussion and the conclusion of the thesis. The results of the analyses and evaluations of Urmia and the other cases have been evaluated to have a general view on the urban design practice in the historic context of Iranian cities. Suggestions for the future studies have been made at the end of the chapter.
CHAPTER 2

APPROACHES AND STUDIES ON URBAN FORM AND URBAN CONSERVATION

2.1 Approaches to Study the Historic City; A Theoretical Framework

The urban form has been studied to investigate the human aspects of the built environment. The historic cities are recognized as a valuable source of information to understand how people inhabited, experienced and changed a setting to accommodate their needs. It narrates the story of past, the different socio-economic relations and the life style of people. Although the term of “urban morphology” has been used since the late 1950s, the studies of urban form go back to the turn of the 20th century (Bilsel, 2015). There has been an extensive development in the theories and analyzing methods of urban morphology since the 1980s. The innovation of computer, with the high graphical and computational abilities, has imposed a considerable impact on the methods of urban form analysis. Space Syntax is a successful example of using computational tools to quantify the data in the morphological studies. The theories and approaches which have affected the morphological studies and are used in the present study can be classified to five groups.

2.1.1 Studying the Historic City to Derive an Urban Design Approach

The historic urban form became an object of study, when it started to be destroyed by the modernization process of cities in the 19th century. Camillo Sitte might be the first architect who proclaimed that the design of city is not just a technical task based on statistics and geometry. In the era of flourishing modern planning, Sitte did not hesitate to explain the charming effects of traditional urban spaces in his book *City*
Planning According to Artistic Principles published in 1889. He prepared the figure-ground plan of urban spaces, mostly plazas, and rendered the most important building, typically church, in black. The visual perception of environment based on movement, the changing perspectives and the lines of sight were the important subject matters through which Sitte evaluated urban spaces. Gordon Cullen was another key figure who approached the city as a work of art; a collection of buildings, trees, nature, water, traffic, advertisements and so on which are incorporated together to create a drama (Cullen, 1961). He presented the concept of townscape as the art of giving visual coherence to the urban elements. Initially published in the journal of The Architectural Review, the book has become a significant source for architects, designers and urban planners. Like Camillo Sitte, Cullen explored the fact that the visual effects of urban space were based on quite definable, if often spontaneous, aesthetic principles. The ideas of Sitte and Cullen are broadly explained in the next parts.

Steen Eiler Rasmussen in his book, Towns and Buildings: Described in Drawings and Words published in 1949 in Danish and then translated to English in 1969, concentrates on the town as a unity, as a whole composed of buildings and places. He considered the buildings as the rooms and houses of the towns where people live and criticized the way they are presented as static objects. Rasmussen emphasized the importance of architecture in the urban structure of the city, and his ideas were widely taught in architectural schools around the world (Periton, 2018). Edmund Bacon in his book, Design of Cities published in 1967, provided a historical study of urban form growth from early Greek and Roman times. His aim was to introduce a theory of urban design. Bacon considered the multiple aspects that affect the urban design practice like the spatial organization, social interactions, natural features, and the perception of environment. Bacon identifies eight elements as the design tools including meeting the sky, meeting the ground, points in space, recession planes and etc.
2.1.2 Studies of Urban Form in Architectural History

Pierre Lavedan, a French philosopher and art historian, published *L’Histoire de l’urbanisme* in three volumes between 1926 and 1982 in which hundreds of different urban designs were identified and presented with basic information. Lavedan included geographical, social, economic, and political aspects into his analysis of the urban form. The third volume of his book is still the best introduction to the morphological history of Paris. The history of urbanism aims to create a kind of genealogy of ideas. An element-based study can be done to gather the relevant case from different cities without paying attention to the evolution of individual urban form. In another type of study, the focus is on the physical features of a particular city. Lavedan conducted both types to make a distinction between spontaneous urban evolution and the town planning. For him, the history of urbanism is concerned with “the creation of new towns, the planned extension of existing ones, and the planned transformation of old urban fabrics” (Darin, 1998)

Spiro Kostof presented an extensive study of urban forms from its origins up to the modern time in his book *The City Shaped: Urban Patterns and Meanings Through History*. He provided a useful categorization of urban patterns, their historical evolution, sociocultural foundations, and their physical characteristics by illustrating multiple examples around the world. The book’s first chapter, *Organic Patterns*, explains how problematic is to make a strict dichotomy between *planned* and *unplanned* patterns of urban form, as an organic city can present a sense of regularity and a planned city may have an internal complexity and irregularity. “Most historic towns, and virtually all those of metropolitan size, are puzzles of premeditated and spontaneous segments, variously interlocked or juxtaposed” (Kostof, 1991). In his book, *The City Assembled: The Elements of Urban Form Through History* published in 1992, Kostof considered the components of a city which are common to all settlement patterns, independent of his previous classification. Particular urban elements such as “the city edge”, “public places” and “the streets” are illustrated in the book by several examples.
In Iran, the studies on the historic cities started with the first archeological excavation of early 20th century by the reign of Reza Shah, the first Pahlavi king. André Godard, a French archaeologist, architect and historian, was an important figure who had key archeological findings, managed the restoration of historic buildings and designed some significant edifices like the National Museum of Iran. Godard began the first excavation in 1911 and then became the director of Iranian Archeological Services in 1928. At the same time, Arthur Upham Pope who was an American archaeologist and art expert was also invited to Iran by Reza Shah. Pope with his book, *A Survey of Persian Art*, published in six volumes in 1938, and Godard with the book of, *L'Art de l'Iran (The Art of Iran)* published in four volumes in 1962, made important contributions for the documentation of historical buildings and sites. Along with the Nationalism policies of the government, Pope and Godard introduced the Iranian art and architecture particularly the pre-Islamic period in the world.

In a similar style, Albert Gabriel, a French archaeologist and art historian, conducted a detailed survey of on the historic settlements in Turkey and the important buildings of Anatolian region. He provided valuable documents as architectural plans and isometric drawings which illustrate the setting of monumental structures in the urban context. The books of Gabriel like *Une Capitale Ottomane: Brousse (Bursa: The Ottoman Capital)* published in 1958, have become an important reference in the historic studies on Ottoman cities and architecture. Through his extensive survey of the urban complexes, Gabriel can be recognized as the pioneer of morphological studies in Turkey (Bilsel, 2015).

### 2.1.3 Urban Geographical Approach to the Study of Urban Form

M. R. G. Conzen was a German geographer and the founder of the British school of urban morphology. In his book, *Alnwick, Northumberland: A Study in Town Plan Analysis*, Conzen illustrated that the urban structure of a small town like Alnwick may have its particular geographical complexity, and by studying its plan some concepts can be acquired to contribute the future development of the city and its
regional environment (Conzen, 1960). Considering the journal of *Urban Morphology* as the main publication of ISUF (The International Organization of Urban Form), it is revealed that *Conzenian tradition*, developed by his students and followers, has dominated the theoretical literature for the last two decades. The concepts with a geographical origin such as *morphological frame, morphotopos, morphological regions, critical continuation, matrix route, accretion, repletion, replacement* and *fixation line* have been widely used in the urban morphological studies. This has caused the architectural concepts, which are significant in the urban design practice, have been less developed and applied.

Karl Kropt in his book, *The Handbook of Urban Morphology*, presents a manual of urban morphological analysis. Based on the *Conzenian tradition*, he provides the principles of urban morphology, its core concepts, the various formal aspects and the methods by which it can be implemented. Kropt makes an emphasis on *urban tissue* as the concept that offers an effective framework for identifying and describing the physical characteristics that generates the particular *character* of a city and its *identity*. His study contributes to categorize and develop the concepts used in morphological studies from a geographical point of view. By explaining case studies, Kropf attempts to illustrates the ideas and methods of urban morphology.

### 2.1.4 Studies on urban form in Iran and the Islamic cities

Basim Hakim in his book *Arabic-Islamic Cities: Building and Planning Principles*, presents how cultural beliefs, customs (Urf) and religious principles of Islam (Sharia) has imposed an effect on the urban form and structure of Arabic Islamic cities. The social diversity of Islamic cities and its impact on the structure of neighborhoods has been discussed. Hakim has attempted to formulate a theory for the Islamic city that can be applied in the contemporary planning. Stefano Bianca (2000), an architectural historian and an urban designer, studied the socio-cultural aspects of Islamic society and attempted to explain its impacts on the urban form of Arabic cities.
Andre Raymond, who criticized the Orientalist view of French historians toward the Islamic city in the early 20th century, proposed the term traditional city to refer the structure of cities before urban modernization of the 19th century. Studying the Arab cities of the Mediterranean region, Raymond approached the city an urban system “with its own originality, endowed with its own specific characteristics, whose structure must be analyzed and whose workings understood, even though they may obey principles different to those with which we are familiar” (Raymond, 2005, 213).

The major characteristic of the traditional Arab city for Raymond is the separation of public and private zones. The public center, including the market, Friday mosque and public facilities concentrates the economic, religious and cultural activities. Through a radio-concentric urban organization, the market plays a unifying role between the private zone of neighborhoods which were individualized by religion or ethnicity. (Raymond, 2005, 214)

Cânâ Bilsel in her Ph.D. thesis, Cultures et fonctionnalités : l'évolution de la morphologie urbaine de la ville de Izmir aux XIXe et début XXe siècles [Cultures and functionalities: the evolution of the urban morphology of the city of Izmir in the 19th and early 20th centuries] presents a morphological study of Izmir, a historic port city in Turkey, in 19th and early 20th century. The evolution of city was traced through the historical maps, visual and written documents, and the impacts of cultural and functional factors on the urban form were studied. Bilsel in an article published in Osmanlı Mimarlığının 7 Yüzyılı: Uluslararası Bir Miras (Seven Century of Ottoman Architecture: An International Heritage) in 1999, discussed the phases of historical evolution, cultural differences and the morphological diversity that the urban fabric of the 19th century Izmir exhibited. In this paper, she also introduced the first attempts of urban remodeling in the city. The transformation of urban spaces was analyzed along with the changes that occurred in the modes of spatial production in this period.

M.K. Pirnia was a self-educated archeologist and historian who spent several years to research and discovering of unknown historic buildings and cities of Iran particularly for the Islamic period. His studies on the traditional routes and
caravanserais of Iran published in the book of *Rah and Robats* in 1973, draw the attention toward these buildings at the time. By the contribution of his student, G.H. Memarian, Pirnia in his book, *Sabk Shenasiye Memariye Iran [A Stylistic Study of Iranian Architecture]* published in 1992 provided a classification of Iranian architectural styles from pre-Islamic period until the end of Qajar dynasty in the early 19th century. The classification was the result of his life-span survey of historic cities and the analytical comparison of them. From the six style, Parsi and Parti styles are related to the ancient Persian Empire, and four styles of Khorasani, Razi, Azeri and Isfahani are related to the Islamic architecture and urbanism in Iran (Pirnia & Memarian, 1992).

The stylistic classification of Pirnia was used by Mohsen Habibi in his book, *Az Shar ta Shahr; tahlili tarikhi az maqhume shahr ve simaye kalbodiye* [From Shar to the city; a historical analysis of the city and its physical image] published in 1996, to categorize the evolution of Iranian city from its primitive form *Shar* to the structurally developed cities. He explained the sociopolitical condition of each period and its impacts on the formation of a style. By drawing the schematic plans of cities, Habibi provides the opportunity to make a comparison between the urban structures of Iranian cities before and after the Islamic periods. Although the book presents a reductionist approach toward the urban form, it can be helpful to study how the urban elements have been transformed regarding the changing political and socio-economic forces through the history.

Mahmoud Tavassoli is an important scholar who has done original studies on the traditional cities which are mostly located at the central part of Iran. The spatial relations between urban elements and their architectural characteristics have been studied and illustrated with sketches and diagrams. Tavassoli published his first book, *Sakhte Shahr dar Eglime Garm ve Khoshke Iran*, in 1981, the revised edition of which was translated to English with the title of *Urban Structure and Architecture in the Hot Arid Zone of Iran*, in 2012. He considered three prominent factors of climate, culture and government in the formation of urban setting throughout the history. In his seminal book, *Usul ve Raveshaye Tarrahi Shahri dar Iran (Principles
and Techniques of Urban Design in Iran) published in 1985, he provided a comprehensive morphological analysis of cities like Yazd, Naeen, Kerman etc. in different scales from their macroform to the scale of neighborhood and urban block. Through figure-ground analysis and isometric drawings, the spatial organization of urban spaces were analyzed and illustrated.

2.1.5 Studying of Urban Form by Computational methods

Bill Hillier was the key founder of Space Syntax in The Bartlett school of architecture, in the late 1970s to the early 1980s. In the book of The Social Logic of Space, Hillier and Hanson presents a new theory of space to explore the relation between societies and spatial systems. Space and society are considered as mutual entities that interact and influence each other. Space syntax was founded based on the theory that a direct connection is existed between the spatial organization of a city and the pattern of urban activity. “It is primarily through spatial configuration that social relations and processes express themselves in space”. (Hillier & Hanson, 1984) Space Syntax provides the methods by which the spaces can be divided into elements, analyzed inside a computational network, then illustrated as graphical models that present the relative connectivity and integration of those spaces. Configuration is a significant concept in Space Syntax that refers to “the relation between two spaces taking into account the third, and, at most, as the relations among spaces in a complex taking into account all other spaces in the complex” (Hillier & Hanson, 1984).

Kayvan Karimi is one of the directors of Space Syntax Limited Company in UCL and also an academician in the Space Syntax Laboratory at the Bartlett School of Architecture. In 1998, Karimi completed his Ph.D. thesis in which a comparative study between Iranian and English cities was done by the methods of urban morphology and Space Syntax. For the first time, the Axial Map analyses were conducted on the traditional and the contemporary urban structures of six Iranian cities: Kerman, Shiraz, Qazvin, Kermanshah, Semnan and Hamadan. Getting access
to the archive of Royal Geographical Society in the UK, Karimi presented the original maps of Hamadan, Qazvin and Kermanshah prepared by the Mesopotamian Expeditionary Force in 1919. These documents are so important to study the traditional urban structure of the cities before the interventions of modernization. The models of Integration Rn (global) and R5 (local) were prepared for the old and new maps of Iranian and English cities. By making a comparison between the models, it was inferred that the Iranian cities has been more radically transformed than the English cities which their developments have been in conformity with the historic urban structure. Except Kerman, the other five cities are selected as the cases of present study, and the Integration models prepared by Karimi are used to save time and avoid repetition.

Ayşe Sema Kubat has conducted several morphological studies by the analytical methods of Space Syntax in Turkey. The historic cities like Istanbul, Antakya and Konya were studied to analyze the morphological characteristics of old and new cities and the transformation of urban spaces. Sema Kubat argues that the principal aim of the studies on urban form held in Turkey, is to document the historic urban fabric which have been damaged along with the ongoing urban transformation. “Urban form is often considered as a container of socio-economic processes and as a marker in the search for cultural identity in Turkey” (Kubat, 2010). Space Syntax has been used by Kubat to evaluate the urban projects to rehabilitate and revitalize the historic areas such as Galata in Istanbul and Sharjah in the United Arab Emirates.

2.2 Conservation and Designing in the Historic Urban Context; the Conflicting Issues of Old and New

The conservation of historic cities seems to be accepted universally, but the interpretations of its principles are different in the countries. The main questions have always been why, what and how to protect. There is a general agreement that the monuments and remarkable buildings are respectable pieces of art which should be conserved. They are also typically durable buildings with a high aesthetic quality
which makes them socially and financially valuable. While the conservation of individual buildings is less problematic, the area-based conservation has always been difficult as the historic urban structure of a city and the system of relationship between urban elements are supposed to be taken into account. The historic part is usually a small and deprived central district around which the city is being expanded by the modern neighborhoods and facilities. The term of historic core is commonly used for the old district of the city. Why we need to protect the rundown and dilapidated historic core while we can construct a new one in its place? To which degree the originality of an urban space should be kept? So that the historic tissue could be conserved? What does a traditional tissue add to our urban experience to deserve the conservation? These questions produce a variety of approaches that differ from the radical intervention for change to the extreme of absolute preservation. It is so difficult to define to what extent the past should be conserved and to what extent it can be compromised to allow the urban environment to be changed regarding the needs of current city (Karimi, 2000).

Peter Larkham presents various approaches toward the historic city which include financial, fashion, psychological, didactic and historical arguments (Larkham, 1996, 6-15). The conservation of historic entities can be financially profitable if its condition is provided. The tourism industrial is an important economic source of the modern time and its development depends on the well-represented historic environment. The fashion is another motivation for supporting some conservation activity when certain well-known companies select the popular old buildings as their headquarters as a gesture of prestige. Larkham explains that conservation has a kind of psychology that initiates from the notion that civilization could be defined as a sense of permanence and the civilized man “must feel that he belongs somewhere in space and time, that he consciously looks forward and backwards” (Larkham, 1996). In this sense, the historic entities of a nation provide the opportunities to look past to be ready for the acceptance of an unknown future. The psychological benefit of preserving the historical environment is to provide visual reference to the past. In the modern era by the developments in technologies and the complexity of life, the need
to be in contact with the past is more necessary. Larkham states that the existence of historic environment stimulates the sense of identity and creates a sense of being proud.

The historic city had a mutual aspect to hold both the tangible and intangible heritage that means the physical features and the spiritual values of communities (Ashworth, Graham et al. 2007). The tangible heritage refers to the buildings and the spatial organization of urban environment. The intangible legacy of cities indicates the pattern of social activities that occur in urban environment encompasses the collective memory of places shared by people. In this sense, the heritage can be defined as a social construct that has been more and more considered in the conservation debates since the early 1980s. Larkham criticized the approaches toward the heritage as the process of selection and presentation of it is done regarding the principles of popular consumption; therefore, “it is a form of commodification” (Larkham 1990, 13). For Larkham, heritage is a term used in the urban projects of selective sites as a key component of the place-marketing and revitalization strategies. In spite of the popularizing of conservation activities, the control of heritage conservation is assigned to the elite classes and the participation of local inhabitants is very little.

The historicity as the quality of being an actual part of history is achieved for the modern observers where they find some visual records of the past; Spiro Kostof (1992, 299) expresses this idea with the following words: “somewhere among the gables and bay windows is the echo of people who came before us and occupied the place and built these buildings as object of pride and self-advertisement.” The historic core of a city creates a sense of place for the society which experiences constant change and transformation. “It reminds us not only who we are but also what we have been” (Kermani, 2017). People see historic environment as a bridge between the past and the present as they are not entirely separate bodies. The different aspects of the historic settlements make their changes in the modern time a complex issue. The difference between the terminology of preservation and conservation demonstrates one of the complexities of this issue. Larkham considered
the term preservation has implied that no change is allowed to be made. The term of conservation, on the other hand, refers to an active process that includes a series of changes of the function and spatial relationship (Larkham 1990, 351). Therefore, conservation has a broader meaning from formal protection to the practical usage, reworking, regeneration and improvement of the historic properties. The change of approaches from preservation to conservation is an important result of the advancement of conservation during the past two centuries.
2.2.1 From Modernist Urbanism to Area-Based Conservation; the Progress of Policies

With the modernist approach in urbanism, free-standing towers are implanted inside large open areas which are supposed to be the place of activities as it was illustrated by Le Corbusier in his sketches. However, as Roger Trancik explained, they resulted in lost spaces which are located “away from the flow of pedestrian activity” in the city and gradually become no-man’s-lands (Trancik, 1986, p.3). The terms used by Trancik indicates the massive empty areas between the buildings which are accessible for people but provide no attraction to be used. The public open spaces lost their boundaries and therefore their character and attraction as a result of the modernist planning implementations. It was an answer in search for a healthy city with larger green spaces, sunlight and air, greater mobility and individual freedom. Colin Rowe and Fred Koetter in their book, Collage city published in 1978, explain that the prominent criteria of modernism are “honesty and hygiene” in place of “traditional subterfuge and imposition”. The aim was “a visible and rational equality of parts – an equality that insists upon openness and is readily to be interpreted as both cause and effect of any condition of human well-being” (Rowe & Koetter, 1978). The basic human needs like variety and choice, social interaction, creative participation, and a satisfying sense of belonging to a larger supportive context have been compromised by the principles of modernist urbanism. According to Rowe and Koetter, the logical and defensible presupposition of International Style – light, air, hygiene aspect, prospect, recreation, movement, openness – “reduces the public realm and the traditional world of visible civics to an amorphic remainder” (Rowe & Koetter, 1978).

The modernist urbanism has led to multiplication of buildings as singular objects isolated from the surrounding urban context and the neglect of fabric. The modernist blocks free on all sides are not able to provide relationship to the exterior space and to other buildings around. The city is interpreted as a structure of solids instead of a structure of spaces within the functionalist approach. Matthew Carmona et al.
explain that morphological changes by modernist planning have broken down the system of urban block and the network of public spaces, as the definite spatial types of streets and squares have been changed to a “more amorphous type of space” (Carmona et al. 2010). The space between buildings for the first time was considered functionally independent from other urban elements. They become a circulation network consisting of large green areas and vehicle routes that link the separated zones of the city. Instead of making connection between urban elements, the highways, large parking lots, massive grass areas and huge parks have become the edges that prevent the continuity and spatial relationship. As a result of this, the city has transformed to be a grid of segregated and single-use building blocks. Jane Jacobs (1961) is one of the first to criticize the construction of “single massive or stretched-out” borders in urban communities. Instead of providing connections, these borders become territorial barriers, making dead ends of uses without connections between adjacent areas. Eventually, “stretched borders transform aligned areas to be border vacuums”: empty of people and dead places (Jacobs, 1961).

There were also preservationist ideas in this period which were a reaction to the technological advancements and the result of people’s more concerns about the values of historic architecture. John Ruskin (1849), who was a well-known theorist of preservation, strongly insisted upon preservation and revivalism of Gothic architecture. He believed that we have no right to touch the historic buildings; “they are not ours. They belong partly to those who built them, and partly to all the generations of mankind who are to follow us” (Ruskin 1849). This extreme idea identifies no chance for physical and functional alternatives. The urban structures of historic cities, the medieval European and Islamic cities, have been referred to, in search for alternative models to modernist urbanism by Team 10, which were a group of young architects who had a critical approach toward the modernist urbanism and international style in the 1960s. The horizontal spatial organization of Team 10 which embodied in the design strategies like Mat-building, Configurative Discipline and then in the Japanese movement of Metabolism are the examples of inspiration from the traditional urban structure. Because of that the conservation of the historic
urban tissue as a spatial configurational pattern is as important as the individual buildings. In this section, a brief history of the approaches and policies that affected the evolution of area-based conservation will be presented. Conservation like any other planning activity cannot succeed without legislative base and political support. There has been a historic progression of ideas and practices through which the concepts of preservation and urban conservation have evolved over the past decades. These concepts have been formed to contribute the maintenance of the built environment to transmit the messages and cultural properties to the future. Perhaps, it was during Renaissance that the first protection of historic architecture happened consciously (Papageorgiou 1971). The humanist approaches of Renaissance contributed for the awareness of the necessity of preserving artistic staffs as a respect for the works of ancient times, which became the inspiration source for the reawakening of classic architecture at that time. By the industrialization movement through the 19th century as a period of scientific advancement and rising urbanization, the integrity of the historic townscape was systematically ignored whereas important initiatives were taken in order to conserve monuments individually. The invention of tramways and the construction of wide streets and roundabouts affected the historic centers and profoundly changed it. (Papageorgiou 1971, 84).

Comité Spécial des Arts et Monuments founded in France was a society that prepared a list of historic buildings for preservation in the 1830s and 40s. It was an example of the first conservation movement in Europe. It was also in French where the laws of preservation of monuments was enacted in the late 19th century. The 1887 Act established diverse categories of historic buildings based on both scientific and legal criteria (Papageorgiou 1971, 40). However, the actions were restricted and concentrated on individual buildings. The regulations were reinforced in the early 20th century, by the supporting acts such as the 1913 Act in England and 1918 Act in France, which provided more operational power for the managers to preserve the historic buildings; until the 1960s, there was no inclusive and practical regulation to protect the European historic cities.
In the 1950s, a new approach was presented in the fields of urbanism and planning. Planning, which offered more priority to economic and social development and had no concern about the historic assets of the city, opened new visions toward the issue. Economic sustainability and the social permanence were among the topics which were started to be concerned in the realm of urban conservation. It is interesting that the first urban planners had great contributions. Patrick Geddes, who was known as the founder of town planning, developed the concept of *conservative surgery*. In the travel to Madras and Lahore, two Indian historic cities, Geddes strongly opposed the planning practice of engineers, who with the title of hygienic improvements had constructed large urban projects and began to of widen the old alleys and demolishing of the urban fabric following what is known as Haussmanization. Geddes believed that the existing street network was the product of practical life in the past. By studying the urban fabric, the problems can be identified to make improvements without unnecessary destruction (Karimi, 1998). The urban pattern can be protected to continue its life as it was the representation of the past. Geddes stated that “by our small removals, straightening, opening, and replannings in detail, a network of clean and decent lanes, of small streets, and open places, and even gardens, is thus formed, which is often pleasant, and I venture to say sometimes beautiful” (Geddes cited in Karimi, 1998). Geddes presented a new view to urban conservation in developing countries. However, his ideas were too early for that era and was not valued as much as it deserved.

The practice of conservation even in the scale of individual buildings, never achieved a noteworthy level before the WWII. The vast bombardment of the centers of European cities and the dominant sense of identity supported by post-war nationalism, made urban conservation a common practice after the 1950s. People became more sensitive to keep the exceptional character of historic areas constructively. Two kinds of approach or a combination of them were prevalent in the post-War Europe: the renovation of historic areas regarding its previous form and the transformation by a modernist approach. Some destructed cities such as Warsaw were rebuilt exactly in the identical manner as it was before the war. However, there
were also numerous development schemes which totally ignored the old structures and established the products of the International Style in the hearts of old centers.

There was a significant change of approach from the conservation of individual buildings to historic areas and townscape after the WWII. It was going to be understood that the monuments are meaningless without their context. The historic center was seen as a potential for active urban life and socio-cultural activities which can provide a unique urban experience. There was a need for a legislative framework to design and plan the historic core of the city. France took the initial steps again. Although the list of French historic buildings was already prepared under the terms of the 1930 Act, the conservation of groups of buildings was not financially supported until 1958. Conservation was recognized as a professional job in 1950 after the establishment of the International Institute for the Conservation (IIC) and the publication of, *Studies in Conservation journal in 1952* (Jokilehto, 2007). A significant turning point in regulations can be recognized in the 1960s as the large projects and street construction plans were paused in favor of rehabilitation of the existing fabric.

Succeeding the 2. International Congress of Architects in Venice which was hold in 1964, a new organization was established as the International Council of Monuments and Sites (ICOMOS) that aims to facilitate the collaboration between architects, urban designers, planners and archaeologists by providing its legislative base. Most of developing countries became the members of UNESCO’s Convention Concerning the Protection of the World’s Cultural and Natural Heritage in 1972, and it was started the world heritage sites to be listed. The Venice Charter makes an emphasis on the concept of originality and provides the codes for maintaining of individual buildings. It indicates that “monuments are to be conserved not only as works of art but also as historical evidence” (Jokilehto, 2007). Conversely to the single monuments, for the first time the UNESCO presented the concept of cultural heritage, which provides the foundation for the conservation and rehabilitation of an area.
In the 1970s, the necessity of conserving the physical state of historic context was seriously felt. Conservation was no longer considered as a backward action and presented sustainable answers to the social and economic problems of cities. This approach addresses the need to make changes in the historic area more sensitively to ensure “the retention of this finite resource in a way which does not compromise its integrity, while guaranteeing its economic wellbeing” (Izadi, 2008). The new approaches have founded the basis for the policies that could make an integrated approach possible; thus, the concepts such as “conservation-led regeneration” or “regeneration through conservation” have been brought to the fore. In contrast to the early conservation ideas that imposed limitations on architecture, appearance, and use of historic buildings, the new concepts highlighted that the historic areas should not stop evolving. Rehabilitation, which had been suggested a long time ago by Geddes, indicated that life should be continued in the historic districts (Karimi, 1998). Urban rehabilitation is not about merely the passive protection of individual buildings with a historic significance, but the integration of historic site to its new environment is considered as the ultimate goal. Urban regeneration that is a new approach of conservation refers to the creative use and re-use of a neighborhood instead of the protection of old staffs. Integration of social and economic programs is taken into consideration together with the measures of physical conservation. A dynamic process is needed to be formed by which the features of historic cities can be preserved and simultaneously, active urban life and economic productivity can be produced.

Urban growth and heritage conservation were considered as two different fields that refers to the particular goals up to the 1970s. The development of urban spaces aims to improve the condition of life. The conservation aims to keep the historic entities for the people who will live in the future. In the Declaration of Amsterdam (1975), the historical continuity was emphasized to be preserved to maintain the circumstances “which enable individuals to find their identity and feel secure despite abrupt social changes” (Izadi, 2008). The idea of conservation with a multi-disciplinary nature was explained by the Council of Europe, in the European Charter
of the Architectural Heritage in Bulgaria (the Bulgaria Charter, 1975). It referred to many sensible subjects such as financial, administrative and legislative aspects of urban spaces. In 1987, ICOMOS adopted the Washington Charter in which the integration of planning and conservation was emphasized to have a better performance in participation of people in the projects and to preserve the social structure of settlements. The historic urban context was considered as the basic part of the whole city. In the 1990s, a significant change towards a comprehensive approach, by which the socio-economic and physical aspects were considered together, was formed.

A good example of integrated approach is the Belvedere Memorandum in the Netherlands, a program that reformed the relationship between urban planning and cultural heritage. In the ten years from 1999 to 2009, the Belvedere program was a practice in merging the activities of heritage conservation with property expansion natural sources, water management, and leisure industry. Considering preservation through development, the program encouraged to be future-oriented and pragmatic in the heritage preservation projects. In 2011, ICOMOS emphasized on the significance of managing the urban transformation inside a framework of regulations for the maintain of historic areas of cities. It was explained as the principles of change as opportunity; change is inevitable, but interventions need to be directed to become opportunities in the historic areas to improve the quality of life and social sustainability (Kermani, 2017, p.95).

2.2.2 Urban Architecture; the Significance of Relationship Between Urban Spaces

Urban design that is the implementation of a planning project is an architectural problem as well. There are some classical studies that considered urban spaces from an architectural point of view. The concepts provided by them are still worth to be considered as they propose methods to analyze the visual and formal characteristics of the city. In this part the ideas of Camillo Sitte, Gordon Cullen, Rob Krier amd M.
Tavassoli will be reviewed. The key concepts like “experience of space by movement” and “line of sight” have been considered in the development of advanced analyzing techniques like Space Syntax.

2.2.2.1 The City as A Work of Art; Camilo Sitte

Originally published in 1889 and then translated to English in 1945, Sitte in his book, *The Art of Building Cities; City Building According to Its Artistic Fundamentals*, criticized the grid layout and the reliance on traffic consideration in the initial practice of modern planning in late 19th century. He believed that the block system, the regular parceling and the “building-frontage line” and the other codes of modern city planning are not capable of producing urban spaces with an artistic attitude. In the era of flourishing modern urbanism, Sitte did not hesitate to explain the charming effects of traditional urban spaces. He could not accept issues like sanitation and hygiene as the main goals of urban design at the expense of losing the aesthetics of place. He believed that the city is a “work of art” and building a city is an artistic task. Sitte presented the picturesque beauties of curved and crooked streets, and the irregular squares which are synthesized with sculpture and painting. He believed that the irregular urban structure of old city was not accidental, but there were deep-seated, intuitive and creative drives behind it.

What Sitte would emphasize is not the style, ornaments, and the formal consideration of buildings. He underlined the art of relationship between architectural elements that make a proper public space. From this point of view, his book is a morphological study with an emphasis on the visual and architectural aspects of urban space. Sitte was aware of the necessities of modern city, and he rejected the imitation of past forms. He believed, however, that this should not prevent us to learn from the traditional town where a vital community life has existed. Sitte questioned the modern open public spaces which “are, at most, used as parking lots, and any artistic relationship between them and their buildings has almost totally vanished” (Sitte,
1986). He criticized the implementations that result in public activities to take place in closed halls, instead of public open spaces of the city.

Sitte’s book is more than a critique of modern urbanization or a nostalgic outlook toward the traditional city. What have encouraged the architects and urban planners to reconsider his approach for over a century is the way he analyzed the urban fabric of historic European cities, and the features that give the particular character to urban spaces (Pollack, 2018). Sitte brings the practice of city building back to the architect who has the skills and tools of integrating the artistic approaches into the urban design process. He made it clear that the rational theory of modernism that produced inflexible geometrical planning would not be able to encompass the aesthetic considerations and enrich the visual experience of city.

Sitte provided a typology of plazas, mostly from Medieval towns of Europe or Italian Renaissance, and made a comparative analysis between them and the modern squares to investigate the morphological differences and their impacts on the perception. The notions by which Sitte made his analysis can be stated as:

- “line of vision/sight”
- “line of traffic”
- enclosed character of the plaza
- deep/wide types of plazas
- proportional relationship
- “picturesque sequence”
- “perspective effect”
- dominant building of a plaza

The visual perception of the built-environment based on movement, the changing perspectives and the lines of sight were the important means by which Sitte evaluated the urban spaces. He considered the city as a scene of theater which should provide the possibilities of an artistic performance to take place. The traditional urban form included effective motifs such as “architectural projections, frequent interruptions of
the building line, zig-zag and winding streets, uneven street width, different heights of houses, flights of stairs, loggias, balconies, gables, and whatever else make up the picturesque trapping of the stage” (Sitte, 1986, p.109-111). Sitte hardly persisted on the pattern of street network which cannot be comprehended as a whole by the spectator. In contrast, he emphasized that the concentration should be on harmonizing everything that can be seen in one view according to *the lines of sight.* This declared how important is the visual aspects of the city for Sitte.

The method used by Sitte was mostly based on the figure-ground analysis of the plans of cities with a particular emphasis on the squares. The most significant buildings were specified by a darker color. The plans were prepared in the same scale to make the comparison of them easier. This simplified graphics helped Sitte to illustrate the two-dimensional qualities such as proportional relationship, spatial organization and enclosed character of the plazas. But he knew that this would not enough to explain why a traditional square is a “well-appointed and richly furnished” for public activities.

Sitte argued that the most important feature of squares is their enclosed character, which is influenced by the buildings around, the numbers of streets open to it and the proportion of square. The span and directions of streets should not be in such a way that makes visual gaps and damages the enclosed character of plaza. He found out that the proportion of space and the height of surrounding buildings also affect the sense of scale and the degree of enclosure. Piazza del Duomo in Ravenna was presented as an example of proper enclosure where “the entering streets are laid out at an angle to our lines of sight instead of parallel to them” (Sitte, 1986, p.143-149) as it can be seen in the figure 1.2.
Sitte distinguishes between three main categories of square based on the location of the dominant building. The size and shape of a plaza stands in a proportional relationship to its dominating structure. This indicates a mutual relationship between the building and open space as well as between architecture and urban design. In the modern city, this relationship has dissolved completely because of the vast and undefined open areas. Below are the three formal categories of plazas as defined by Camillo Sitte:

- Deep squares where the length is more emphasized and the important edifice is placed on the short side of the plaza. The tall churches are appropriate for the deep plaza.

- Wide squares where the short side is more emphasized and the important edifice is placed on the long side. Broad buildings like the city hall are good for the wide layouts.

- Grouped squares that is an urban complex consists of several interlinked squares. Each plaza should maintain its unique character and at the same time should interact with other urban elements around.

Piazza Roma and Piazza del Domenico are located next to each other in the city of Modena, Italy. Sitte presented them as two examples of deep and wide squares which are well-proportioned. For Sitte, the two streets of Cesare and Fonte are cleverly directed toward the church in San Domenico plaza that makes an emphasis on the importance of the church. Belle Arti Street which passes in front of the church, does not reduce the enclosed character of the plaza since it is perpendicular to the line of vision (Figure 1.3). The projecting corner of the palace building is another point mentioned by Sitte that helps separating the two plazas and providing more enclosure. The contrast between the sizes and functions of two plazas, which lie so narrowly together, is also an important feature that makes their spatial impression more effective (Figure 1.4).
Sitte was aware of the importance of movement in the experience of city and the *perspective effect* in the comprehension of urban environment. It is the great harmony between the buildings, open space, monuments and furniture that creates a vivid public space. Even, the location of a statue became prominent in the analysis of Sitte. To have a pleasant visual experience, the statue should be placed against a neutral background at the edge of the square untouched by the line of traffic; placing it at the center of plaza makes a barrier to watch the architectural details of buildings around (Sitte, 1986).

What Sitte meant by the placement of monuments in the plazas can be well depicted in Singoria plaza of Florence. The giant Michelangelo’s statute of David stands close
to the walls of the Palazzo Vecchio near its entrance. The uniform and dark walls of the palace provide a nice background by which the magnificent of the marble statue has been more reflected. (Figure 1.5) This provides a way for the integration of art and architecture in the urban space. Sitte was aware of the importance of movement in the experience of city and the **perspective effect** in the comprehension of urban environment. It is the great harmony between the buildings, open space, monuments and furniture that creates an aesthetic quality in public space. Even the location of a statue became prominent in the analysis of Sitte. To have a pleasant visual experience, the statue should be placed against a neutral background at the edge of the square untouched by the line of traffic; placing it at the center of plaza makes a barrier to watch the architectural details of buildings around (Sitte, 1986).

What Sitte meant by the placement of monuments in the plazas can be well depicted in Singoria plaza of Florence. The giant Michelangelo’s statue of David stands close to the walls of the Palazzo Vecchio near its entrance. The uniform and dark walls of the palace provide a nice background by which the magnificent of the marble statue has been more reflected. (Figure 1.5) This provides a way for the integration of art and architecture in the urban space. (Figure 1.6)

![Figure 2.4. Michelangelo’s statue of David in Singoria plaza, Florence, Italy](image)
A magnificent grouping of plazas around the Cathedral of Salzburg was depicted by Sitte as a rare sample of Italian style plaza in Austria. It is interesting that the courtyard of Cathedral is both separated from the surrounding open spaces and at the same time has become a public plaza. Two double-arcade colonnades on the right and left sides of the Cathedral generate covered entrances which reciprocally enhance the enclosed character of courtyard and keep the passage free. (Figure 1.7) The result is a complex of interwoven open spaces which generates an artistic effect (Sitte, 1986, p 76).

The ideas of Sitte can be traced in his unimplemented project proposed for the western section of the Ringstrasse, a grand boulevard that serves as a ring road around the historic district of Vienna. In the early 1890s, competitions for the greater Vienna metropolitan area and for reorganization of the Ringstrasse in front of Votive
Church were held. Although Karl Mayreder, the director of the newly established City Planning Bureau, in his report acknowledged the importance of Sitte’s plan, but it was clear that the principles of new master plan were not those established by his ideas (Herscher, 2003). Sitte explained the condition of Ringstrasse project as “one of those wedge-shaped plazas that inevitably arise in a gridiron layout, with all the faults inherent in this shape” (Sitte, 1986, p.144). Sitte’s first concern was the existing buildings which had no meaningful relationship in terms of architectural style and formal unity with each other. The second concern was the tremendous size of vast and empty space in front of the free-standing Votive Church, a neo-Gothic building. In this condition, the boundary of plaza was not defined and separated from the nearby streets (Figure 1.8).

Figure 2.7. The plan and the view of free-standing Votive Church and the project designed by Sitte

Sitte considered the following design criteria in his design:

- Monumental buildings should be part of the walls of squares and should not be free standing. The main façade of Gothic church with its soaring towers requires a deep plaza producing different angles of perspectives rendering the unique beauty of the church.
- Because of the vast open area in all directions without any sense of enclosure, the first task is to provide a confined human-scaled plaza. The atrium D is defined by the built-up lots G and H which was
articulated by the arcades in conformity with the architectural style of Votive Church.

- The height of new buildings should be specified according to the adjacent structures which would be allowed by the designer to be seen or not. In order to prevent the apartment houses to be seen from the plaza, Sitte made the height of G buildings enough.

- The large and small monumental elements can be installed at the edge and corners of the plaza. At the entrances c, d, e, and at the corners of the plaza, the uninterrupted arcaded gallery could be made more monumental by archway, decoration and statues. All of the monuments and fountains should be placed in a way to leave free the area immediately in front of the church and a broad strip on the longitudinal axis from e to A.

- There is a “proportional relationship” between the size and the shape of a square with its dominating structures. The width of a plaza and the important building’s height should be constructed with the minimum proportion of 1:1 and the maximum 2:1, regarding the architectural features of the building.

- The style of buildings’ façade can be differed in the interior and exterior of plaza, as the outdoor features can never be seen at the same time with the indoors. “Whatever the eye can encompass at once should be harmonious and that which one cannot see is of no concern” (Sitte, 1986, p.143-9).

- Regarding the vast open area of the site, a grouped plaza can be proposed for the project. It was done by designing the parcel J by which plazas E and F were generated. The enclosed character of plaza E was strengthened by the archway a. The new plazas make the opportunities to catch the lateral views of beautiful church.
2.2.2.2 The Art of Relationship as the Townscape; Gordon Cullen

Gordon Cullen in his influential book, *The Concise Townscape*, considered the city as a collection of buildings, trees, nature, water, traffic, advertisements and etc. which are incorporated together to create a *drama*. “One building is architecture but two buildings is townscape” (Cullen, 1961, p.8-11). Cullen believed that as soon as two buildings are placed next to each other, the art of townscape is released. In order to make a vivid theatre of urban life, Cullen indicated the need for an *art of relationship* between the urban elements. He based his ideas on the *faculty of vision* by which people comprehend their environment. Through examining the way people experience and percept the urban spaces, Cullen suggested several notions as below:

- Serial vision
- Drama of juxtaposition
- Existing/emerging views
- Exposure/enclosure as the two sense of position
- Here-ness/there-ness
- Occupied territories
- Viscosity
- Precincts
- Punctuation
- Fluctuation

Cullen illustrated his ideas by the pictures and sketches which are mostly from the cities of United Kingdom. The notions, which are repeated in different sections of the book, refer to the constituent elements of space, their spatial relationship and the impacts of environment on human perception. The purpose of the book, as Cullen stated himself, is to expose the *art of environment* as the central fact of *townscape*.

*Motion, position* and *content* are the three aspects which were considered by Cullen. For a pedestrian, the city is experienced by movement with a uniform speed. The spatial arrangement of environment provides different views which are revealed by
the changing positions of the spectator. This is what Cullen named *serial vision* for which the elements of the town should be manipulated to make an emotional impact. “A long straight road has little impact because the initial view is soon digested and becomes monotonous” (Cullen, 1961, p.8-11). Contrast is an architectural design concept that contributes the urban space to be experienced more sensational. When two different urban elements were deliberately put together, a contrast is felt and the drama of juxtaposition is produced.

Cullen recognized that a person who experiences the environment by movement is constantly aware of his position and this is coupled by an awareness of elsewhere. *The sense of position* as the instinctive reaction of body to the environment is a notion used to analyze a person's self-awareness about his position in the urban environment. For Cullen, this is the essence of people’s emotional reactions which can be manipulated by designing to create a dramatic situation. For example, the sense of being below the ground level produces the senses such as intimacy, inferiority, enclosure, and claustrophobia and above level gives exhilaration, command, superiority, exposure and vertigo. For Cullen, the ground level has the potential for unifying and joining the separate elements of a town. Some interesting townscape perceptions are produced by a clever relationship between the elements to generate the notions of *here-ness* and *there-ness*. Without creation of *here*, *there* makes no sense. These spatial concepts contribute to articulate the urban environment into distinguishable parts (Figure 1.9). Existing of an arch at the entrance of two areas can generate two worlds of inside and outside on its two sides. The existence of a church spire turns simple enclosure into the drama of Here and There.
In order to illustrate his ideas, Cullen used a series of sketches the locations of which are specified by arrows in the map (Figure 1.10). Arrows present the changing views of the moving spectator. In his sketches, one can identify how “the slightest deviation in alignment and quite small variations in projections or setbacks on plan have a disproportionately powerful effect in the third dimension” (Cullen, 1961, p.17-22). Cullen presented the sense of discovery as a factor that makes the experience of the city more exciting. The shifting interplay of urban elements in each vista reveals the importance of townscape in the urban design as a three-dimensional concept. Dramatic juxtaposition refers to a sudden transition of scale and distance, a change of level and the transformations which produce a leap and visual break. Screened vistas by using foliage of trees produce dramatic impact by withholding a view until one has become close enough to penetrate the screen. Cullen’s analysis method underlined the importance of visual perception by which the city is experienced through serial frames like a movie in which you are one of the actors/actresses. The designer is like the director who decided when and how a sequence of exposures and enclosures and of constraint and relief should be happened.
The occupied territory is a kind of situation that makes the boundaries between areas ambiguous and produces new forms of possessions and new types of activities. 

*Viscosity* is defined by Cullen (1961) as a mixture of *static possession* and *possession in movement*. He indicates that the segregation of inside and outside would reduce this feature and in contrast, the spaces with an in-between character could be the proper setting of viscosity. Architecture is not the pictures in a gallery to be displayed individually. It has to be part of a drama and create dramatic situations. According to Cullen, complete segregation of public and private spaces prevents the possibilities of generating a variety of activities in urban space. Cullen used the terms of *indoor landscape* and *outdoor room* (enclosure) to explain the spaces with reciprocal character as in-between realms. The spatial drama of relationship can be set up when the various interplays of indoor and outdoor spaces provide the chance to feel the duality of hereness and thereness. He introduced the notions of enclave, enclosure and focal point as different forms of semi-closed and defined public places which apart from the noisy traffic of the city provide a safe and human-scale area for communication.

The *precinct* is a notion proposed by Cullen (1961) to explain the importance of separation between the car-oriented transportation arteries and the core of urban spaces where mostly pedestrians are active. *Punctuation*, a notion used by Cullen (1961), refers to the physical signals which acknowledge the change of function and pattern in the urban environment. They can be different types of building like a
church which interrupts the boring alignment of a street, and creates a pause. The
typical town is not a pattern of streets but a sequence of spaces created by buildings.
*Fluctuation* is another notion that refers to the stimulation of our sense of position
through moving from a wide space to the narrow.

### 2.2.2.3 A Typological Study of Historic Urban Elements; Rob Krier

Rob Krier in his book, *Urban Space* published in 1979, aimed to present the aesthetic
qualities of urban space which are characterized by the “structural interrelation of
details”. He analyzed the formal characteristics which is independent from the short-
lived functional concerns and symbolic interpretations which may vary from one age
to the next. The two basic elements of a city are recognized by Krier as the street and
the square assimilated to the corridor and the room of an interior space. The square,
produced by the grouping of houses around an open space, was the first form that
man discovered to organize the environment. The organization offered maximum
control for the inner space, and also make it easier to defense against outside attacks.
This pattern of spatial organization has been frequently practiced through history in
the form of Agora, Forum, square, cloister, interior courtyards of buildings and etc.
(Krier, 1979) The street is a product of the spread of a settlement once houses have
been built on all available spaces around a central square. It provides a framework
for the distribution of spaces and gives access to the individual plots. The traditional
functions of public squares and streets have changed by the car-oriented modernist
urbanism and by the changes of socio-economic and cultural situations.

A series of tables were prepared by Krier to present the typology of urban spaces and
the relationship between the buildings and open space. He proposed that the patterns
of squares have derived from the three basic shapes of circle, square and triangle.
The formal modification of these basic shapes as the result of changes in angles and
dimensions, addition of parts, reduction and overlapping were presented on the table.
The various types of intersections between street and square were also illustrated in
a table to signify how important it is for the enclosure character of square (Figure 1.11).

![Image]

Figure 2.10. The transformation of a basic form through various alterations & The typology of intersection between street and square

Circle, square and triangle are the three basic shapes that are transformed by the following mechanisms: angling; segmentation; addition; merging; overlapping or amalgamation of elements; and distortion. They can produce geometrically regular or irregular results on all spatial types. Through these alteration of forms, Krier provided a series of sketches which were obtained by the analysis of real traditional urban spaces (Figure 1.12-15).
Figure 2.11. Orthogonal squares angled, divided, added and superimposed & Different types of street-square intersections

Figure 2.12. The orthogonal plans for square with free-standing buildings and monuments
Inspired from Camillo Sitte, Krier criticized the artistic impoverishment of urban spaces in the modern city. He approached the history as a source of “knowledge gained over the course of centuries carries a certain conviction which we cannot allow to go unnoticed” (Krier, 1979). The aesthetic resources of architecture, which are valid independent of time and style, have been ignored in the modern development. His sketches deliberately analyzed the principles by which the urban spaces, mostly from the medieval European cities, were configured. This provides a typological study which consider the formal changes of urban spaces through time.
Any kinds of intervention as urban planning should be managed by “the logic of the whole and in design terms must offer a formal response to pre-existing spatial conditions” (Krier, 1979). The historic integrated urban structure of Stuttgart, a city located in the southwest of Germany, was destroyed as a result of damages after the Second World War and the reconstruction process based on the modernist car-oriented program. Studying the projects designed by Krier for the traditional center of Stuttgart will be helpful to understand his approach toward the design in the historic context. Three proposals for the Station Area, Rotbeuhlplats and Wilhelmsplatz will be explained as the examples. Krier deliberately inspired by the historical urban space in his design proposal, in order to retain the qualities like spatial continuity in the urban experience of Stuttgart (Krier, 1979).

In the design of Station Area, the problem was explained as the dominance of car traffic that occupied the streets and squares around, while the pedestrians can only gain access to the station by subways (Figure 1.16). Krier’s suggestion is to construct a raised pedestrian level above the roadway, which will lead to the station across the flow of traffic. Although this may distort the visual effect of the buildings on the square, for Krier, it is worth to alter some features to make urban space more appropriate for the experience of people. The Konigstrasse Street in which the facade of buildings is inharmonious was proposed to be planted with a double row of trees as a pedestrian path (Figure 1.17). “This device reduced the costly street furniture and screens the architectural chaos of the street” (Krier, 1979).

Figure 2.15. Locations of the sites of project on a current aerial photo of the city and Krier’s designed plan
The suggestion of Krier for the Rotebuhlplats, a 19th century square, reveals the importance of enclosed urban spaces for him. The buildings around the courtyard were partially destructed and changed in the war and the one side of the square did not exist. Krier’s scheme included the reopening of the original arcade in the square by some additions. A glazed gallery was proposed to be constructed on the empty side to provide the enclosure character of the space. Krier was not sure about the function and architectural features of the gallery and kept its design to be done regarding the requirements of the site (Figure 1.18).
In the design proposal for Wilhelmsplatz, the key concern was to reconnect two parts of the city which are split off from each other by a modern street named Haiststatterstrasse. It would contribute to create a meaningful configuration of urban space for the pedestrian circulation. Important features of the scheme are a glazed covered arcade, an open theater and the re-planning of the Leonhardsplatz, a small square in front of the church (Figure 1.19). The key themes of this project are explained by Krier as:

- To make the sense of enclosure in the Wilhelmsplatz.
- to configure a square around the Leonhardskirche (the church) to build an appropriate urban space.
• to reestablish the historic significance of the Haistatterstrasse, along which the historic fortification walls of the 13th century exists. (Figure 1.20-21).

Figure 2.18. The location of urban elements in the current aerial photos

Figure 2.19. Design alternatives proposed by Krier for the project
2.2.2.4 The Study of Iranian Historic Cities: Mahmud Tavassoli

Mahmoud Tavassoli in a series of books studied the urban structure of traditional Iranian cities and illustrated the architectural and spatial qualities of them. The cases were selected mostly from the central part of Iran including the cities like Yazd, Kashan, Isfahan, Naeen and etc. The morphological characteristics of urban form were studied in different scale from the neighborhood to the block and building levels. The interrelation between urban elements and the spatial fluidity of spaces provide an interesting experience in spite of the monotonous exterior surfaces of buildings. Introvertedness is an important feature of traditional Iranian architecture. The buildings include an interior courtyard around which the rooms were aligned with the elaborated facade. The exterior surface of the building without even an opening was a simple wall. However, the spatial organization of urban spaces creates an interesting urban experience for the visitor.

The sense of enclosure is a significant quality of urban spaces in the traditional Iranian cities that is provided by different elements from buildings to the range of trees in the historic gardens. It creates a strong sense of place and makes an area
pleasing for use (Figure 1.22-23). In this sense other factors and qualities should be considered like the proportion and human scale. (Tavassoli, 2016)

![Diagram]

Figure 2.21. a: Shahtahmasb meydan, Yazd and d: Vali Soltan meydan, Kashan; the high degree of enclosure – b: Haji Mahalleh alley, Kashan; an enclosed space on the way of alley – c: the covered entrance of urban spaces to increase the sense of enclosure – e: Persian garden; enclosing of space by the trees – f: the changes of level to separate two spaces – g, h and i: the narrow alleys and their different directions to close the line of sights (Tavassoli, 2016)

![Image]

Figure 2.22. The quality of enclosure in Vali Soltan meydan in Kashan & a neighborhood center in Gorgan (Tavassoli & Bonyadi 1992)

The architecture and urbanism of traditional Iran was based on the physical and spiritual needs. The proportion of each room in the traditional house was defined based on the function of that space. Although the traditional Iranian city was formed in an organic pattern, the visual balance was established in the configuration of urban spaces. Regarding the climatic zones of a city, the proportion of urban spaces may
substantially differ. In the cities located in hot and arid climate, narrow streets, deep shaded courtyards, and small local squares, with high feeling of enclosure are often observed (Figure 1.24).

![Figure 1.24](image)

Figure 2.23. The various proportion of alleys in the cities located in different climatic zones of Iran (Tavassoli, 2016)

The urban structure of traditional Iranian city is formed by the spatial sequence of elements with various physical characteristics. The perception of a diversity of spaces one after another make the experience of urban spaces exciting and sensational. Tavassoli called this quality *Tabayon-e Fazaee* that literally means the *spatial contrast*. “Long, linear and narrow passageways, import a feeling of dynamic space” (Tavassoli, 2016). Using these alleys for movement and then entering the centers of neighborhood with a more static character inspire the pedestrian to stay and produce activities. *Tabayon-e Fazaee* is the spatial drama of “dynamic and static spaces” in the urban environment (Figure 1.25).
Tavassoli presents the notion of *contrasting spaces* as the main principle to generate the quality of *Tabayon-e Fazaee*. The transitional realms provide the opportunity for conflicting spaces to coexist and make relationship with each other. The result is an interwoven urban tissue in which there is no interruption between the elements that physically and functionally link (Figure 1.26).

The *flowing space* is the term used by Tavassoli to indicate how the relationship between urban elements was articulated in the traditional Iranian city. Rokn Addin Shrine and Sa’at Meydan of Yazd is a good example. The dome of the shrine can be seen from the meydan but the entrance needs to be found through a narrow alley and an archway (Figure 1.27). The *spatial articulation* preserves the autonomy of elements and at the same time link them providing the *continuity* of urban spaces.
There is a particular conceal order in the outward disorder of the organic Islamic cities of Iran (Tavassoli, 2020).

Figure 2.26. The articulated entrance of Sa’at meydan and the spatial continuity to Rokn Addin Shrine in Yazd

The neighborhoods were an outcome of the social organization of the Islamic community. Each neighborhood had its own management and therefore a definite boundary. There were also particular facilities and places that make each neighborhood different and identifiable from others. In the figure 1.28, two neighborhood centers of Yazd are depicted. They are connected with each other through a winding street that preserve the spatial continuity without a direct connection. This quality preserves the autonomy of two neighborhood centers and at the same time make an integrated urban structure (Figure 1.28).

Figure 2.27. The flowing space between two neighborhood centers which were defined by their particular elements
Hasan Abad had been the name of a garden on which a new street, called Sepah, was built in the 19th century through the expansion of Tehran, the capital of Iran in the Qajar period. By the urban modernization in the 1930s, another street perpendicularly crossed Sepah Street and at their intersection at a roundabout, named Hasan Abad Square, was formed. Four similar buildings were designed around the square by the Iranian-Armenian architect Qelich Baqelian with a Palladian architectural style (Figure 1.29). Tavassoli explain that Hassan Abad Square is a historic square located at the historic part of Tehran which has lost their “functional identity and significance” (Tavassoli, 2016).

Figure 2.28. The main structure of Tehran in the mid-nineteenth century, and the location of its five main squares; a: Hasan Abad. b: Ferdowsi. c: Mokhber al Dowlla. d: Baharestan. e: Sabze meydan

Figure 2.29. Hasan Abad Square in 1960s and the 1970s after construction of the modern bank

In the 1970s, approximately two-third of the southeastern part of the square was destroyed and a bank building in a modern architectural style was built (Figures 1.30-32). The new building had no harmony with the architectural style of Hasan Abad
Square. In 1995, the Municipality of Tehran proposed a project to restore and rehabilitate the façade of the square by changing the modern building and harmonize it with others. The project encompassed the building of an exterior skin in front of the glazed facade of the bank. A copy of the nearby façade as a surface would be put to improve the visual symmetry of Hasan Abad square. The Facadist approach was criticized as a superficial solution for the problem by Tavassoli who proposed a new design approach that avoids the naïve duplication of the past in the contemporary city.

Figure 2.30. Hasan Abad Square in a: the 1950s to b: the 1960s. Construction of a modern building on the square and the transformation of land parcels from large courtyard building to apartment blocks

Figure 2.31. The architecture of old building in Hasan Abad Square & the modern bank constructed on its southern side

Tavassoli explains the design method as “the old facade is simplified and abstracted, and the result has been considered in the new arrangement. In this process, the proportions of the building façades were carefully studied, and the basic elements such as vertical and horizontal shapes, corner structure, and openings have been
regarded carefully” (Tavassoli, 2016). As it can be seen in the figure 1.33, the historic façade was analyzed to get its proportional relations.

Although it was the project that was proposed by the Municipality that was finally implemented, the design of Tavassoli presents an architectural approach which seeks a new reading of the past (Figure 1.34). The façades of the historic buildings were analyzed and the new building is suggested to be changed to make the visual harmony with them. The historic buildings are used as a source of inspiration for the rehabilitation of visual appearance in the historic context.

Figure 2.33. The implemented project that is a skin of historic building constructed in front of the modern building to conceal its glazed facade & the proposition of Tavassoli to change the modern building (Tavassoli, 2016)
2.2.3 Space Syntax; an Analytical Approach to Study Urban Form

Space Syntax encompasses the techniques and theoretical frameworks for analyzing, illustrating and interpretation of spatial configuration. It has developed to analyze the relationships between spatial elements in order to evaluate the impact of the built environment on human behavior. The way people perceive, move through and use the space are supposed to be understood by Space Syntax (Karimi, 2012). Nowadays, it has been extensively used in the urban morphological studies and other fields such as urban traffic planning, predicting air pollution levels, assessing the occurrence of burglaries in different neighborhoods, and estimating the potential for retail development in streets. Space Syntax applies architectural notions like visibility, centrality (to-movement), between-ness (through-movement) and spatial sequence. It contributes for testing the hypotheses and making a better interpretation of urban structure. What makes Space Syntax interesting and popular is its positivist approach, concrete process, accuracy and the successful prediction in the complex situations.

2.2.3.1 The Theoretical Foundation

Since the mid-1970s, a group of researchers at the Bartlett School of Architecture and Planning, UCL, has studied the correlation between physical space and the social life. Bill Hillier et al. in an article published in 1976, presented the notion of Space Syntax, for the first time, as a method of analyzing built environment. The paper was an attempt to understand “how and why different societies produce different spatial orders through building forms and settlement patterns” (Hillier et al. 1976). Morphic language was introduced as a notion that constitute the spaces through syntax (the systematic production of patterns). It is different from natural and mathematical languages, but borrow properties from both. The morphic language includes spatial organization but does not possess semantic meaning. It is the materialized description of the society by which the world becomes intelligible to human beings.
Morphic language was presented by Hillier to recognize how the morphology of space can be produced from basic elements, relations and operations. (Hillier et al. 1976). This was the base of what has been presented as the method of Space Syntax. Hillier and Hanson’s book, *The Social Logic of Space* published in 1984, is the key theoretical statement of space syntax. The fundamental thesis is that “space” is not a container or reflection of social ideas but it is a social idea per se and possesses agency to make social things happen. Space Syntax refers to a configurational “pattern language” that is able to express complex relational schema which cannot ordinarily be expressed through natural language. *Configuration* is the key term used by Hillier to refer to the interrelation between at least two elements with respect to the third one. The relations of all elements in a complex regarding the others generate the configurational rule of it. Therefore, spatial configuration is a more complicated notion than spatial connection, “which need invoke no more than a pair of related spaces” (Hillier & Hanson 1984).

Although Space Syntax is a rational methodology, its theoretical base has been founded on psychology. An American psychologist, James J. Gibson, was who made important contributions to the studying of visual perception. He challenged the thoughts that the system of nerves frequently creates mindful visual perception, and instead supported the notion of ecological psychology, through which it is explained that the human mind directly perceives environmental stimuli without additional cognitive construction or processing. Gibson explained the notion of natural vision as “when no constraints are put on the visual system, we look around, walk up to something interesting and move around it so as to see it from all sides, and go from one vista to another” (Turner & Penn, 2002). Gibson’s ideas have constituted the base of the writing of algorithms which are used in the computer program of Space Syntax developed by Bill Hillier and his team. In the models prepared by Space Syntax, the occupant’s comprehension of the environment is not considered, and instead the ecological relationship of an individual with the setting is measured through *affordances* that refers to the physical features of objects which display for
users the activities they can do. Users should be able to perceive affordances without having to consider how to use the items.

Hillier explained that the spatial configuration of the urban form produces “attraction inequalities” that privilege some urban spaces over others for movement on a “probabilistic” basis (Turner & Penn, 2002). This is presented as the theory of natural movement. It refers to the ability of street layout itself to predict pedestrian movement. This can be explained by another theory of Space Syntax, the movement economy, which proposes that in a functionally successful urban center, the axes that encourage people for more movement will be the streets on which commercial and other public facilities, especially retail, tend to develop. It is well-matched with natural movement which suggests that more integrated axes are probable to be more accessible streets in respect to others and will attract more users. Initially, the network of streets produces movement. Then, the functions that seek movement transfer to streets that include more movements. This generates a multiplier impact by encouraging more shopping stores and pedestrians. It culminates in an adaptation of the street network to accommodate the larger combination of functions. The dynamic process provides the appropriate relationship between the pattern of spatial configuration, the subsequent movement pattern and the proper distribution of functions that delivers the cities much of their historic liveliness (Eyüboğlu, et al. 2007). Movement, in other words, is the cause, not the consequence of the presence of land-use attractors. Starting from these theories, Space Syntax has developed the measures to predict both the vehicular and pedestrian movement rates which is a powerful technique in the urban design practice.

David Seamon recognized Space Syntax as a proof for the influence of spatial morphology on human activities. (Seamon, 2015). Verified by empirical studies, Space Syntax provides incontrovertible quantitative evidence that a specific spatial organization of a place can contribute to the type of that settlement and its functionality. For Seamon, Space Syntax is important for urban studies and environmental phenomenology as it reveals how a spatial structure guides particular actions and circulations and how “a self-conscious understanding of this human
world/physical world intimacy might lead to environmental design and policy that supports a stronger sense of place and community” (Seamon, 2015). The main subject for an urban designer is space rather than the form, and the street network should be well analyzed to create the best plan for a particular part of the city. In a historic city with an organic pattern, Space Syntax is helpful to reveal the invisible order of urban fabric as the most permanent element of the city that should be considered in the interventions.

2.2.3.1.1 The Criticism Toward Space Syntax

Space Syntax is criticized as a method which rely heavily on statistical analysis of form that may cause to neglect the socioeconomic aspects of the environment. Hillier (1989) is well aware that he is susceptible to deterministic charges, however, he defends that a spatial arrangement makes the field of possible encounter and co-presence within which we live and move; and “whether or not it leads to social interaction, this field is in itself an important socio-logical and psychological resource” (Hillier, 1989). The social customs are practiced in built forms, so analyzing the spatial relationships can explain the procedures that control social activities.

Although the process analyses in Space Syntax is objective and repeatable, but the interpretation of the statistical results is criticized to remain complex, subjective, and therefore, controversial. Alasdair Turner, another key figure of Space Syntax, stated that “the danger is in the application of a reductionist formal mathematical description in order to explain multilayered socio-spatial phenomena” (Turner, 2003). As the main developer of Depthmap, Turner makes a self-criticism toward the two-dimensional attitude of Space Syntax in its analyzing method which discards the three-dimensional character of the built environment. The land use pattern, cultural preconceptions and climate features are the other factors which are not taken to account in Space Syntax.
Space Syntax theory aims to describe the social logic through its manifestation in the spatial organization. It is assumed that the configuration of space (the way spaces are put together) relates directly with how people perceive, move through and use spatial systems of any kind, ranging from small domestic spaces to large-scale cities. (Karimi, 2018). Netto explained the various forms of reductionism which are applied in the analytical approach of Space Syntax: the reduction of urban experience to the action of movement; the reduction of public activities to physical presence in a space; and the reduction of built environment to the syntactic characteristics. These can be wholly summarized as the reduction of urban life to the network of spaces (Netto, 2016). Axial analysis is an approach that mostly overlooks distance to make an emphasis on topological relations. The axes of map become the main urban elements of the network with the intersections as links. This network of lines does not present a direct view from one end to the other as they should pass over topographical obstacles. The micro-morphology of an urban space, comprising of sidewalks, plants and trees, barriers and traffic are inevitably overlooked by reduction of the street section to the axes. (Pafka, et al. 2018). Cities are three-dimensional networks of overpasses and underpasses that can hardly be reduced to spatial axes. This deficiency of Space Syntax is more highlighted when the micro-morphological elements of historic city is removed and the new wide straight streets are privileged. In cities with an organic pattern, the impact of random activities which are free from a deterministic relation should not be overlooked “on the shaping of the grid, deforming the directions of new streets on the basis of the aggregates of built forms” (Netto, 2016).

Despite of all deficiencies, the use of Space Syntax has been increased in the recent years and this makes it an ever-advancing field which provide new solutions to make the process more inclusive. Space Syntax helps progressing of studies in planning and urban design practice. It is a kind of method that lets the scholars to present objective concepts instead of using the ones offered by the social sciences (Turner, 2003).
2.2.3.2 The Process of Space Syntax Analysis by Depthmap

The computer programs like Depthmap have been developed to make the complex calculations of Space Syntax analysis. The process starts by preparing the graphs which are the different representations of a plan. The graphs are mathematical entities that consist of a finite set of dots called vertices connected by links called edges. This network is turned into a pattern of relationships, which can be quantitatively examined to identify the specific role that each element plays in the configuration of the system (Al-Sayed, 2014). *Axial Map, Convex Map* and *Visual Graph* are the three types of graphs by which the Space Syntax analyses are done. The output is usually presented as a graphic model which includes a range of colors from dark red which indicates the high values to dark blue which typically indicates low values. The color range can be changed by the user in parallel with the other related models.

Depthmap, that is the software package of space syntax, has become an open source to be used freely since a several years ago. Also, there are various sorts of information and a descriptive manual on a website with the address of [http://www.spacesyntax.net/](http://www.spacesyntax.net/) which has been the main source of learning and implementing Space Syntax in the present study. The digital maps are prepared in AutoCAD program with DXF formats and imported to UCL Depthmap 10th Edition program for Space Syntax analysis. The Axial Maps are prepared inside the Depthmap by the software itself. The results are presented in the form of numeric values and graphic models.

2.2.3.2.1 Axial Map Analysis

The graphic representations of space are based on the movement action and occupation of a space as the main functions in urban environment. An axis is the longest straight line that indicates the direction of movement through spaces. The main code for preparing an axial map is to diminish the quantity of axes and the
change of turning angles between the two axes. The fewest, longest and walkable axial lines are preferred in the graph that cover all spaces of a map. “This represents the distance up to which observers can have an uninterrupted impression of visibility and permeability as they move about the town and look in various directions” (Topçu & Kubat, 2007). From phenomenological point of view, the advantages of Axial Map, among the Space Syntax community, is its relationship to movement pattern and traffic inside a settlement (Seamon, 2015). The architectural concepts such as line of sight and experience by movement, which were already developed by Sitte and Cullen in urban studies, are some of the central ideas considered in the Axial Map Analysis. On an urban scale, movement is the main action by which Space Syntax defines the spaces to the longest possible lines that are axial lines or lines of sight (Al-Sayed, 2014).

The Axial Map can be drawn on a plan one by one by the operator in AutoCAD. The plan can also be imported to the Depthmap program in which the axial map is automatically prepared by the command of Axial map. The analysis can be started by selecting Run Graph Analysis from the toolbar. In the opened window, the local and global scale of the analysis can be determined by giving the value of radius; \( n \) is for the global and the radius of 2, 3, etc. are for the local analysis. By selecting the item of include local measures all the local analyses like connectivity and mean depth will be done.

2.2.3.2.2 Convex Map Analysis

Convex Map is produced by reducing and partitioning the spatial complexity of a layout to a set of fewest and fattest convex spaces. Convex space is the two-dimensional presentation of an enclosure. It is an occupiable void which can be geometrically identified by the area inside of which no line drawn between any two points goes outside. The geometry of a convex space presents a quality that all of the corners inside the space should be seen from the all other corners. Thus, the entrances of a convex space are visible from all others. Convex spaces experientially have the
potential for rest, locality, and events to be happened in a place. Spaces like streets with long and narrow form may have some features of place, but they present an axial shape that is appropriate for movement and circulation flow. The *fatter* convex areas are typically places that hold social activities and events, just like the square.

Seamon explained that the invention of Axial and Convex maps by Hillier have made an important contribution to spatial studies, as they establish empirical measures to recognize how particular spaces provide the setting for movement and staying (Figure 1.36). They are important from a phenomenological standpoint because “their identification provides important insight into experiential dialects like movement/rest, inside/outside, and dwelling/journey” (Seamon, 2015).

Axial and convex maps provide the analytical graphs on which a wide range of measures can be conducted. In Axial Map Analysis, the aim is to understand which paths (axes) in a settlement is more central and accessible than others and present
more integration. Then, the axes that are less central and accessible can be recognized as the pathways with less potential for activities.

Figure 2.36. Convex and Axial maps of Eliat Residence, Mies van der Rohe (Bafna, 2003)

2.2.3.2.3 Segment Map Analysis

Segment Map is an advanced version of Axial Map developed to improve the analysis. As there are some inconsistencies between the results of Axial Map Analysis with the data gathered from empirical field study, Segment Analysis has been produced. In the Segment Map, in contrast to Axial map, all pieces of lines are recognized as an independent axis. Therefore, when an axis intersects with others, the segments are produced between each pairs of vertices.

The Axial Map can be transformed by Depthmap into the Segment Map easily. Then, the analysis by the two methods of Angular Segment Analysis and Topological or Metric Analysis can be conducted on the map. Segment Analysis examines the shortest distance between each element in respect to others in the system. Shortest path in Space Syntax can be defined in a number of ways:

- Angular: the least degree of angles one need to turn to achieve the destination
- Segmental: the minimum number of line segments one need to pass to reach the destination
- Topological: the minimum number of turns one need to do to reach a place
- Metric: the shortest distance based on metric unit (Al-Sayed, 2014).
Angular Segment Analysis is a method to examine the shortest angular depth between one element in comparison to others. Depth represents the least number of turns one need to do to go from the starting point to any other axis in the system.

Step Depth Analysis is a measure which can be done for all types of graphs (Axial, Segment, Visual and Convex) regarding three parameters of “angle”, “topology” and metric distance. Angular Analysis was created to match with the spatial legibility.

2.2.3.2.4 Visual Graph Analysis

The visual perception of urban spaces is an important issue which has been considered by the notions such as line of sight, picturesque sequence, perspective effect and serial vision which were introduced in the present study. The question is how these notions and ideas can be systematically used to study the ever-changing urban areas. In this term, Space Syntax provides a methodological ground to use the theoretical ideas as the tools by which the built environment can be analyzed.

Isovist, a term used in Space Syntax, indicates a polygon created by delineating the area visible to an observer from a particular position, most often assumed as having a 360-degree field of vision. Michael Benedikt for the first time presented the notions of isovist fields or visibility polygon on the map to give an insight how people navigate in the environment (Turner, et. al. 2001). This provided a perceptual illustration from the perspectives of spectators, as they observed and understand the environment. Space Syntax applies the notion of isovist as an analysis method to examine the visibility pattern of the spaces.

As the first step, the visibility graph should be prepared by importing the DXF file into the Depthmap. A grid is overlaid on the plan and the area to be analyzed is filled by a dark color. The size of grid units can be determined by the user regarding the scale of the studying map. As the result, a network of units, which present the different points of occupation in a space, will be presented as the Visual Graph. An isovist is a physical body bound by a closed polygon; hence it has geometric
properties such as area and length of perimeter. Through the Visual Graph Analysis (VGA), the spatial properties of isovist field will be attributed to each grid unit, and consequently a graphic model is constructed linking the units with each other. Depthmap generates polygons that signify the possible area of a view from each certain place. The networks of inter-visibility of places is not displayed because there are lots of them. Instead, the units are illustrated by colors regrading to the numbers of locations that are visible from that point. The colors range from blue (for low) then green and yellow as middle values and then red that presents the high visibility value.

2.2.3.3 The Measures of Space Syntax as the Means of Analysis

The analysis is done on the graphs (Axial Map, Convex Map and Visual Graph) by the measures in local and global scales. Some of the measures used for analyzing are: “Connectivity” (the number of elements that are directly linked to a particular space), “Integration” (the centrality and accessibility of a spatial element), “Control” (the visually dominant places of a map), Choice (the shortest paths from all origins to all destinations) and Step Depth (the number of syntactic steps between the selected location and any other location in the graph). In the global scale, every possible relationship throughout the graph will be taken into account, whereas in the local scale the analysis is restricted to a certain local part (Al-Sayed, 2014).

There are some particular terms that explain how the analysis is progressed in Space Syntax. One of them is the notion of depth which is mostly applied to examine the interrelations of elements. In Space Syntax, it refers to the distance between any pair of spatial elements. The distance has three different types used in various situations:
• Topological\(^1\) distance: the number of turns one has to make to reach from one space to another; the shortest path needs few turns as possible.
• Angular distance: the degree of angular change from one space to another
• Metric distance: the metric distance from one space to another

The “Integration” is the most meaningful measure of Axial Map analysis which correlates well with the number of pedestrians found to be walking along the axial line. Integration is calculated by the average number of steps each line takes to connect any others within the graph. Therefore, it allows to determine the more central elements with respect to the others in an urban system. Integration is revealing the quantity of people who are probable to be in a place, and is supposed to correspond to numbers of social meeting, events and retail activities (Topçu & Kubat, 2007). The potential functional center of a city can be represented in the layout. The analysis was conducted in the global scale \( HH \) and the local scale \( HH R2, 3 \) or more. The most integrated axes will be depicted with red color as the shallowest areas of the graph. Hierarchically, other lines are automatically colored orange, yellow and green, to blue and dark blue for the least integrated or segregated elements. The importance of graphical representation is that the character of each element, its relation with others and the change which will be happened by design can be seen at a glance (Eyüboğlu, et al. 2007).

*Intelligibility* is a measure that is defined as the correlation between the local measure of *connectivity* and the global measure of *integration*. The measure of connectivity for each segment refers to the number of immediate neighbors that are directly connected to it. So if a particular segment intersects with other two lines, its connectivity value will be two. Angular integration in Segment Analysis examines

\[^1\] Topology is the mathematical study of the properties that are preserved through deformations, twisting, and stretching of objects. Tearing, however, is not allowed.
the closeness of each line to the other segments in terms of the sum of angles that is necessary to turn. The notion of intelligibility refers to easily identify the global spatial position of an element regarding the local connections that can be recognized by the degree of correlation. Intelligibility allows an observer to understand the environment and increases the predictability of system and the ability for wayfinding. Depthmap allows to calculate the correlation between two measures with the scattered plot diagram. The correlation in the diagram is analyzed by R-Squared or R2, a linear regression in the statistical analysis which is known as the coefficient of determination. It provides a measure of “how well observed outcomes are replicated by the model, based on the proportion of total variation of outcomes explained by the model” (Steel & Torrie, 1960).

The measure of Choice basically presents the potentials of every axes to be chosen by the users as the shortest route, a quality which is named between-ness. The shortest path is the path with the minimum angular changes which has the potential to be a through-movement trajectory. In the global scale, the measure of Choice presents the favorite paths of drivers and in the small scale, it presents the paths selected by pedestrians. Choice is calculated by calculating the quantity of times each axis falls on the shortest path between all pairs of others. It is a great measure to predict the potentials of pedestrian movement and car traffic. Case studies suggest that defining a metric radius to make a locale analysis is particularly needed in the Choice measure done by the Segment Analysis (Al-Sayed, 2014). The metric radius refers to the distance from each segment along all the others in the network.

The measure of Visual Integration is one of the means used in the Visual Graph Analysis. It is based on the number of visual steps that take to get from one grid unit to any other points within the system (Al-Sayed, 2014). Depthmap analyzes the shortest path for each unit of a graph that is the least number of links or steps that need to be traversed to reach one node from another. Therefore, the measure of Visual Integration depicts the deepness of each location in respect to all others. The place with high integration value, depicted in red, is a visually central area from which you do not need to turn very much to go to other places. Conversely, a place
with low integration value, depicted in dark blue, is more visually segregated regarding others.

The measure of *Step Depth* can be applied for one location as a unit of the grid to illustrate how many changes of directions is needed to go from the chosen unit to any other locations. Selected place has the step value of zero, all elements that directly observable from selected unit have the step value of one; all the elements directly observable from the units with the step value of 1, have the step value of two, and so on.

*Visual Clustering coefficient* is a measure of VGA that presents how the visual information of a particular place changes through the movement. It specifies to what extent the visual field of an observer will be engaged or lost as the location of him would change from that point. If the adjacent area of a place approaches an open and wide polygon, therefore the value of clustering coefficient measure is high and changing that position will not cause a considerable loss of visual information. However, in a conjunction where the visual fields of isovists are multidirectional, the value of measure will be low as moving from that location involve loss of part of the currently visible area (Al-Sayed, 2014). Comprehending these features is significant for understanding the relationship between navigation and wayfinding types of movement. Movement in some sense involves making decisions, and the spaces with low clustering coefficient value present various alternatives to choose by pedestrians and therefore become decision points in the environment. On the other hand, places with high clustering coefficient value have the potential for social interactions. For instance, a public plaza with a convex visual field can be a place of gatherings, while in a junction there are numerous opportunities to move and it becomes the place of decision-making. This seems likely to prove a useful property in studying the perception of spaces and may also be useful in behavioral studies. (Turner, et al. 2001).

*Control* and *Controllability* are two other measures of VGA. As it can be inferred from the words, control refers to the visually dominant areas, while controllability
refers to areas that are certainly visually dominated. The process starts with analyzing each location to estimate how large is its visual field. However, if the locations it can see also have large visual fields, they will contribute very little to the value of control. So, in order to have a dominant control, a point must see a large number of spaces, but these spaces should see each other relatively little. The measures of control and controllability are useful to predict how people might interact with space either moving or standing, discussing and generally occupying it.

2.2.3.4 Space Syntax as a Method of Studying Historic City

Space Syntax has been increasingly applied as a method for analyzing historic cities particularly in the last decade. Making a review of previous studies reveals that the advantages and deficiencies of Space Syntax have caused quite polemical approaches toward its usage. Reactions span from full acceptance among adepts or followers, to its rejection as a version of a positivist vision, to silent absorption of its principal ideas and methods (Netto, 2015). As the present study would apply Space Syntax to analyze a traditional city, it is important to understand how its techniques contributes to the studies of historic urban structure.

There are generally three fields in which Space Syntax has been used in the historic context:

- Evaluating the Integration of historic core regarding the new developments of the city
- Assessing an urban quality by making a comparison
- Combining Space Syntax with the GIS-base programs
2.2.3.4.1 Evaluating the Integration of Historic Core with the Contemporary City

In the study of historic cities, an important concern is the transformations imposed by the interventions and the expansion of city. Opening new streets changes the old pattern of movement and generates new alternatives for development. However, in most of the cases such interventions cause the historic part to be isolated and segregated. Space Syntax constitutes an appropriate tool to compare the integration values of urban elements in different historical periods. Therefore, it will be possible to interpret how the changes of street network affect the integration of urban spaces.

Ela Çil in her article, *Space Syntax Analysis of the Twentieth Century Transformation of Kula*, studied the morphological transformation of Kula, a historical small town in Aegean Anatolia. The main aim is to make a framework for the future development of the city by understanding how the historic city has been affected by the changes through time. Three time periods were selected according to the stages of spatial transformation of the city: the first period is between the 1900s and the 1930s when Kula still manifested the formal characteristics of an Ottoman town, the second one is between the 1930s and the 1970s during which new streets were opened, and the third period is between the 1970s and the end of the 20th century during which the urban fabric was subject to substantial changes. The author used Space Syntax to study the position of important urban elements from past to the present time. By overlapping the layers of urban form and the Axial Map analysis (pedestrian movement), the isolated and integrated spaces are determined and the relationship between the tissue and potential activity areas is examined. Most of the mosques were located on the most integrated street of the historic town in the Ottoman period. The impact of modernization and the construction of Ankara-İzmir motorway in the 1950s is interpreted by the author as a considerable factor that has changed the hierarchy of urban elements and has isolated the historic tissue. The traditional bazaar has lost its potential to integrate the urban elements at macro level and the historic part of the town has become an abandoned area. (Çil, 2008)
In a series of studies, Ayşe Sema Kubat has applied Space Syntax to analyze the morphology of historic cities. She described Space Syntax as a diagnostic tool to understand how the evolution of urban structure can lead to changes in the patterns of density, land use and socio-economic settlement. Kubat (1997) applied the syntactic measures of Space Syntax to analyze the urban morphological structure of Anatolian fortified cities, and related the findings with the economic, social and cultural values that make up the city. She explains that the low value of integration is the typical feature of the fortified towns of Anatolia which share common morphological characteristics with other Islamic urban structure as the traditional Iranian cities. The most integrated axes in the organic urban pattern of these cities are located at the core where the socio-commercial activities are concentrated. As a part of the project of revitalizing historic Sharjah in UAE, Kubat et.al conducted a multi-method research including Space Syntax and field studies. The main goal is stated by the authors to develop “an analytical framework that will be utilized for future development strategy and urban design guidelines for revitalizing the historic part of city” (Kubat, et al. 2014). Space Syntax was used to examine the level of spatial integration of the historic part with the new city and to analyze the pattern of pedestrian and vehicle movement. Using SPSS, the correlations of the values of Integration and Choice measures with the data collected by field studies like the number of vehicles and pedestrians are examined. It is seen that there was no meaningful correlation between the counts of pedestrians and the values of Integration and Choice measures. The authors conclude that there might be other factors at work for directing the pedestrian movement and attracting people in different hours of the day. This is one of the deficiencies of Space Syntax in which a substantive priority is given to the street network, and other aspects of spatial dimension like the pattern of land uses are ignored in the process.

The traditional Turkish cities are studied by Asami, Kubat and Istek to examine the patterns of street network. The specific features of them were revealed by various analyzing methods including Space Syntax. A comparison was made between the organic pattern of Turkish cities and the European cities which have more geometric
grid plan. The discernible qualities of traditional Turkish street network which are very similar to the Islamic model of city are illustrated by the Space Syntax analysis. Therefore, the space-syntax-related indices can be recognized as powerful tools to study the particular character of Turkish cities (Asami, Kubat & Istek, 2001). Thilagam and Banerjee (2014) examines the urban structure of medieval temple cities in South India by the methods of Space Syntax. The specific structures of cities were formed based on the centrality of a religious building that represent the symbolic expression of power. The authors evaluate this unique urban genotype of Indian culture to understand to what extent the symbolic considerations have affected the configuration of the city. The syntactic measures reveal a hierarchical structure for the temple Hindu cities. the landmark religious elements with the commercial activities in the urban core present an exclusive public space with simultaneously instrumental and symbolic aspects. The authors were able to identify how much main elements of the city contributes to these two aspects by the axial and convex map analysis of Space Syntax (Thilagam & Banerjee, 2014).

Space Syntax is applied in a comparative study conducted by Roshani and Sagafi in Tabriz, an Iranian historic city located at the west north of the country. Since the last century, the historic center of city has experienced considerable changes in terms of the construction of a new street network and an unprecedented urban expansion. The authors selected four time periods and conducted Space Syntax analysis on them to see how the qualities like spatial cohesion, hierarchy, centrality and accessibility have changed through time (Roshani & Sagafi, 2016). The measures of Integration, Mean depth, Connectivity and Intelligibility were conducted on the maps of 1907, 1947, 1971 and the current state of the city. The results revealed how the historic part of Tabriz has lost its integration and connectivity by the changes imposed in different periods of time.

Abedini et. al. studied the urban transformation of Urmia by the methods of Space Syntax in the four periods of time: 1933, 1976, 1994 and 2016. The aim is to evaluate how the urban integrity of Urmia has been changed by the interventions and what have been its impacts on the land use pattern of historic core (Abedini et al., 2018).
An important deficiency of the study is that the traditional urban structure of Urmia before the construction of new streets was not analyzed. Therefore, the integration model of pre-modern city was not existed to understand how much it has been changed through time by making a comparison with the contemporary models. Regarding the values of Integration models, Abedini et. al. (2018) concluded that the historic core of Urmia has become more segregated by the further development of the city.

2.2.3.4.2 Assessing Spatial Qualities of Urban Space

Space Syntax has been considered as a new method for evaluating the quality of urban space. Griffiths and Vaughan explain that the numerical analyses of street networks produced by Space Syntax can be applied to express and examine theories about patterns of circulation in urban spaces, social interactions and economic activity. It can be helpful in the interpretation of the history of urban spaces “to give an overall account of urban spatial culture” (Griffiths & Vaughan, 2020).

Topçu and Kubat make a comparison between the traditional and modern parts of Antakya, a historic town at the south of Turkey, within the scope of the concept of livable area. The morphological characteristics of four areas selected from commercial and residential districts in the old and new parts of the city were compared. The authors calculated the livable area index that is the proportion of walkable open spaces to the total built areas. The open spaces should be accessible for public activities; thus, the way to calculate these spaces may be different in the traditional and modern districts. The areas with private possession and the vehicle-oriented realms like parking lots and vehicle lanes should be subtracted. Through “livability index”, the authors attempted to compensate the shortcomings of Space Syntax analysis. The measures of Integration and Intelligibility are modeled for the sample areas. The integration model of an urban area correlates with its movement pattern, and the high value of intelligibility for an area is assumed to be a sign of legibility. The data collected by the two methods are compared to examine whether
an area with high livable index has a greater intelligibility and integration values or not. There were some inconsistencies in the results of comparison between the two variables (Topcu & Kubat, 2012). In the traditional Islamic cities there has been an apparent distinction in the morphological configuration of the public realm and neighborhoods inside an organic urban structure. The hierarchical structure of the city and the segregation of neighborhoods contributed to the privacy of residential areas in the Islamic city. This causes a decline in the value of Integration measure that means the lack of connectivity. However, this should not be interpreted as a failure. In the aforementioned study of Antakya, the inconsistencies come from the same reason. Whereas the sample area from the old residential district had the lowest “livable area index”, it was attributed by the highest value of Intelligibility.

Karimi (2012) explained the application of Space Syntax in the urban design practice as an analytical method that contributes the designers to make better decisions. The contemporary city has become a complex entity with a wide range of information that needs to be considered in the design process. The nature of designing is based on the intuition and creativeness of that designer that may not sufficient to guarantee the success of a project. Karimi gives the example of Nottingham Market Square project that is a prominent public space in historic urban context of a medieval English city. The historic square had been already designed in 1950, but it was not successful in terms of the distribution of functions and urban furniture. To identify the problems particularly in the circulation of people and also to evaluate the design propositions, Space Syntax specially the Visual Graph Analysis was applied.

Thilagam and Banerjee examines the urban structure of medieval temple cities in South India by the methods of Space Syntax. The specific structures of cities were formed based on the centrality of a religious building that represent the symbolic expression of power. The authors evaluate this unique urban genotype of Indian culture to understand to what extent the symbolic considerations have affected the configuration of the city. The syntactic measures reveal a hierarchical structure for the temple Hindu cities. the landmark religious elements with the commercial activities in the urban core present an exclusive public space with simultaneously
instrumental and symbolic aspects. The authors were able to identify how much main elements of the city contributes to these two aspects by the axial and convex map analysis of Space Syntax.

2.2.3.4.3 Space Syntax in Combination with GIS Data Sources

The recent researches have extended the limits of Space Syntax by generating new systems. For instance, GIS-linked tools and software make it possible to do the analysis of Space Syntax inside of a GIS environment. HGIS, *Historical Geographical Information Systems*, is a field that focuses on the implementation of GIS technologies for historical research. GIS makes it possible to assign the complicated historical data to the coordinates of a map or a plan to produce different archive sources (Griffiths & Vaughan, 2020). Although GIS offers a powerful platform for the mapping, analysis and visualization of historical spatial datasets, it makes poor relations with the structure of urban space. Space Syntax, on the other hand, stops approaching historical maps as illustrative data which needs to be explained, rather it treats them as artefacts that carry analytical weight on own right. Space syntax analysis generates the visual and quantitative data which can illustrate propositions, for instance about the circulation pattern, social activities and the function of places in the past, that can both be qualified by non-cartographic historic documents and assist in their interpretation. Therefore, Space Syntax has become a complementary method for urban morphology and socio-cultural studies of environment. Griffiths and Vaughan explains how the methods of Space Syntax make it possible for the historian to follow hypotheses concerning “the effects of the material organization of the urban setting on urban life through its ability to describe social data in terms of the structure of lived space” (Griffiths & Vaughan, 2020).

After the rapid expansion of the modern cities, the integration of historic core with the new urban structure has been problematic. Historic Urban Landscape (HUL), a term adopted by UNESCO in 2011, refers to the importance of connecting urban heritage to its city. More than the conservation of single buildings, HUL considers
the integrity of urban heritage as a socio-cultural and economic property for the growth of urban spaces. It considers the sustainability of urban planning practice and design interventions with considering the current built environment, intangible heritage, social diversity and economic factors. Studying the historic core of London, Kong and Karimi explained that Space Syntax “can provide an effective platform for studying urban heritage in a closer link with all other aspects of the city” (Kong & Karimi, 2019). They produced a heritage network for London by linking the data of each historic site to the segment model of Space Syntax. This integrates heritage data with a spatial model and presents the spatial characteristics of the historic core. The main aim was to integrate urban heritage with the future planning and providing evidence for a better decision making process.

To summarize, Space Syntax is a complementary method of urban studies which could be applied along with other morphological analysis and interpreted with the data collected by the historical researches. There is unlikely to be a single method of spatial analysis that can effectively deal with multi-modality, three-dimensionality and micro-morphology. The continuous attempt to improve the performance of Space Syntax is made by the UCL Laboratory team. The conversion of Axial Map to Segment Map has been one of these improvements that contribute the measures of Choice and Depth particularly in the historic urban fabric. Conducting the analysis in local scales by defining a radius in terms of metric distance or topological steps is another newly developed method that could be considered in the studies of historic urban context. The local scale calculates the interrelation of elements within a specific limit, but the global scale considers the whole network and favors large-scale elements like wide streets. The local scales analysis well reveals the characteristics such as Integration in the historic context. By taking in to account its advantages and disadvantages, Space Syntax has considerably contributed the urban morphological studies and will be further applied in the future studies.
2.3 The Significance of this Chapter

In the second chapter, a literature review is done to explain how urban form has been approached in the world and also in the Iranian context specifically. Different methods were used in urban studies that range from visual observation to analytical techniques that present new instruments to measure the qualities of built environments in an objective manner. With the modernism in architecture and functionalist planning, the old urban fabrics of cities were approached as useless entities that could be recklessly demolished. Yet, the theories of scholars like Camillo Sitte in the early 20th century is valuable in terms of raising an awareness that the historic urban spaces can be sources of inspiration for the future development. Later in the late 1960s, the provision of a legislative ground for the area-based conservation was a significant outcome of the criticism on modernism that gained impetus in the 1960s. The original studies of prominent figures like Sitte at the turn of the century, Cullen in 1960s and Krier in 1970s and 1980s are reviewed in this chapter as they prevailed the study of urban form in architecture. Their concepts are still relevant and applied in the development of new methods of analysis, like Space Syntax. It can be seen that the Iranian urban literature is also inspired by the theories, concepts and methodology that have been formed in the Europe. Tavassoli is one of the important scholars who have made extensive investigations on the traditional Iranian cities. Based on the concepts like fluctuation and Here-ness/there-ness developed by Cullen, Tavassoli presented the notion of Tabayon-e Fazaee that is more compatible with the Iranian urban structure.

In the last part of this chapter, the analytical method of Space Syntax that is founded on the significant architectural qualities of urban spaces is explained. The concepts which were used by Sitte and Cullen in the study of medieval European cities are applied to create a computer-based program that is able to quantify the spatial characteristics. The Axial Map represents “the distance up to which observers can have an uninterrupted impression of visibility and permeability as they move about” (Kubat, 1997). The Convex Map represents the potential of a space to be a place of
activities that has a particular degree of enclosure. The Visual Graph analysis makes it possible to examine the viability pattern of a space and therefore its accessibility and attractiveness. Space Syntax provides an opportunity to study the syntactic measures of a city by numerical values that are comparable with other environment. The results of analyses have been generally interpreted regarding the economic, social and cultural values. It is seen that there are meaningful relations between the measures of integration and the popularity of urban spaces. Space Syntax has become a pervasive methodology in urban studies and continues to be developed to overcome its shortages. In the present study, it is used to evaluate the urban design projects by making comparison between the values of different states.
CHAPTER 3

THE IRANIAN CITIES; TRADITION, MODERNIZATION AND RENOVATION

3.1 The Urban Structure of Traditional Iranian Cities

The term “traditional” which is common to use for the historic Iranian cities can be a little confusing in terms of the time period it refers. The history of Iranian architecture and urbanism is divided to two periods of time: before and after of Islam. This division make sense as the social and political structure of the country as well as the main urban elements of the city were totally changed after Islam. The pre-Islamic city was known as a city-temple, city-power or city-castle as it included a multilayered structure to preserve the king and his relatives. (Habibi, 2000) The palace and governmental buildings were located inside the citadel, which was protected by strong fortifications and had a dependent structure inside or beside the city. Habibi (2000) presented six styles to categorize the traditional architecture and urbanism of Iran. The two of the six are related to the pre-Islamic period and the four ones refer to the period after the conquest of Iran by Muslims in the middle of 7th century. Achaemenid (550-330 BC), Parthian (247 BC- 224 AC) and Sasanian (224 – 651) empires were the three main governments of Iran before the conquest of Muslims. The Parsi and Parti styles refer to the architecture and the morphological features of the cities constructed by the three empires. In the first era of Islamic period, the architectural practice and urbanization were mainly under the influence of pre-Islamic styles. However, by accepting of Islam as the new religion by Iranians and the development of Islamic beliefs, Khorasani, Razi, Azeri and Isfahani styles were started to be formed successively. At the present time, the urban and architectural traces of the pre-Islamic period are limited to some archeological sites which mostly are not inhabited. Therefore, the traditional urban environment of present cities in Iran generally refers to the Islamic period.
3.1.1 The Origin and Rules of Formation

Kostof traced the evolution of Islamic cities considering different factors such as topography, irrigation system, land division and laws and social order (Kostof, 1991). The deterministic factors on formation of the urban environment in the Iranian Islamic cities were natural features, the zone of climate, the principles of religious ideas, cultural beliefs, social and economic conditions (Kheirabadi, 1991). The traditional cities had four major functionalities: the center of commercial activities; the place of administrative affairs by the government; the place of socio-cultural activities without centrality of economy; and lastly, the place of settlement where dwellings are built. (Habibi, 2000)

As the large part of Iran is located in a warm and dry climate, water has always been an influential factor in formation and distribution of the settlements. The cities were either closed to rivers or had an access to subsurface water reservoirs by constructions like Qanats (Kheirabadi 1991). The water sources influenced the geographic location of cities and also the direction of their development. The ancient trading roads were another important factor in the formation of Iranian cities. There were various thoroughfares in the country each of them became important in the specific periods of time. The Silk Road, Spice Trade Road and the Royal Achaemenid Road were the important commercial paths on which the largest cities of Iran have been formed (Figure 2.1).
Particularly in the Middle Ages after the significant growth of productivity, the trade encouraged the growth of cities in the Islamic countries—including Iran. Almost all the major Iranian cities were located along the major trade routes (Kheirabadi 1991, 41). One of the significant of these roads was the Silk Road which stretched from China to Syria. This East-West road linked the key Iranian cities, such as Nishabur, Semnan, Dameghan, Ray, Qazvin, Hamedan and Kermanshah. The north-south branches of the Silk Road linked other cities like Tabriz, Isfahan and Shiraz. These cities had to provide an appropriate spatial response to visiting caravans in terms of accommodation and trade activities. This caused the birth and evolution of two very important elements of Iranian traditional cities, bazaar and caravanserai. These elements with an economic function have transformed to the important socio-cultural areas in the traditional city.

Caravanserais and public facilities were always built on the way of trading roads to accommodate the merchants whose travel took a long time. The buildings were placed near agricultural settlements or villages to provide water and food easily. Sometimes, these small villages were developed to the extent that themselves became a trade center. Kheirabadi (1991) illustrates the process of formation and
development of Iranian city on a trade road by the diagrams in the figure 2.2. By increasing the population to take the job opportunities, the Jame mosque and residential neighborhoods were added and a new city was configured. The linear bazaar in this type of cities became the main urban element to which other public buildings adhered. The fortification wall was the last significant structure of traditional city to establish its security. The gateways were placed on the way of intercity routes or near strategic military areas like the castle, Ark.

Figure 3.2. The formation and development process of an Iranian commercial city. R: religious buildings – H: Hammam (Bath) – C: Caravanserai (Kheirabadi, 1991)

There have been different ideas in terms of the most significant urban element of traditional Iranian city. The Jame (Friday) mosque and the covered bazaar have been among the prevailed elements. Falamaki (1978) believed that the bazaar is the main urban elements of the traditional Iranian city by which a settlement can be recognized as a city. The significance of bazaar as well as its decline was interrelated with the expansion and the fall of the city. It was developed along the main axes of the city and linked the major gates. The majority of public activities occurred inside or around the bazaar (Kheirabadi 1991).
3.1.2 The Pre-Islamic Cities of Ancient Iran

In the pre-Islamic period of Iran, the king was the person authorized by the God, *Ahura Mazda*, to rule and guide the people. He was the absolute power and owned the all entities of the kingdom. There was a tough system of social classes formed according to the intimacy with the king, wealth and the occupation. The religious persons were always placed on the high levels of society as they legitimized the king and his government. The change of social class for a person was not typically possible and the hierarchical structure of the society remained intact. The urban structure of Iranian cities in the pre-Islamic period was the reflection of its social system. Regarding the strong segregation between social classes, the city in Parsi and Parti styles had multiple defensive walls to protect the upper classes. This produced an intertwined structure at the center of which the king and his relatives were settled (Sharestan). Ordinary people, most of the time, remained outside of the wall in a completely undefended position (Shahr) (Habibi, 2000). The Figure 2.3 depicts the schematic drawings of the pre-Islamic cities in Iran.

![Figure 3.3. The schematic models of Parsi and Parti styles as the pre-Islamic urban patterns in Iran (Habibi, 2000)](image-url)
Unlike the city-state model of Greek and Roman empires, the ancient Iranian city was a city-power which symbolized the authority of the king. (Habibi, 2000) Therefore, the public spaces like meydan was not an important element in the urban structure. The multiple fortification walls and the settled areas between them generated the shape of city. It was structured like a castle to preserve and symbolize the power of king and his relatives. Outside of the fortification wall and in front of the main gateways, there was an open space used to make announcement and declare the King’s orders. These were perhaps the first forms of meydans used also for aggregation and seasonal market. After the Muslims conquest of Iran, the urban structure of city was changed according to the new needs. The schematic drawings of two models present how meydan was transformed to a central and important urban element in the Islamic city.

3.1.3 The Model of Traditional Iranian Islamic City

After the conquest of Iran by Muslim in the 7th century, the structure of the city was considerably changed. The urban structure of city in Kharasani, as the first architectural and urbanism style of the Islam era, was presented with public buildings such as Jame Mosque and school instead of king’s palace at the city center. The central meydan became a significant open space around which other urban elements were organized. Called Ark in Persian, the castle which was the place of governmental buildings and palaces was no longer an isolated element. The security concerns were maintained, but it became more integrated in the urban structure of Islamic city. Depending on the size and status of the city form, the significance of Ark was varied (Kheirabadi 1991, 77). The Khorasani model of city was developed in the 12th century by Razi style when two city centers started to be formed. The one was located next to the Jame mosque as the religious and public center and the one next to the palace symbolized the governmental center of the city. They were connected by the most significant urban element of Islamic city, the bazaar. Making relationship with the important elements of the city, the meydan in the Islamic city
became a multi-functional urban space (Figure 2.4). This model with slight changes had been practiced in Iran until the beginning of urban modernization in the early 20th century. Through this time in spite of some serious interruptions, the city maintained its main characteristics and spatial structure. The term of “Iranian traditional city” is referred to the historic structure of cities formed and evolved from the 9th to the 19th centuries.

Figure 3.4. The schematic models of Khorasani and Razi styles and the formation of Islamic city in Iran (Habibi, 2000)

3.1.3.1 Islamic Beliefs and Its Impacts on the Urban Structure

Islam connected people of many diverse nations via a new ideology, but later it gradually was mixed with the vernacular cultures of regions and, therefore, a range of various Islamic cultures were created. In this regard, recognizing a unique Islamic culture among the Islamic nations is not an easy task. Nevertheless, the influences of a united ideology unavoidably brought along some similarities among differences. The nature of Iranian traditional culture should be considered as a fusion of ancient Iran and the Islamic culture. In the formation of cities, religion had two main
contributions; firstly, along with other factors, religion affected the rules and traditions that were influential in the construction of the city; and secondly, it gave rise to the formation of some specific buildings and urban elements, for instance, mosques, schools, and so on.

Islam established and defined a set of ritualized patterns for people’s conduct, all aspects of everyday life on the individual and the collective level. Although, Islamic ideology did not determine any specific idea regarding the formal aspects of architecture with the exception of some general rules for the streets’ width and height, it shaped the whole aspects of life through defining a framework of behavioral prototypes which, inevitably, led to the culturally determined patterns. Stefano Bianca in his book entitled *Urban form in the Arab world: Past and present*, argued that despite the differences in formal aspects, “there is a specific Islamic quality which becomes apparent in every appropriation and adaptation of pre-existing architectural and artistic heritage” (Bianca, 2000). A number of researchers attempted to explore the Islamic principles and rules, which were employed in city-making. Hakim (1986) explains some of these principles including the precedence of neighborhood, introvertedness, and privacy, which correspond well to the Islamic teachings. According to him, if someone intended to sell his home, the neighbors had priority to buy even at a lower price. This had led to the creation of Sabat which were the constructions over the streets that connected two homes located in front of each other. The minimization of views into the domestic interior and the reluctance of people to decorate the exterior surface of houses are the examples of cultural effects on the architecture and urbanism of Islamic city. Hakim maintains that the principles and the language of pre-Islamic architecture, represented in the building types and urban organization, along with the environmental and climatic conditions influenced the physical form of the city at both the macro and micro scales (Hakim, 1986).

Compared to European residential quarters, the organization of neighborhoods (Mahallehs) in traditional cities of Iran was more complex and differentiated. The neighborhoods were divided and separated based on the ethnic background, religions, jobs, and the place of origin. The structure of the traditional Iranian
neighborhood was not based on the social class, and hence the poor were able to live next to rich ones. The absence of dominant civic institutions increased the need for social consensus and the importance of certain mechanisms of human interaction. Hence, the city and its urban form were the outcome of a shared desire to follow certain religiously prescribed patterns of life (Bianca, 2000). The neighborhood in the Islamic city becomes a socially independent unit that developed its own facilities and management system based on a tribal structure or the family clan. While the covered bazaar and the urban elements of city center was the most public realm of the city, privacy was an important factor in the spatial organization of neighborhoods (Sultanzadeh 1989, p.367).

Islam introduced new types of buildings which affected the spatial structure of cities. The most important of these buildings was the Jame mosque which was constructed at the cities’ center next to the bazaar. A mosque was not only a place for religious rituals but also a place for people’s gathering, social interaction and even education. In the later years, madraseh (school), another city construction, was separated from the mosque in order to embrace some of the cultural and political functions of the mosque. Sultanzadeh (1986) states that in addition to their educational function, schools were also important places for intellectual and political activities. The Shiite sect of Islam has created some other urban elements such as imamzadeh and hosseyniyeh which are not common in other Islamic cities. Imamzadehs is the shrine of the descendants of Shiite Imams (twelve religious leaders). They are buildings which are visited by millions as an important source of attraction inside and outside of the cities.

3.1.4 The Physical Characteristics of Traditional Iranian city

The Iranian traditional city had mostly a central spatial organization where the bazaar and Jame (Friday) mosque created the core of town. In an organic pattern, the main streets connected the gateways of the city to the center and produced an urban spine. Sometimes, the bazaar extended between two gateways and generated a powerful
axis on which most of important buildings were built. The public realms of city particularly meydans were articulated either along the spine or at the city center. Stemmed from the main streets, the secondary network configured the structure of neighborhoods. On the secondary street network, the local public buildings like a mosque or a bath (Hammam) were placed serving to the inhabitants of a neighborhood. In front of them, an open and wide space was often configured as the socio-economic center of neighborhood representing the semi-public realm of urban structure. The narrow and cul-de-sac alleys were the semi-private elements provided the accessibility of housings and preserved the intended privacy of residential territory. The spatial organization of traditional Islamic cities presents a hierarchical structure from public to private spaces.

3.1.4.1 The Organic Pattern of Islamic City

The term of organic is a biological concept that refers to living entities. It was coined in the 1750s and from then on has been used in the literature. The similarity of the pattern of urban space with the living organisms is used to make an emphasis on their similarities: “the venation of leaves in Muslim madinas, and the pattern of tree rings in the ringed expansion of a town like Nördlingen” (Kostof 1991, 52). From a different point of view, an analogy is made between human organs and urban elements. This can be considered as a biological metaphor to describe the particular features and functions of city. The commercial center of the city is likened to a heart, and the street network to the arteries and the parks and greenery areas as the “lungs” (Karimi, 1998). These analogies make sense in metaphoric terms but have been rejected by some scholars as there are important differences between a city and an organism.

Another common definition of cities with organic pattern is its opposite meaning to geometric planned cities. The planned historic city was mostly constructed by a king, to represent the power by a monumental and regular form. But, the organic cities have been naturally developed through a countless of actions of individual in a
smaller scale. (Karimi, 1998). This is the most significant difference between the two pattern: the city as a product of limited concepts of organizations and agencies, or the city as the result of several opinions accidentally occurred through a long period of time. The traditional Iranian cities had an organic pattern that as there was no control on the constructions and the neighborhoods had a semi-independent structure. The was no municipality in the traditional Iranian cities that was common in the historic European cities (Kheirabadi 1991, 77). The security and administrative affairs were done by Darugheh, the police force, in cooperation with the local leaders.

Despite the principles of modernist planning, the organic cities have not been taken to account as disorder and chaos. These types of cities cannot be quantified easily as the geometrical properties like symmetry and similar elements are not existed. Yet, this characteristic did not result in the lack of social structure and public activities. Conversely, the organic pattern has created a unique sense of urban experience which cannot be obtained in regular patterns (Jacobs, 1961).

3.1.4.2 The Hierarchical Structure from Public to Private Realms

Human territoriality is an attempt “to affect, influence, or control actions and interactions (of people, things, and relationships) by asserting and attempting to enforce control over a geographic area” (Sack, 1986). The boundary-making is a human action for protection, through which inside/outside, open/closed and public/private realms are created for the consistency of social relations. Since the ancient times, boundary setting has been recognized as a legal right for people protecting their private territories. Ali Madanipour in his book Public and private spaces in the city published in 2003, considers the socio-spatial qualities of public and private realms. He explains how much the boundary is important to make the character of spaces it separates and relates. “What the boundary is meant to signify, its construction method and material, and the way it relates to the spheres that lie on either side, all shape the character of its juxtaposed realms” (Madanipour, 2003,
Madanipour believed that in practice, a continuum exists between public and private realms as the vast majority of spaces are neither truly public nor truly private. A diverse array of varying shades of the semi-private and the semi-public are existed in urban environment (Madanipour, 2003, p.239).

Walter Benjamin’s exploration of Naples is an exemplary description of a city where “the stamp of the definitive is avoided” and the porosity between public and private spaces promotes “emancipatory potential” of urban life (Benjamin, 1985). The inhabitants of Naples “refused to submit to simple demarcations of private/public, or even indoor/outdoor”, and therefore “the daily routines and high dramas of everyday life unfolded largely at the thresholds: in staircases, doorways, window ledges, front streets and back alleys” (Koch, 2010). The story of the medieval city of Naples was repeated in Iranian traditional neighborhoods with different forms. As the privacy is an important criteria of the Islamic society, the structure of neighborhood did not allow a stranger to access the narrow and cul-de-sac alley. Although it was not a private property, but the alley is appropriated by the neighbors a semi-private realm which was used for gatherings and domestic activities.

The Iranian traditional cities have a hierarchical structure established among its main elements: mosque, bazaar and neighborhood. It was a hierarchy of domains beginning with the private spaces of the dwellings, the semi-private spaces of cul-de-sac alleys under the control of immediate neighbors, the semi-public realms as the center of neighborhood and the public spaces as the congregational areas and the bazaar. The bazaar acted as the backbone in this socio-spatial structure as it went across the city and connected the main urban elements of city center. Each neighborhood was directly without the mediation of any other quarter related to the spine of the city that is the covered bazaar (Tavassoli & Bonyadi, 1992, 125). Main streets stemmed from the covered bazaar and stretched into the neighborhood center which marked the territory of the residential realms. A gentle transition is formed between the bazaar as the public space and the neighborhood as the semi-private realm that allow both interaction and protection. The hierarchy of spaces between public and private realms in the Islamic city produces a hierarchy of social control
and protects the patterns of personal and communal life. “Public and private spheres are interdependent, and largely influence and shape each other” (Madanipour, 2008). The boundary between them is ambiguous and contested because each realm is subjected to pressures from inside and outside, and therefore constantly changing. (Madanipour, 2003). The hierarchical structure of Iranian traditional city had the potential to generate various forms of in-between space.

Figure 3.5. The map of old Naeen (Tavassoli & Bonyadi, 1992) the texts are written by the author

Figure 2.5 presents the urban structure of Naeen, an Iranian traditional city of Iran. The red color illustrates the covered bazaar as the most public realm of the city that began from one of the main gates of the walled city. In a linear form, the bazaar extended through the heart of the town where the inner castle and the Friday mosque existed. It became the urban spine from which the main streets stemmed into the neighborhoods. Naeen had seven neighborhoods each one with a center that comprised of the public facilities to meet the requirements of inhabitants and a meydan named Hosseiniyeh (Tavassoli, 1983, 246).
3.1.5 The Open Public Spaces in The Traditional Iranian City

In the compacted urban tissue of Islamic cities, there was a little open area remained for public spaces. In the Figure 2.6, Kostof illustrates how the urban structure of a Roman city has been transformed to the organic compacted urban fabric of an Islamic city with less open spaces, superblocks, cul-de-sue alleys and the inward communication system (Kostof, 1991).

Figure 3.6. The transformation of a gridded Roman city to an Islamic urban structure (Kostof, 1991).

The solidly framed Roman grid with its open public spaces like forum and amphitheater was appropriated by the people of Islamic community. Gradually, the public monuments were used for the private dwellings and mid-block pathways begin to violate the orthogonal street pattern. The result is an urban structure with a minimum open public space and the winding system of narrow alleys. Kostof presents the social structure of traditional Islamic city as the most important factor to rearrange an inherited pre-Muslim grid pattern, “fuse and introvert its checkers into exclusive superblocks” (Kostof, 1991). Neighborhood unity based on relationship and tribal membership, and the absence of systematic supervision over the city form were allowed the citizens treated the property according their personal demands.

The compacted urban fabric and the lack of large open spaces is the common feature of most of Islamic cities. It was in the 15th century that the governmental meydans was started to be shaped in large scale with geometrical forms in the Iranian cities.
They provided a place for the government to show its authority and power, and allowed people to do socio-economic activities. Particularly in the capitals and politically significant cities, the meydan became an important urban element which links the newly-established governmental complex to the existing city. The traditional bazaar with a linear form had a constructive interaction with the meydan and articulating its relation with the other elements.

3.1.5.1 Meydan; An Important Urban Element of Traditional City

The Persian equivalence of the word square is Meydan (as it is pronounced in Persian) which is also written as Maidan in some English dictionaries. In the Oxford dictionary it is defined as “an open space in or near a town, used as a parade ground or for events such as public meetings” (Stevenson, 2010). Regarding its etymology, meydan originates from Urdu and Persian and consists of two parts: “mey” and “dan”. In Persian, “dan” is a suffix used to indicate a place of something. For instance, the word Goldan consists of “Gol” that means flower and “dan” that indicates its place. (Dehkhoda, 1931). Therefore, Gol-dan means the place of flower that is the “vase” in English. Nowadays, it has been used to a vast variety of open spaces in different scales and with different functions in the Islamic cities. A very large circular area, which is generally used by vehicles, without a sense of enclosure can sometimes be called as meydan.

Kostof stated that open spaces in the Islamic city is mostly confined to “residual, interstitial areas between cells – neighborhoods, bazaars, the mosque complex” (Kostof, 1992). There was no distinct civic arena as Roman Forum in an Islamic city, but there are well-defined public spaces like maidans (as it was written in dictionary) that for Kostof is inaccurately translated as squares. The maidan was a kind of public place without political functions. Small ones were just an open area like vestibules at the entrance of monumental buildings. It served to manage the crowded visitors of the buildings and made the circulation of people easier (Kostof, 1992).
H. Soltanzade in his book, *Fazahaye Shahri dar Baftiaye Tarikhiye Iran [Urban Spaces in the Historical Texture of Iran]*, stated that meydan, in the traditional Iranian cities, is an open space located either on the intersection of passages or nearby a street with a social, recreational, commercial, military or a combination of these functions. He categorized the meydans in terms of their prevailing function and their physical characteristics. Soltanzade explained the architectural qualities of each category and the relationships that meydan makes with other urban elements. Seven types of meydan in terms of their functions are as:

- Public meydan
- Commercial meydan
- Governmental meydan
- Military meydan
- Neighborhood meydan
- Relational meydan
- Sportive meydan (Soltanzade, 1990).

In terms of the physical characteristics, Soltanzade categorized the meydan based on 10 features:

- The position of meydan regarding the street network nearby
- The shape and geometry
- The degree of its enclosure character
- The physical and functional features of buildings around meydan
- The architectural characteristics of surrounding surfaces
- Being roofed or not
- Including a designed landscape or not
- Including a holy monument inside or not
- Including greenery area inside or not
- the way that passages connect to Meydan (Soltanzade, 1990).
3.1.5.1.1 Public Meydan

Each city regarding its importance, bigness and socioeconomic conditions might have functionally different types of squares. The public meydan was often a component of the city center in which religious, governmental and commercial activities were presented. At least a main street directly connected one of the gateway to the public meydan. In spite of its occasionally small size, juxtaposition to the Jame mosque and the covered bazaar reinforced the socio-economic functionality of public meydan.

Founded in the early 19th century in Tehran, the capital of Iran in the Qajar period, Sabze meydan was an example of public meydan. Surrounded by a two-story building with a colonnade at the ground floor, it was connected to the traditional bazaar of Tehran. On the east side of Sabze meydan, the Shah (Imam) mosque is located, and on the north side the governmental complex including the Ark meydan was developed (Figure 2.7). The two meydans were configured in front of each other acting two different roles in the capital. Ark meydan was the place of official ceremonies as a governmental square. Sabze meydan, on the other side, is a component of traditional bazaar and the place of socio-commercial activities (Soltanzade, 1990). The important economic role of Sabze meydan has continued at the present time to the extent that it is known as the place of determining the exchange rate of foreign currencies in Iran (Figure 2.8).
Sabze meydan was smaller in size in comparison with the governmental Ark meydan. However, by its unique morphological situation, Sabze meydan has been always the important node of public life. Figure 2.9 presents the examples of public meydans from different Iranian traditional cities. The location of Jame mosque as the prominent building of the complex is determined in black color.
3.1.5.1.2 Commercial Meydan

Being on the trading roads was an important factor in the development of Iranian cities. In these cities, the bazaar had a significant formal and socio-economic role. While a powerful central government was founded and a permanent security was set up, trading was highly developed, and bazaar, particularly in the large cities, started to be expanded. In the 16th and 17th centuries, the rulers of Safavids, who presented their power by the ambitious urban development projects, extended the bazaar outside of the limit of old towns by construction of new commercial meydans. Isfahani style is the forth and the last traditional architectural style of Iran between the 15th to the 18th centuries. The meydan with a geometrical shape and articulated edges is one of the important symbols of this period.

Ganjali Khan meydan in Kerman is an example of a commercial meydan which was configured through the expansion of the covered bazaar by the Safavids in the 17th century. Appropriately integrated with the urban structure of the city, the meydan includes public buildings like caravanserais, Hamam (baths), school and mint house that have produced a multi-functional urban space (Figure 2.10). Similar to Tehran, the governmental Ark square was located in a very close distance to Ganjali khan meydan and the both meydan have been connected by the covered bazaar. This trend was repeated even after Safavids by the rulers who desired to display their power and goodwill.

Figure 3.9. The various forms of public meydan from different Iranian cities
By the urban development of Yazd in the 15th century, two meydans was constructed outside of the old city. Amirchaghmaq was the ruler of Yazd who built the first meydan and then Shahtahmasb meydan was constructed in the 17th century. Having socio-commercial functions, the two meydans were connected by the linear covered bazaar and surrounded by public buildings (Figure 2.11). Built in the 19th century, Khan was the third meydan of the complex with the commercial role that was completely surrounded by the bazaar (Figure 2.12). Based on the principles of Isfahani style, the squares had geometrical shape, mostly rectangle, with the articulated edges that acted as an extension of linear bazaar. In the compacted urban tissue of traditional Yazd, the meydans provided public facilities and the required space for socio-economic activities. Unfortunately, this well-organized urban complex has been destructed through the urban modernization and construction of new streets.

Figure 3.11. Amirchaghmaq and Shahtahmasb squares in Safavid period, and Khan square in Qajar period were constructed in connection with the linear bazaar
3.1.5.1.3 Governmental Meydan

As it can be inferred by its name, the governmental meydan was existed in the capitals and politically strategic cities. It was mostly used for military parades, soldiers’ training, official ceremonies, social activities and the execution. In some cases, the meydan had a significant administrative function and it was rarely used for other purposes. Built in the 19th century, the Ark meydan of Tehran is an example of a pure governmental building. Through the large expansion of the capital, it was formed just in front of the Sabze meydan and the traditional bazaar as the public center of Tehran. The meydan provided a preliminary area before entering the complex of palaces (Figure 2.13).

The governmental meydans of Tabriz, Qazvin, Isfahan and Shiraz will be broadly studied in the fourth chapter. After the construction of Sahibabad meydan in Tabriz in the 15th century, the governmental meydans became an inseparable element of the newly-built administrative complex. Built in the 17th century, Nagsh-e Jahan square
(Meydan-i Shah) of Isfahan was the most famous governmental meydan of Iran and the symbol of Isfahani architecture and urbanism style (Figure 2.14).

Figure 3.14. The development of Isfahan in Safavids and construction of Nagsh-e Jahan square (Arefian et al. 2014)

### 3.1.5.1.4 Military Meydan

The military squares had been received more attention after the prevalence of artillery force in the large and border cities of Iran. The relatively large open space started to be built in order to keep the artilleries. It was called *Tupkhane* in Persian that means the house of cannons. Meydan-e Tupkhane had typically a rectangular shape surrounded by rooms where the soldiers resided and the equipment was stored. Meydan-e Mashg was another type of military meydans without considerable buildings. The military training of soldiers and the shooting practice were done inside the meydan.
In Urmia, which will be studied in the next chapter, the Topkhane meydan (as it is pronounced in the local language) was built inside the Chaharborj castle in the 19th century. As Urmia had no large square to hold the ceremonies, Topkhane meydan was changed to a public gathering place in the national ceremonies like Nowruz (Figure 2.15). Unfortunately, there is no evidence of this meydan nowadays.

Figure 3.15. Topkhane meydan of Urmia constructed in the 19th century inside the castle of Chaharborj

As the capital of Iran in the 19th century, Tehran included the important examples of military squares, Meydan-e Mashg and Meydan-e Tupkhane (Figure 2.16).

Figure 3.16. The two military squares of Tehran which their functions have changed after the city expansion

By the urban modernization, the dramatic expansion of the city and the changes in the equipment of army, most of the military meydans were physically and functionally changed. The Meydan-e Tupkhane of Tehran has totally transformed in terms of form and function three times up to the present time. Farrokh Muhammadzade studied the transformation process of the military meydan, started
by the expansion of Tehran in the late 19th century, to a public space and then its change to a traffic junction at the present time. In its initial form, Meydan-e Tupkhane was surrounded by a two-story building as the place of soldiers and military equipments. There were six streets which opened to the square from all its sides. In order to keep the enclosure character of it, the entrance of each street was articulated by an arch gate (Figure 2.17). By demolition of the old fortification wall of Tehran and the expansion of city, the meydan changed its function to a public space rather than a military meydan.

![Figure 3.17. The plan of Meydan-e Tupkhane based on the 1889 map of Tehran and one of its gateways](image)

Through the modernization movement of the first Pahlavi period (1925 – 1945), a Baroque-style building as the Department of Telecommunication was added to one of its side. The streets were widened by destruction of the arch gates and the meydan was opened to the car traffic. Although it was lost its enclosure character to some extent, but Meydan-e Tupkhane kept its importance as the new public square of the capital. In the third stage of its transformation, the Baroque-style building was replaced by a tall modern building as the symbol of progression in the 1970s (Figure 2.18). The meydan has totally lost its harmony and character and has become a roundabout for the heavy traffic of cars (Muhammadzade, 2003).
3.1.5.1.5 Neighborhood Meydan

Depending on the climatic zone, the religion of inhabitants and the socio-economic status of the city, the neighborhood squares (in Persian: Meydan-e Mahalle) could be existed in various scales with different levels of importance. The socio-cultural statue of a city had a considerable impact on the form and number of neighborhood meydans. A neighborhood meydan could be an open area in front of public facilities or at the intersection of several streets. It was the place of gatherings, social intersection and the daily market for the neighborhood.

In the central region of Iran, the neighborhood center was developed to get a geometrical form to be appropriate for a theatrical performance. Called as Hosseiniyeh, the meydan was used to hold the annual mourning ceremony of the martyrdom of Imam Hossein who was an important figure of Shia (Figure 2.19).

In some traditional Iranin cities where the majority of people was not Shia, the neighborhood center was not practiced as Hosseiniyeh. For instance, the majority of Urmia’s population were Christians and Sunni; therefore, there was no need for a place with the characteristics of Hosseiniyeh. The neighborhood meydans were small open spaces which organically formed at the intersection of streets or in front of public facilities.
The figure 2.20 presents a typology of neighborhood meydans in different cities of Iran. In the drawing of plans, the red color marked the visually dominant building which may refer to a mosque, a covered Hosseiniyeh, a temple or a school (Madrase). Other public buildings are depicted in grey color and the residential buildings by the hatch. The form and scale of neighborhood centers differ regarding their functions and situation. Some of them are articulated with a defined geometrical shape, and others are formed at the intersection of streets or by only a widened space in front of a public building.

Figure 3.20. The morphological features of neighborhood meydans in various traditional Iranian cities; the red color indicates the visually important building and the grey color presents the public facilities

3.1.5.1.6 Linking Meydan

For Soltanzade, almost all types of meydans in the traditional Iranian cities, along with their specific functions, act as a means of connection between urban elements. However, there have been linking squares which have no significant function except connecting. In the figure 2.21, the urban structure of Meybod, a traditional town in the central part of Iran, is illustrated. Two examples of its public and neighborhood meydans which are framed by the red squares have already been depicted. In Meybod, a linking meydan is also existed which has no public buildings around.
Instead, the doors of two houses are opened into the small square (Figure 2.22). Its urban role is to connect the main street stemmed from the covered bazaar to the neighborhood. Its articulated edges and the small scene at the middle indicate that it can be a small Hosseiniyeh. The linking meydan can also be sometimes used as a local market for the inhabitants of neighborhood.

Figure 3.21. The different types of meydan in the urban structure of Meybod

Figure 3.22. A linking meydan in one of the neighborhoods of Meybod

3.1.5.1.7 Sportive Meydan

The sportive meydan is maybe the rarest type in the traditional Iranian cities, as the most of recreational activities and sportive competitions were conducted in the public and governmental squares. Soltanzade gives the examples of sportive meydans as the large open areas which were used for horse riding, meydan-e
Asbdavan in Persian. In the 19th and early 20th centuries, a sportive meydan was constructed on the north of Tehran, outside of the city wall. There is no evidence of it at the present time. Sometimes, the sportive competitions are conducted as a social activity in the neighborhood meydans of traditional cities. Nagsh-e Jahan square of Isfahan was famous as the royal field for playing Chowgan (polo) that is a sporting team game with horses originated in the ancient Iran (Figure 2.23).

![Image](image_url)

Figure 3.23. A miniature depicts the playing of Chowgan in Nagsh-e Jahan square and a wrestling competition in one of the neighborhood centers of Yazd

### 3.1.5.2 The Notion of In-Between Space

*In-between space* is an architectural concept developed upon a philosophical base which provides the physical and theoretical ground for reconciliation of conflicting realms. If the city is considered as the site of various forces, the in-between space is about the studying of link between them: juxtaposition, contact, confrontation, overlapping, penetration or superposition. The significance of in-between space is its potential to make meaningful relations. Theoretically, the co-existence of opposite forces is not possible, and a rigid boundary should divide them to manage their relation. Boundary grants a rigid separation with a manageable connection, as a single door on a wall. However, it can be also articulated in the spatial conditions to make an in-between space which have been indicated by the terms like *soft edge* (Gehl, 2011), *transitional realm* (Madanipour, 2008), *scalloped edge* and *edge with thickness* (Alexander, 1977). By them the boundary is transformed from a rigid line to a space, and this subsequently changes the qualities of realms nearby. The
coastline between the see and land can be transformed to a zone of interrelation between the two distinctive realms.²

Philosophically, the in-between space creates a situation where a relation takes place. The _situation_ transcends the physical space and generates spatial qualities that support _interpersonal events_ (Willie, 1994). The space which was once static and straightforward becomes a site for exchanging of energies between opposing forces. The _in-between_ realm “between those who have it in common” (Arendt, 1958) make opportunities for dialogue and co-existence.

Overlapping of divergent realms can also generate the in-between space; an undesignated space where the qualities of both sides exist. It creates a realm of ambiguity where no exact boundary exists. Richard Sennett points out the difference between a boundary as a limit and a boundary as a zone. The zone becomes a porous edge and an active realm of exchange where “different territories and different conditions meet” (Sennett, 2010). The sharp distinction between urban realms is unbeneﬁcial and harmful. To explain it more tangible, Sennett refers to a comparison between _cell wall_ and _cell membrane_. “Whereas the cell wall’s function is that of a container holding things in, the membrane is at once porous and resistant, letting matter ﬂow in and out of the cell, but selectively, so that the cell’s need for nourishment can be met” (Sennett, 2010). Sennett explained how the difference between _wall_ and _membrane_ is important in urban design. Membrane presents the quality of _porosity_ as the combination of _resistance_ and _openness_; no rigid obstacle and no free ﬂow. It is the “dual quality of the membrane” that is signiﬁcant for urban

---

² Namık Erkal studied the urban architecture of the Golden Horn, an important commercial zone of Istanbul in the Ottoman period. Analyzing the visual documents and textual sources, the author illustrates how a landing square between the sea and the fortification wall was formed and developed to be the Ottoman official weighing and distribution centers from the mid-fifteenth century to the mid-nineteenth century. The morphological characteristics of Unkapanı according to its particular function were studied to depict how a historic wholesale trade center was formed on the frontiers of the Ottoman capital. The spatiality of the commercial harbor is illustrated by analyzing its architecture and the functional processes inside it. (Erkal, 2018)
forms: a porous zone that simultaneously protects and allows communication between in and out (Sennett, 2006).

The sharp distinction between urban elements has eliminated the spatial hierarchy and the opportunities for various forms of social activities. The semi-public and semi-private realms have been removed by the principles of modernism urbanism such as functional separation. The notion of in-between space has been considered as a means to criticize the modernism approach. Stavros Stavrides in his book, Towards the City of Thresholds, explained the discontinuous character of contemporary urban space, and proposed that we need to consider concepts like urban thresholds to understand spatiotemporal experiences in this discontinuity (Stavrides, 2010). His idea of a city of thresholds refers to a network of intermediary spaces which present opportunities for encounter with otherness and activate negotiations and inventive transformations. Threshold represents the spatial condition in which various qualities have existed at the same time. At the edges of plazas in European cities and the courtyards of Islamic buildings, arcades articulate the indoor and outdoor spaces as an overlapping realm. It becomes a threshold in which one enjoys the shadow of buildings and experiences the vitality of open space at the same time.

Three types of in-between spaces in the urban structure of traditional Iranian city will be discussed in this section: Hosseiniyeh, Jelokhan and Sahn. Acting as the neighborhood center, Hosseiniyeh becomes a transitional area between the public realms of the city and the semi-private realm of narrow alleys of neighborhood. Jelokhan is a threshold at the entrance of residential and public buildings used for waiting and gathering. Sahn that is the courtyard of public buildings like mosques, schools and caravanserais, is a permeable open space on the compacted tissue that becomes accessible for various types of public activities.
3.1.5.2.1 Hosseiniyeh; a Turning Point Between Public and Private Realms

In the traditional Iranian cities, Hosseiniyeh is a small meidan which is “located inside or near the center of the neighborhood” (Rezaei Badafshani, 2007). The critical reason for its existence is to serve as a venue for Muharram ceremony commemorating the martyrdom of Hussein ibn Ali, the third Imam of the Shia Muslims. Unlike the other religious rituals which are carried out inside the mosques or any other enclosed spaces, Ta'ziyeh has been performed in Hosseiniyeh; probably the only open public space of Islamic city without military, commercial or administrative functions. Hosseiniyeh was mostly formed at the central cities of Iran with an intensive Shia population. It has been intended that the Muharram ceremony become an integrated activity with participation of all people with likely different religions and beliefs. The active participation of community in the reenactment of the episode of Karbala was vital for reinforcing the distinct Shiite identity and its collective memory.

The initial form of Hosseiniyeh was a relatively wide space beside the main path or at the intersection point of main passageways (Rezaei Badafshani, 2007, 138-48). It did not have a clear form and it was not spatially defined. In the Safavid period, regarding the socio-political importance of Hosseiniyeh, the neighborhood square was transformed to a congregation hall for the only indigenous theater engendered by the world of Islam; Ta'ziyeh. It became an important component of the neighborhood center which may comprise of a mosque and other public facilities such as a cistern, school and maybe a public bath. The importance of Hosseiniyeh was to the extent that they often exceed that of the mosques in the centers of the residential quarters and even that of the Jame mosque (Kheirabadi, 1991, 54).

In the introverted and organic structure of Islamic city, Hosseiniyeh has its own specific character. Its geometrical form was a response to the need for a public hall which was unique in the traditional Islamic cities. Hosseiniyeh is an urban space which presented the characteristics of an interior courtyard where the surrounding walls were elaborated as the façade. The edges of the square were structured by
consecutive deep niches which formed some covered seats (Figure 2.24). They provide the place where spectators can sit and watch the play that is performed at the middle of the square. Hosseiniyeh was probably the only public open space of Islamic city without specific military, commercial or administrative functions.

Figure 3.24. The covered and open Hosseiniyeh in Zavareh (Tavassoli & Bonyadi, 1992)

As it was explained, the Iranian traditional city follows a spatial sequence starting from the covered bazaar, the public space, followed by neighborhood center, the semi-public realm, then the semi-private space used by a few number of households, and consequently ends with the house as the most private realm. (Tavassoli, 1990). Hosseiniyeh in this spatial sequence is a transitional area that articulates the relation between public and semi-private realms. The entrances of Hosseiniyeh were punctuated by arches to increase the sense of enclosure. These arch gates “marked the end of one activity or one kind of place, and the beginning of another” (Alexander, 1977). A feeling of transition into a new space was emphasized as the arch gates makes the senses of hereness and thereness (Figure 2.25). They indicate the leaving of one realm and the entering to another. Therefore, the massages would be sent to the aliens to prevent their entrance and increase the security of the neighborhood. These architectural elements are in accordance with the specific function of the meydan. Hosseiniyeh is a turning point between the socially and functionally different realms, bazaar and neighborhood, to form a static space that acts as a public meeting ground.
3.1.5.2.2 Jelokhan; Designation of Private Property for the Public Use

*Jelokhan* in Persian means *in front of something* and it refers to an open space at the entrance of residential and public buildings. It is generated by recession of the building and the designation of a private property for the public favor. The more important the building is, the larger is its Jelokhan. Soltanzadeh states that the presence of Jelokhan makes the entrance of a building more important, inviting and distinct from the street, square or wherever the building was located (Soltanzadeh, 1993). Jelokhan is a specific element of the Shah (Imam) Mosque located at the southern side of Nagsh-e Jahan square in Isfahan. It makes an emphasis on the presence of a magnificent structure, and articulates the relation between the building and the meydan. The recession of Shah Mosque creates a form which pauses the movement and gives the opportunity to see the beauty of colorful Muqarnas on the entrance gate (Figure 2.26). Jelokhan was built as a platform raised by some stairs, surrounded by a low stone fence, and a small pool at the middle of it. People gather around the pool and also sit on the stone fences, and Jelokhan has become an appropriate place for social interaction.
The entrance of traditional Iranian houses provide a spatial sequence from the threshold (Jelokhan), doorway, the vestibule (Hashti) and the corridors that lead to the courtyard. Jelokhan in this condition is a roofed semi-enclosed space furnished with platforms for sitting and waiting. It can be used for a short meeting by strangers who would not enter the home (Figure 2.27).

**Figure 3.27.** The recession of entrance that generates a threshold in front of the door

### 3.1.5.2.3 Sahn; An Architectural Element with the Quality of an Urban Space

In the lack of formal institutions in the Islamic city, there was no need for the buildings such as city halls, courts or the places for congregation (Bianca 2000). Most of the institutional functions were fulfilled by the Jame Mosque, the most important building of the city for not only religious but all sorts of political and social functions. Spiro Kostof (1992) explained that the courtyard, *Sahn*, of the mosques provide non-religious functions like marketplaces. In the early Islam, the communal treasury had its pavilion in the *Sahn*. Official weights and measures were also kept at the mosque; teachers held classes under its porticos, judges heard cases, and the town crier read proclamations. The protest against a ruler was showed when people did not participate in the Friday prayer. The mosque was the political, social and religious focus of the city and “the true civic center of the town is the courtyard”
(Kostof, 1992). Every member of society had equal claim for the appropriation of public realm for commercial activities. “Whoever comes earliest to a public place has the right to make use of it through that day. Except for women. In particular, public space was considered unsafe for Muslim women, and to be avoided by them” (Kostof, 1992).

The interior surfaces of Sahn were articulated by arcades to support the public activities on the open space. Arcades act as a threshold between the inside and outside and have been an appropriate form to flank a public plaza in order to make it a pleasure place for activities. The alignment of the columns is perceived as a limit which can be crossed frequently. They indicate that a change in “gait, voice, and behavior is appropriate by modulating from the scale of the square to the scale of an individual building” (Ines-Novot, 1996).

The Jame mosque was usually supported with other elements like the covered bazaar. Instead of a single entrance, the mosque has multiple accesses from the bazaar and alleys of neighborhood allowing for a high degree of interaction. In the traditional Iranian cities, there are several examples that the Sahn of public buildings have been used as an urban space for a vast variety of functions. The complexes of Jame mosque in Yazd and Isfahan, and the Malik mosque of Kerman presented the Sahn as a vital urban space in the everyday life.

The Sahn of great Jame Mosque of Isfahan was an example of a courtyard that acts as a public space. Having multiple accesses from the alleys of neighborhood and the traditional covered bazaar, the Sahn presented the quality of permeability with the city. The Sahn of great Jame Mosque was integrated with the compacted urban tissue of the context and became a public place for everyday life (Figure 2.28).
The Sahn of Jame mosque of Yazd was a component of an urban complex. An interwoven spatial organization was produced between spaces with different formal and spatial characteristics. The courtyard of school, the Sa’et meydan and the Sahn of Jame mosque were connected by the linear covered bazaar and an organic street network. The permeability of Sahn and the reciprocal relations with other elements transformed it from being only a courtyard to an active public space (Figure 2.29). Making reference to Sennett, Sahn is a membrane more than an obstacle, as it presents the quality of porosity; no rigid wall and no free flow. The Sahn presents a dual character to be an architectural element of a building and to act as a transitional realm in the urban context.

Malek Mosque was not the Jame mosque of Kerman, but its Sahn presented the same quality. The rectangular courtyard of the mosque is completely recognizable in the compacted urban tissue of the neighborhood. The Sahn was integrated with the
context to the extent that it seems to be a meydan more than the courtyard of a building. The multiple entrances of Sahn are marked on the aerial photo (Figure 2.30). Similar to most of historic urban areas, the modern street network destructed the interrelation between the Sahn of Malek mosque and the neighborhood around.

Figure 3.30. Malek mosque in the compacted urban tissue of Kerman and the accessibility of its Sahn

In the traditional urban structure of Iranian cities, Sahn took the role of a public place in the lack of defined urban space in the Islamic city. It was integrated with the context and make meaningful relationship with the streets, bazaar and the neighborhood nearby, by a permeable character. Unfortunately, the morphological characters of Sahn and other traditional urban elements have been damaged by the urban modernization of Iranian cities in the early 20th century. In our contemporary cities, a large amount of publicly owned lands is usually fenced, separated and controlled by the military and governmental administrations. These are no-man lands without any particular use and are inaccessible for most of the time. The doors of mosques are usually locked except the limited times of praying.

*Porosity* is a spatial quality that can be seen in the traditional public realms of Iranian cities. It experienced by “passing through different territories” (Sennett, 2006) with
different functions and characters. Porosity indicates the practice of crossing boundaries in an unplanned and uncontrolled manner. In this sense, it differs from the state of openness and accessibility. The Sahn of Jame mosque inside the compacted tissue of traditional Iranian city had a high degree of permeability that articulates and characterizes the relation between public and private realms.

3.2 The Urban Modernization of Iran and the Transformation of Traditional City

The historic cities already experienced large-scale urban developments, but the type of the interventions were completely different from what was done in the Industrial era. Before the 18th century, the existing cities were kept away from radical transformation, and the new urban projects were implemented outside of the existing settlement that seems to be an individual construction (Kostof 1992, 271). Studying the urban structure of Anatolian cities by the methods of Space Syntax, Eskidemir and Kubat demonstrated that the urban development in the Ottoman period was done in conformity with the ancient Roman plan (Eskidemir & Kubat, 2019). The ancient axes of the cities like Trakya and Bursa and urban spaces such as Agora are recognized as the elements with highest value of integration. Some of them like Kurtuluş Caddesi in Antakya still has a significant role in the present city. Making a comparison with the Italian cities, which originally shared the same plan with the Turkish city, it is attempted to understand the morphological identities that cultural changes have brought to the historical urban areas. It can be inferred that contrary to the Iranian cities, the urban modernization of Antakya was done with a little impact on the historic structure of the city.

In the 16th century, the large-scale urban development of Isfahan was conducted considering the traditional structure and presented a great adaptability with the old city (Lawless 1980). The government was occasionally engaged in the building of the traditional urban environment in Iran. Majority of the public buildings like mosques and public baths were constructed by the wealthy people of the city who
were generally merchants or a relative of the King (Madanipour, 1998, Marefat, 1997). The large-scale projects led by the government were less in size but set frameworks for the urban change and became a guidance for the development of urban space in the future. The development plan of Isfahan in the 17th century was undertaken by Shah Abbas Safavi to represent the power of the Shiite government in its great capital. Abdulac (1984, p10) believed that large-scale urban projects are always politically planned as the personal desire of the King may also affect as well. Based on their political intentions, the government determined the type and extent of urban developments whether by the engagement on the constructions or by enforcing the plans.

The process of urban modernization has been totally different in the Western and the non-Western cities. The Industrial Revolution, as the starting point of changes occurred in the Western countries and was never transferred to others until the 20th century. The urban modernization was inevitable for the European cities since a new pattern of economic relations were established that made a great impact on all aspects of urban life: population, social system, politics, transportation and so on. In Iran, the foundation of a modern society was not existed, but the modernization started by the physical transformation of cities and other fields like education. A sudden disruption was occurred in the gradual process of urban growth in Iran that resulted in a rejection of the past (Lawless, 1980). The radical change in the system of transportation by vehicles was a significant cause in the physical transformation of historic city. The entrance of railway system to Iran have a revolutionary effect on the transportation of materials and equipment, and also started to change the urban cities (Karimi, 1998). There were two key impacts of railways on urban structure: the first one was the extensive destruction in the center of city that resulted in the formation of large empty holes that split the urban spaces; secondly, the railway makes it possible to live outside of the city center on suburbs that resulted in the urban sprawl.
3.2.1 The Initial Intervention in the First Pahlavi Period

The 20th century was the onset of modernization of Iran under the Pahlavi government. Paying no attention to the existing context and the historical growth patterns, wide straight streets have been destroyed the traditional urban structure of Iranian cities. The vehicle-oriented approach in the urban planning had no conformity with the congested tissue, organic pattern and the winding alleys of traditional cities. Ehlers and Floor illustrates the transformation of Iranian cities by a schematic map in which the main elements of Islamic cities are destroyed by the new street network (Ehlers & Floor, 1993). As it can be seen in the figure 2.31, two modern streets usually cut through the historic city and intersected at the city center where the important traditional elements were existed.

![Schematic Model of Traditional Iranian City and its Transformation](image)

Figure 3.31. The schematic model of Iranian traditional city and its transformation after the modernization (Ehlers & Floor, 1993)

The urban modernization process was implemented in the world either by the construction of a new city near the old one, for instance in the Tunis, or by making vast interventions on the existing city, as what happened in Baghdad. In the cities like Beirut and Kuwait, the old structure was completely removed and reconstructed (Lawless, 1980). A new street network was typically imposed on the large towns in Middle East until the 1940s (Lawless 1980, 44-45). In the Iranian cities, there were massive destructions in the old urban fabric, but the historic core resisted and is still alive.
Under Reza Shah’s plans (1925-41), the central aim was to modify the social and spatial substance of Iran (Ehlers and Floor 1993, Madanipour 2003). The government attempted to become a strong power and the urban transformation was considered as the symbol of transformation. The King followed three significant principles of nationalism, secularism and modernization, to completely eliminate the religious and clerical system of traditional Iran. The strategy of urban modernization was implemented using force and without any attention to the existing historic context. The traffic planners came up with the ideas to ensure the best conditions for vehicle transportation by a typical scenario: the superimposition of a new street network on the compacted urban fabric articulated on their crossing points by large roundabouts. The monumental buildings were built at the end of streets at the middle of squares presenting the new axes of the city. This pattern was conducted in almost all large and middle-size cities of Iran with different intensity. In Tehran, the transformation was more extreme than for instance, Tabriz in which the old streets were used to construct new ones. (Ehlers and Floor 1993, p 257).

3.2.1.1 The Establishment of Municipality and the Legislative Base of Changes

To Madanipour, the scale and austere geometric plan of the street network were an indication of the authority, which attempted to form and manage the cultural entities regarding to its principles (Madanipour, 2003). The Municipal Law enacted in 1930 gave the authority to conduct projects on the historic context by the municipalities (Habibi, 2000). Street Widening Act, which was passed in 1933, became an instruction to transform all of the cities (Mozayeni, 1974). The measures and size of the streets and squares were determined by the Ministry of the Interior that resulted in a uniform intervention on the traditional urban structure. For instance, the width of the chief road had to be 16 m, that of the channels on each side 0.5 m, and that of the pavements 3.5 m, and totally 24 m. The circular central square had to be constructed with a radius of 16 m, the surrounding walkway 3.5 m wide, an inner
channel 3.5 m wide, a street 16 m wide, an outer channel 0.5 m wide, and an outer sidewalk 3.5 m wide. The architecture of buildings around the main roundabout should be in conformity with each other. Trees should be planted in the same intervals along the streets (Ehlers & Floor, 1993).

In order to manage, supervise and give technical helps for urban design practice in all cities of Iran, the Ministry of the Interior also established a group, named Technical Department, consisting of professional engineers, architects and urban designers (Kiani, 1986). The department in Tehran was responsible for making important decisions and solving the problems in the implementation process of plans. It provided an efficient support for small cities where there was a lack of budget for urban and architectural projects. Until 1941, the requirements of municipalities were provided by the department. Therefore, the grid network of streets was implemented almost in all of the traditional cities of Iran (Ehlers & Floor, 1993; Kiani, 1986).

Since the establishment of Islamic cities, Waqf has been a form of property endowment according to the laws of Islam. It typically involves donating a building, plot of land or other assets for Muslim religious or charitable purposes with no intention of reclaiming the assets. A large amount of buildings and urban properties have been donated for the public favor by the rich persons (Flamaki, 1978). A religious foundation has been formed to manage the social and formal responsibility of Waqf to maintain and restore the historic buildings and to prevent the division of large land parcels. A new act passed in 1941 authorized the municipalities to use Waqf buildings and lands within the boundaries of plans for the urban development (Ehlers and Floor 1993) This was against the Sharia, the Islamic law, which prohibits the Waqf properties to be used for other purposes, but the law was enacted in the parliament. Although the act was withdrawn a few years later by the second king of Pahlavi, it made an irreversible effect on the traditional urban tissue.
3.2.1.2 The Haussmannian Paris as a Pattern for Urban Transformation

Laurence Lockhart, a British historian, who witnessed the rapid changes of Iran that were taking place over the half century from the 1920s to the 1970s describes the urbanization of Iranian cities with an optimistic view in the 1930s. He stated that more than remaining like an Oriental city without modern social facilities, the Iranian cities were radically transformed to produce wide avenues as a planned network on the intersections of which attractive monumental elements were placed. Lockhart assessed the changes of congested texture of the old city as the sign of enlightened administration. (Karimi, 1998). Marefat believed that the program chosen by Reza Shah was the heritage of Baron Haussmann who developed a large-scale project in Paris by imposing a geometrical pattern of boulevards on the traditional tissue (Marefat, 1997). In 1867, the modernized urban space of Paris was presented in Exposition Univeselle in which the leaders of countries from around the world were impressed to make similar practices to their own cities. Known as Haussmanization, this attitude became a model to modernize the historic cities to respond the new requirements of modern nations. The model presented various aims as to make the monumental buildings more visible, to improve the sanitarity of old neighborhoods, to guarantee the air circulation and to facilitate the movement of military force to secure the public peace (Giedion, 1967, p.745-6). Although many European cities was not transformed as extremely as the model of Haussmanian Paris, this approach was taken in the urban projects with different scales (Kostof 1991, 82).

Both of the kings of Iran and France, Reza Shah and Napoleon III, attempted to make their power more dominant after a period of rebellion, the constitutional revolution of Iran in 1906 and the French revolution in 1789. Before his monarchy, Reza Khan, who was confronted with a collapsing economy, found the solution in the radical renewal of the country. “We want to have a modern Iran and a modern nation… Iran should be mentally and somatically, outwardly and inwardly European-oriented” (Mozayeni, 1974). Mozayeni explained that the legislations which gave the authority to change the narrow traditional alleys by Iranian municipalities were in
Haussmannian language. However, there are considerable differences between the expropriation policies of two actions. Haussmann started to expropriate the lands much more than it was necessary for the building of boulevards to have the advantages of making profits of enhanced property values (Jordan, 2004). This policy made it possible to financially support the next phases of the project and at the same time to harmonize the architecture of an urban block. In Iran, there was no plan for the lands behind the new streets and the expropriation was limited to the first one or two parcels along the new street.

3.2.2 The Acceleration of Changes; the 1960s and 1970s

Urban modernization of the historic core was accelerated for the second time in the 1960s and 1970s, along with the socio-cultural changes of Iranian societies. The high revenues gained by selling oil provided the financial base to make changes on the physical and social structures of cities. The population of urban environment also experienced a dramatic increase from 5.6 million in 1956 to 9.7 million in 1966 and 13.2 million in 1972 that accelerated urban growth. In the last decades of second Pahlavi period, the modernization of the old cores continued by the government (Mozayeni, 1974). As the growth of cities became out of control, the necessity of master plans was revealed. The Iranian planners in a close collaboration with a European or American office started to prepare the master plans based on the principles of modern planning policies without considering the particular characteristics of the context. Isfahan was the first city for which a master plan was prepared and then it continued for other cities such as Tehran, Tabriz, Mashhad and Shiraz. The plans were formed based on the regulating three parameters of circulation network, the pattern of land use and the density of buildings regarding the number of stories. The horizontal expansion was encouraged to reduce concentration of the activities in the old city centers. The significant historical buildings were marked in the master plans to be conserved, but there was no plan for their settings and urban fabric (Lawless 1980, p 208). The initial grid system of new
streets was keeping to be completed on the old texture disregarding the historic patterns of growth. Therefore, the isolation of historic fabric continued to be a crucial problem of the traditional cities.

The master plans were prepared in response to the rapid and unprecedented growth of the cities. However, they continued to have a modernist approach and planned to decentralize the city to have a horizontal expansion that resulted in the increasing isolation of the historic core. The government acted a law to encourage the reconstruction of historic districts by offering exemption from tax “for any proprietor who replaces his old house with a new building” (Lawless, 1980, p 200). This law began to be a threat for the remained urban fabric of neighborhoods. Within the historic cores, many of the large old courtyard houses were demolished as their owners could sell the subdivided plots or obtain even better financial returns by building multi-story blocks of flats. Although the master plans have contributed to preserve some historic buildings and monuments, the traditional urban tissue was totally neglected.

In the 1970s, an apparent contrast can be identified between the historic center and the newly developed settlements in terms of the concentration of inhabitants, public facilities, physical condition and the items related to socio-cultural features. The old districts, which were suffering from decay and lack of maintenance, became the destinations of newcomers who were mostly migrants from rural areas or neighboring cities. The attractive appearance of the new quarters, with their broad avenues, modern buildings, luxury shops, cinemas and other entertainment, presented a class segregation that was previously rare. However, the historic cores in most of the Iranian cities was still a significant urban element with a multifunctional character. Consequently, old and new coexisted next to each other “as the old was strong and deeply rooted enough to wage a war against the new” (Madanipour, 1998, p 247).
3.2.3 The Urban Development After the Islamic Revolution of 1979

The Islamic Revolution in 1979 was an attempt to transform the country’s political, social, economic, and legal structure. The traditional values and the cultural heritage of the past were emphasized to promote “the notion of Islamic authenticity” (Kazemi, 2003, P. 81). The government attempted to enter different social and cultural fields, economic relations and domestic affairs to produce new patterns that support Islamic identity against the Westernization. However, the tendency for progression have been prioritized over the vague notion of identity in architecture and urbanism, and the attempts to provide a new prototype has been unsuccessful up to the present time (Nasab, 2014).

The uncertain condition after political change and the frustrated war between Iran and Iraq paused all planning activities in the country for near a decade. In 1989, the government prepared the First Five-Year program of Economic, Social and Cultural affairs. The main goal of this program was to privatize the economy to encourage investment and to rebuild the cities damaged in the war. The boom of oil price in the early 1990s provided the budgets for the public agencies to conduct large-scale projects as in the development of housing and urban spaces. Began in 1995, the Second Five-Year program of Iran was generally similar to the policies of the first one. In spite of the strategic plan for privatization, the government remained on the top of all affairs as the Islamic Republic is stable and centralized for the first time since the revolution.

The rapid expansion of cities and the transformation of historic core continued in this period. The New Town Corporation that was founded in 1988, and the “National Land and Housing Organization”, inaugurated in 1992, were among the largest governmental development agencies. The historic core of traditional cities which had not been considered for decades, were involved in the large urban projects. However, the profit-oriented approach in the new projects have directly affected the social and spatial structure of the historic cores and intensified the problems of these areas. The complexities of landownership and the deep financial crisis of the late 1990s caused
most of these projects were suspended for a long time. The large vacant areas and the abandoned properties became the new problem of historic neighborhoods. They became a place to sell drug and centers of criminal activity.

The elimination of urban fabric was widely done around the holy shrines, known as Imamzadeh to expand their areas that is known as one of the main reason of interventions on the historic context. The managers of religious places created institutions and organizations after the Islamic revolution, and they started to plan the enlargement of the complexes by themselves. Exempted from taxes and many legal restrictions, these foundations have become so powerful and independent from the government provides their own economic resources by establishing charities and organizational bodies.

The process of urban modernization of Iranian cities was implemented based on the following principles:

- At least two modern streets were superimposed on the historic core without considering the pattern of existing fabric.
- A ring road was constructed on the trace of demolished city wall and the historic ditch that presented the boundary of the historic core.
- Modern two-story buildings were built at the edges of new streets.
- The superimposed network of streets was extended outside of the historic core to determine the direction of urban development. The result is a powerful grid of roads that connects the old and new elements of the city with each other. It has become the new structure of traditional Iranian cities.

The expansion of cities by the modern streets encouraged the people to live in the new neighborhoods with modern facilities. It reduced the significance of historic core as the center of activities. The traditional center became abandoned as new centers were formed on the peripheral area of cities. The traditional covered bazaar
as the main urban element of historic city that integrated the whole structure of the city lost its importance due to the luxurious shopping centers. As the structure of the traditional city has been transformed, the historic urban spaces which were lucky enough to survive have become segregated elements.

3.3 The Change of Approach Toward the Historic Urban Context in Iran

The urban modernization in most of developing countries coincided with when the West started to think seriously about the preservation of historic cities. From the 1920s, the centralized and authoritarian state of the first Pahlavi modernized the country in all the fields including architecture and urbanism. The secular government changed the traditional legal system based on the Islamic law and got the control over religious activities (Kermani, 2017). The tendency for industrialization with an inefficient economy, the explosion of population and the need for rapid urbanization as well as the rising social classification were the factors which dominated the Iranian urban design practice in the first half of the 20th century, without leaving any time to think about the unwelcome old structure of historic cities. The restoration and preservation of historical monuments was based on the political ideas that prioritized the pre-Islamic archeological sites and monuments. In 1922, the Society for National Heritage was established to make archeological excavation and to preserve the cultural heritage. The first list of historic building and monuments titled: A Brief Inventory of the Historical Heritage and Edifices of Iran was prepared in 1925. However, the traditional urban fabric of historic cities was treated as a worthless entity which could be swept away. (Falamaki, 1978)

3.3.1 The Development of Conservation Policies in Iran

The actions toward the preservation of historic core has started in most of developing countries since the 1960s. This was inspired by the Western trends of that time and the awakening of the urban collective conscience. The National Organization for the
Conservation of Historic Monuments was established in the mid-1960s to commence a major study on the historic monuments and prepare a plan for rehabilitation. It published numerous volumes of documents relating to architectural details and restoration techniques. The first plans for conservation were prepared for the historic sites in the cities like Tehran, Isfahan and Shiraz. However, majority of them were not executed (Lawless, 1980). Although the approaches towards the traditional urban fabric started to change, conservation in practice was restricted to the single buildings. The table 2.1 presents the various organizations which have been responsible for the conservation activities in Iran from 1850 to 2004.

Table 3.1 The institutions, organizations and legislative frameworks employed in the conservation between 1850-2004. (Kermani, 2017)

<table>
<thead>
<tr>
<th>Year</th>
<th>Event</th>
</tr>
</thead>
<tbody>
<tr>
<td>1851</td>
<td>The establishment of the first department of antiquities, which has been reorganised and renamed several times since, in 1928 and 1934 (Archaeological Survey of Iran), 1964 (General Office for Archaeology) and 1965 (National Organisation for Conservation of Historic Monuments).</td>
</tr>
<tr>
<td>1922</td>
<td>The establishment of the Society for National Heritage, a semi-public influential institute in the field of introducing and preserving cultural heritage, introducing the first list of historic buildings in 1925, preparing the first technical briefs for preservation and restoration, carrying out over 60 preservation projects, and creating a national museum and a public library are the most significant activities of this institute during its 57 year existence.</td>
</tr>
<tr>
<td>1930</td>
<td>Approval of the first Act regarding the preservation of cultural heritage, followed by indexing, listing and restoration of historic monuments.</td>
</tr>
<tr>
<td>1960s-1970s</td>
<td>Several national and international congresses on the preservation and restoration of historic monuments during the 1960s and 1970s.</td>
</tr>
<tr>
<td>1960s-1970s</td>
<td>The development of a wide range of restoration and preservation projects in the mid-1960s which increased rapidly in 1970s.</td>
</tr>
<tr>
<td>1960s-1970s</td>
<td>In 1973, 600 major sites were on the list for preservation and 300 were actively under repair.</td>
</tr>
<tr>
<td>1973-1978</td>
<td>The rehabilitation plans for the historical core of Isfahan, the bazaar and Oudlejan quarters of Tehran and the historical city centre of Shiraz were prepared during the Fifth Development Plan.</td>
</tr>
<tr>
<td>1986</td>
<td>With the establishment of the Iranian Cultural Heritage Organisation in January 1986, conservation policy gained greater priority and underwent vigorous development.</td>
</tr>
<tr>
<td>1986</td>
<td>After the establishment of the second cabinet of technocrats in 1992, the organisation mostly focused on the contemporary role of cultural sites and economic use of historic buildings and sites.</td>
</tr>
<tr>
<td>2004</td>
<td>The Cultural Heritage Organisation merged with the Iran Touring &amp; Tourism Organisation as an independent organisation under the direct supervision of the President of Iran.</td>
</tr>
</tbody>
</table>
Steinberg stated that the establishment of international organizations responsible for cultural affairs like International Centre for the Study of the Preservation and Restoration of Cultural Property (ICCROM), United Nations Educational, Scientific and Cultural Organization (UNESCO), and the International Commission on Monuments and Sites (ICOMOS) has made a positive impact on the conservation activities in the developing countries. However, it is the monuments that are more advantageous than the fabric of traditional neighborhood (Steinberg, 1996). The Iranian Cultural Heritage Organization (ICHO) was founded by merging different responsible units and institutions with each other in 1986. By ICHO, there have been a significant change of approach and legislations toward the cultural heritage. For the first time, a practical force was formed to protect the historic urban context rather than the individual buildings (Hodjat, 1995). These changes were progressively supported by the conquest of reformists in the presidential election in 1998. The new government attempted to provide a reasonable relationship between the socio-cultural policies and the political development. The local councils started to be selected and the formation of NGOs contributed to participate the citizens in the process of urban development. By the establishment of Urban Development and Revitalization Company (UDRC) in 1997, the traditional tissue of city cores was considered more seriously in the future development of the cities. The management of conservation programs and encouragement for making investment are the key duties of the company. Rather than economically based development plans, such as those used by the Cultural Heritage Organization, the reformist organization struggled to establish a balance between the socio-cultural, political and economic issues. From 1997 to 1999, the UDRC developed its strategy and controlling structure based on lessons learned from the previous experiences. In 2000, the administrative structure of UDRC changed from a company to an organization (UDRO) by which it became financially independent, and a budget was assigned by the parliament (Hodjat, 1995). Through this time, some of the important renewal and rehabilitation projects of historic sites were designed in Iran.
The third plan of development (2000-2005) of Iran was an attempt to join in the cultural and economic policies. UDRC separated to seven branches in different parts of the country and a directing committee was established in each province. The aim was to strengthen the local management and transferred the responsibilities to them. This made an important impact on the selection of urgent areas, and the scale and process of intervention in the historic urban context (Izadi 2008). The large-scale urban projects in the historic cores of Iranian cities were started to be implemented in this period of time. The table 2.2 illustrates the evolution of regeneration policy and planning system in Iran after the establishment of the Urban Development and Regeneration Company in 1997. (Kermani, 2017)

Table 3.2. The process of the legislation and policies in Iran after the foundation of the Urban Development and Regeneration Company in 1997 (Kermani, 2017)

In summary, there are two organizations in charge of the conservation and renovation of historic core. Cultural Heritage and Tourism Organization is the first one in the national level. Any kind of regeneration and revitalization plans inside the boundary of historic cores of city should be approved by this organization. The other authority is the Organization of Urban Development and Revitalization, which was responsible to provide the regulations and strategical plans at the national and local
scales. According to the recent experiences, other organizations with a high operation potential like municipality have been also involved in the process and changed the direction of projects. The financial problems, which Iran has encountered by the economic sanctions, have enforced Cultural Heritage and Tourism Organization to change and accept the profit-oriented projects that are in contrary to its principles.

Along with the political and economic problems, there is a lack of an integrated heritage management system in Iran to make comprehensive decisions about the historic sites. Urban development and heritage conservation need to be integrated in order to keep the active role of historic heritage in the urban life. These two issues should contribute each other as no renovation project can be successful without an adjustment to the changing societies; and the urban development without respecting to historical values will result in a loss of identity. Nasab et al. (2014) emphasized that an integrated attitude can be achieved by the participation of inhabitants and local managers of historic context. The authority of central government should be reduced by supporting decentralization of responsibilities to have more successful revitalizing projects (Nasab et al. 2014). In this sense, there is a lack of appropriate regulation by the parliament to transfer the responsibilities and decentralize the government (Kermani, 2017).

3.3.2 A Framework to Study Different Aspects of Designing in the Historic Urban Context

Regarding the experiences of developing countries, Steinberg (1996) provided a quintet of issues which can be considered as a framework to evaluate the renovation and rehabilitation projects. The issues have various aspects of political, cultural, social, economic and urbanization (Steinberg, 1996). As the political and economic aspects of a project share so many common issues, they can be put in a group. The social and cultural aspects can also be considered together while the urbanization that refers to the physical aspects of intervention on the historic urban context is an
individual item. Therefore, a tripartite framework is provided to study the various issues related to the urban design and conservation of historic cities.

### 3.3.2.1 The Political and Economic Aspects

The political and economic aspects are related issues referred to the national policies of each country, involved international and local organizations and the financial sources to support the conservation activities. These issues are very crucial as the developing countries mostly lack adequate resources to conserve and improve even the most precious monuments. The large-scale rehabilitation project, which needs an efficient administrative system, strong policies, programming and financial support, have always encountered with various problems. The participation of affected population in the design process and implementation of conservation and rehabilitation schemes is an important issue which can guarantee the success of a project. Avoiding a top down process in programming and including the local organization in the process is the key to encourage people for participation. A mix of private and public resources make the progression of project faster and more confident. There is a need for proper policies to control the increase of land values and upcoming taxes. How much the economic role of tourism can make positive impact on the conserved area. How it can be foreseen that the older land uses and activities compete with the new ones?

Steinberg (1996) explained that the absence of political commitment in the developing countries caused the attempts of heritage organizations in national and international levels to be inefficient. For instance, in Cairo and Sana’a, the struggles on behalf of the Aga Khan Foundation of Architecture and UNESCO could not achieve a success as the local authorities expected to receive a World Bank loan. However, there are also successful conservation and rehabilitation programs in large scales in Tunis and Bhaktapur which were done by the collaboration with multilateral external donors (Steinberg, 1996). An integrated conservation refers to the revitalization of whole historic city center, including the economy of inhabitants, the
necessary infrastructure, the rehabilitation and restoration of monumental buildings and the renovation of old neighborhoods.

3.3.2.2 The Socio-Cultural Aspects

The historic core of cities in the developing countries like Iran has been generally abandoned by moving of high-income inhabitants because of various infrastructure problems and the change of life style. Therefore, the changing social structure of historic core needs to be considered against the issues like gentrification that causes the displacement of people and their businesses. By implementation of conservation projects, the present low-income residents cannot afford the increasing values of land uses. The economic condition of the residents and the unconcern attitude of landlords make it so hard to maintain the old houses in the historic neighborhoods (Steinberg, 1996). This need a proper studying of the social context and an effective program to overcome the problems.

Nowadays, culture is not a concept in itself, but it is a source of income for the advancement of local economy. It has been considered in the tourism-orientated marketing of cities as a means of attraction. From this point of view, the old cities, particularly in the middle eastern countries, have considerable potentials due to their ancient cultural values. There are also opposite views that criticized the economic approach toward the heritage sites as the misuse and misinterpretation of history. The tourist-historic cities have become more like open air museums than a backdrop to people’s daily lives. Although often economically successful, these “heritage landscapes” have been condemned for manipulating local identities and commercializing history.

3.3.2.2.1 The Issue of Identity in the Islamic Republic of Iran

Identity is defined as the qualities and the characteristics of a person or a thing that makes it different from others. Therefore, it has a very close meaning with the
The concept of character which is widely used in architecture, conservation, urban design and planning. Character refers to the differences between the entities; what gives a city its unique character are the features that make it distinguishable from other settlements. To be distinctive means to have a particular character and hence to get an identity. The most significant cultural aspect of historic conservation in Iran is its potential to be a source of identity.

The notion of identity has become a very strong political discourse in Iran after the Islamic revolution. The issue of identity crisis refers to violence of traditional values by existence of Western approaches and life style. In 1961, the term of Westernization was founded by Jalal Al-e Ahmad as a terrible widespread illness like cholera that terminates the society (Shirazi, 2018). After about 40 years of the Islamic revolution in Iran, there is no agreement for the definition of Islamic Architecture and Urbanism and its principles and implementation methods. Various institutions, scholars and academicians have been ordered to prepare the principles of the Islamic architecture and to provide guidelines to produce a traditional urban environment. Except some general descriptions, there is no noticeable statement to be considered on this topic. This dissensus, as stated by Academics, comes from the multifacetedness and the complexity of issues which make a comprehensive answer so difficult. Politicians insist on the nostalgic approach toward the past and the unclear desire for a utopia. Shirazi express this situation as “a drastic schism between the ‘call’ to traditionalism at the level of discourse and an ‘anarchy of manifestation’ in practice” (Shirazi, 2018).

The concept of character plays an important role in other countries as in the UK where there is a process of “character appraisal” to identify the special and distinct features of an area. This process leads to the establishment of conservation priorities and the definition of guidelines for development. Larkham (1996) is one of the critics of British character appraisals and argues that they are often too simplistic and tend to attribute too little significance to issues coming from the fields of geography and urban morphology. There are clear parallels between the character of area and the character of people. If one describes a person one does not focus only on their outer
appearance, but considers their individuality or personality; that which makes them who they are. The character of areas is, in similar vein, more than a mere description of a visual appearance, because there is often a deeper meaning involved, one that cannot be identified that easily.

By a top down program, the government in Iran has attempted to encourage all cultural actors including architects and urban designers to represent the glorious past of Islamic era. The simplistic approaches of new architectural styles, which just make formal references to the past, has been always controversial. Diba believes that the prevalent approach towards producing identity is so superficial and liken it as the design of the buttons while the “suit itself is being produced according to the Occidental model” (Diba, 2002: 120). In the late 1990s, the attentions were drawn to the historic core of cities and their potential to represent the lost identity. The Islamic Republic started to prepare large-scale urban projects which have cause major transformation in the traditional urban context. In spite of the traditionalist architectural style of the facades, the plan was designed without considering the overall urban structure of the historic city. The Imam Square project of Urmia is an example of this approach which will be studied in the next section of present chapter. The top down process of decision making, designing and implementing of the project has caused irrecoverable damages on the historic core of Urmia. In the next chapter, other renovation and rehabilitation projects of meydan will be analyzed to examine their interaction with the historic urban context.

3.3.2.3 Urbanism Aspects

Urbanism aspects deal with the form of urban environment and morphological logic of a historic context. Each city has its own pattern of urban spaces and physical characteristics as the natural features around and pattern of land uses, the density of buildings, the form of circulation network, typological qualities, and the main urban components. These are the morphological characteristics of city which has evolved through history. The pattern of urban fabric and the size of individual parcels is the
major feature that makes a significant impact on the urban form (Steinberg, 1996).
For an area rehabilitation and conservation project, conservation of the original urban
fabric is an important goal. When the tissue pattern and the land parcels is broadly
modified, apparently the nature of the historic site is going to be changed fundamentally.

Kropf (1996) has identified the practical importance of the concept of character and
has proposed a framework to identify and describe the physical features that create
to the particular character of cities. Among them, urban tissue is of major importance,
forming a synthesis of all of the components and providing a basis for distinguishing
the distinct parts of cities. The urban fabric is formed by the acts of construction and
reconstruction in history. The urban elements and pattern of streets are emblems of
particular events. The past of a city is written in its urban fabric. Kropf stated that
urban fabric presents a framework for describing the physical features that make the
traditional character of cities revealed (Kropf, 1996).

Steinberg gives the example of Medina of Tunis, where the area conservation and
redevelopment was done without any consideration of urban pattern. The quasi-
traditional style housing (classic Tunisian courtyard houses) were constructed for the
middle and high-income class to give a historic appearance. This is an example of
superficial approach like Facadism which usually occurs to minimize the visual
disturbance of new buildings by making new construction look old or decorative or
by making large buildings look like a number of smaller ones. It undermines the
morphological logic of urban space and the patterns of social relations and collective
memory which was shaped through time.

3.4 The Significance of this Chapter

In the third chapter, the urban structure of Iranian traditional cities and their
transformation is examined regarding the different periods of time. The
morphological characteristics and the main urban elements of the historic cities are
studied with a particular emphasis on the *meydan* that is one of the main focuses of the present thesis. A typology of *meydans* based on the functional aspects and physical features with various examples is presented that contributes to understand the nature of public open spaces in the traditional Iranian cities. The notion of in-between space, as an intermediate realm that makes the coexistence of functionally different areas possible, is also considered to explain how spaces like the courtyard (Sahn) of Jame mosque was acted as a public space. The organic pattern and hierarchical structure are two common features of traditional Islamic cities of Iran which started to be radically changed through the interventions of the early 20th century. The process of urban modernization of Iranian cities is explained in the three stages from the first Pahlavi period to the present time. It was in the 1990s that a notable change in the approach toward the historic urban fabric was initiated. The legislative base and operational instruments for rehabilitation and conservation of historic cores were founded in this period. Although it was relatively late for the traditional cities of Iran to maintain their urban structure, the new approach provided the opportunity to reconsider the remnants of the past more consciously. Some major urban design projects as the rehabilitation and renovation of traditional urban spaces were planned in the late 1990s and started to be implemented in the 2000s. Public squares constitute a favorable subject within the projects that are selected as the case studies in this study. The present chapter provides an introduction for the reader to be familiar with the practice of urban development in the Iranian historic cities. Understanding the traditional model of Iranian city, its process of transformation and the emergence of the conservation policies are significant to figure out how the urban design as an intervention on the historic urban fabric was processed. The lack of up to date conservation regulations, the complexity of bureaucracy and the weakness of management can be among the reasons for the failure of urban projects in Iran. The present thesis is an attempt to provide a methodological approach to study the interventions on the historic urban context.
CHAPTER 4

THE TRANSFORMATION OF A HISTORIC CORE; IMAM SQUARE PROJECT OF URMIA

4.1 The Origin and Formation of Urmia

The urban structure of traditional Iranian cities and their morphological characteristics were studied in the previous chapter. The main elements and their configuration on the city present the model of traditional Iranian cities. The Jame Mosque and covered bazaar were at the city center with perhaps the governmental buildings. Regarding the socio-political importance of the city, the meydan was formed in a close interaction with the bazaar. The main streets connected the gateways to the center in an almost direct way. Between them, neighborhoods were formed by a secondary network of streets and alleys. Through the urban modernization of the 20th century, the traditional structure of the Iranian cities has been transformed with different degrees but in the same manner.

Urmia was located in the ancient Urartu or the Kingdom of Van, which had linguistic ties with the Anatolian Hurrians but was strongly influenced by the Assyrians. The kingdom rose to power in the mid-9th century BC, but went into gradual decline and was eventually conquered by the Iranian Medes in the early 6th century BC. Ur in means city and Mia means water (in Arabic Maya) in Assyrian, therefore Urmia in Assyrian language means the city of water (Dehgan, 1968). At the south region of in about 80 km distance from Urmia, one of the important archeological sites of Iran, the High Mound of Hasanlu, has existed (Figure 4.1). In 1956, findings revealed an ancient city with the urban structure of pre-Islamic Iranian Parsi style (Habibi, 2000). By a citadel at the top of mound and layers of residential areas around, Hasanlu presents a Median city in the 8th century BC. The citadel and its surrounding homes, known as Sharestan, were occupied by the king, his families, solders, and upper-
classes. There was a temple inside the citadel, and a fortification wall surrounded the complex with an internal gateway. The bazaar is believed to be formed among the residential dwellings known as Savad where ordinary people lived. Hasanlu was burned by Urartian and from then on was not settled and only used as a fortress occasionally. The layer of burned city fortunately has been remained in a good situation.

![Plan of the Mound of Hasanlu](http://www.iranicaonline.org)

Figure 4.1. The plan of the Mound of Hasanlu (http://www.iranicaonline.org)

There has not been any comprehensive archeological excavation in Urmia. However, a number of antique objects have been found in the city that share the same historic period with Hasanlu civilization. Professor Minorsky, a Russian Orientalist in 20th century, believed that most probably there was a similar historical settlement in Urmia like its nearby places (Dehgan, 1968). Ali Dehgan in his book, *The Land of Zoroaster*, explained that the archeological findings around Urmia Lake determined the old history of the region, about 2000 BC. However, there is no physical evidence in terms of the urban structure. Because of the construction materials, the events like wars, and natural disasters such as earthquake, most of traditional Iranian cities were
ruined and frequently reconstructed. In Urmia, except of some buildings, most of the city has been rebuilt during the last century.

Dehgan mentioned that Urmia was called the origin of Zoroaster, an ancient prophet whose teachings and advices developed into the religion of Zoroastrianism among Iranian-speaking people. Azerbaijan was one of the first parts of ancient Iran which became independent of the Seleucid Empire with a dominant Greece culture, and it became the heart of Zoroastrianism, the symbol of Persian culture. Perhaps because of that Urmia has been known as the land of Zoroaster.

4.1.1 The Geographical Features of the Settlement

Located at the west side of Urmia Lake, Urmia is the second most populated city of the northwestern region of Iran. From the Safavid period on, the city has been considered as an important border city with the Ottoman Empire and now with the Republic of Turkey. Because of that a considerable investment on the industrial infrastructures has never been planned by the central government. Agriculture and gardening have been the main occupations of the inhabitants and the economic force of the region. Urmia, at least in the last three centuries, has never had the big landowners, called Arbab in Persian, who possess considerable pieces of land and rent them to workers in order to profit the interest (Kaviyanpour, 1966). The people always had their own small gardens or farms, and the economic status of people was generally fine. At the present time, more than 60 percent of the city’s inhabitants have a second occupation that is gardening and agriculture.

The natural features have imposed a degree of control on the orientation and boundary of a settlement in the Iranian context. Closing to water sources has always been an important principle for a traditional city. Therefore, most of the cities were existed near mountains, rivers and Qanats (the traditional water cannels system in Iran). Urmia has been established on a flat and fortified plain which is bounded by mountains on the west, a river on the south and in about 20 km distance from Urmia.
Lake on the east (Figure 4.2). The mountain has determined the limits of urban expansion and the river has become an important urban element of the city since the 1980s.

Figure 4.2. The aerial photo of the city and Urmia lake at the present time (source: Google Earth)

The 1956’s aerial photo of Urmia as its oldest view presents the historic core and the natural features around. Shahar Chay River, originated from the mountains, was located outside of the town’s border. Agricultural lands were existed around the city. The pattern of agricultural land division was an effective factor on the future expansion of the city. The aerial photos of 1984 and the current time present the gradual disappearance of green areas and the expansion of the town on all its sides (Figure 4.3).

Figure 4.3. Aerial photos of Urmia in 1956 (source: Iran National Cartographic Center) 1984 and 2018 (source: Google Earth)
Nowadays, Shahar Chay River has been a green edge at the middle of city with the areas for promenade and recreational activities. The urban growth has been driven to the south and west toward Seer Mountain to maintain the agricultural lands on the north and western sides of the city.

Urmia was not on the way of ancient Silk Road, but it was located between its two branches. The city was indirectly connected to the Silk Road and the important cities like Tabriz. Although Urmia has never been an important trading city, but it has always been a local center for distribution of products and services in the region (Figure 4.4).

![The Silk Road map](https://en.unesco.org/silkroad) & The map known as Iran & Turan drawn by Adolf Stieler in 1875

The diagram in the figure 4.5 presents the situation of Urmia regarding the historic Silk Road. The closest important city to Urmia is Tabriz with which the city has had a close strategic and logistic relation. The lake of Urmia was also used to transfer soldiers and necessary staffs between the two cities in the emergency conditions. At the present time, the lake is overpassed by a bridge and the distance between the two cities has reduced to 130 km.
The traditional Urmia was located on an almost flat area with a low slope about 1.5 percent from one side to the other. The only place with relatively sharp slope, about 5 percent, was at the southern part where the castle was constructed. The map in the figure 4.6 illustrates the topography of the region, the border of city and the intercity roads which arrived the city center through the gateways. From the seven gateways of the traditional Urmia, four ones provided a direct access to the bazaar. The gateways which opened to the important roads were: Bazar Bash, Hazaran, Askar Khan and Balo gateways. In the aerial maps and the schematic map of 1850, there is no intercity road reached to Ark gateway which was opened to the castle. Perhaps this is because of the military function of the gateway to provide more privacy and isolation.
4.1.2 A Brief History of Urmia and Its Demographic Characteristics

Muslim Arabs invaded Persia in 633 and Urmia like the other Iranian cities was conquered by them. From then on, it is possible to find some direct descriptions about the physical and socio-economical characteristics of the city. Al-Baladhuri, a Muslim historian in the 9th century, described Urmia as an ancient city with a so many farmlands and gardens. Because of its fertility, numerous groups of Arabic tribes immigrated to Azerbaijan and Urmia (Dehgan, 1968). Ibn Ḥawqal, an Arabic geographer in the 10th century, stated that “Urmia after Maraghe is the largest city of the region, and people engage with agriculture and gardening”. In Taghvim-al-Boldan, an Arabic geographic book written by Abolfada in the 13th century, Urmia is described as a relatively large city with 12 thousand footsteps (Paa) perimeter, 120 relative villages and 74 thousand Dinar budget from central state (Dehgan, 1968). According to the first maps of Urmia, the city had a fairly circular shape. Based on the perimeter stated in Taghvim-al-Boldan, the size of walled city of Urmia in 13th century was a little smaller than the 1933 map. Therefore, the size of the city had not extremely changed through the seven centuries. (Dehgan, 1968)
Evliya Çelebi, an Ottoman statesman in 17th century, in his well-known travelogue, the Seyahatname, explained his observation of Urmia. During his third travel to Iran in Safavid period, he visited Urmia for a mission on behalf of Erzurum’s ruler. The description of Evliya Çelebi can be important to understand the condition of Urmia in the Safavid era as there is a lack of information. Below is the exact translation of related part from the forth volume of Seyahatname:

“Rumiyye (Urmia) and its surrounding areas are full of nice gardens and flowers. The perimeter of city is 17 thousand footsteps, but considering the gardens around, it is very hard to revolve it by horse in a day. There are not so many animal flocks around. There was a ditch encompassing the city, but it has been filled by soil…. Most of people in Urmia are Sunni and because of that they have never invaded Ottoman territory…. Generally, the city has 60 neighborhoods and 6 thousand home inside the fortification wall. There are several palaces which are all beautiful. The palace of Urmia’s ruler is a garden with 70 mansions and 600 servants. The city has 80 mosques which are constructed by Salafi kings…. There are six schools, three Tekye (a place to carry out religious ceremonies) and several Hammam (traditional baths). Bazaar has 200 Charsuq with covered paths and small openings on the ceiling for lightening. The store chambers of bazaar are so adorned and well-smelled especially the drapery’s Raste³. Urmia and its surrounding villages, which are 150, have about 300 thousand populations” (Çelebi, 2000).

It seems that there are some exaggerated statistics in Seyahatname which might be the results of the optimistic approach of Evliya Çelebi toward the places he visited. Vladimir Minorsky, questioned the writings of Çelebi about Urmia. He believed that the given statistics are incorrect, specially the population and the size of Urmia. Minorsky referred to Baillie Fraser, a Scottish travel writer, who visited Urmia in 1821 and stated its population as 20 thousand. There can also be some doubts about

---

³ Raste is a relatively long covered passage which makes the main linear structure of traditional Iranian bazaar
the number of neighborhoods, as 60, and the mosques, as 80. (Dehgan, 1968)
Arabkhani believed that in terms of the characteristics of public spaces and the
everyday life of people, Çelebi illustrated Iranian cities in a very generous manner,
and this approach caused some positive exaggerations in the physical features of
cities. However, in terms of religious and political affairs the same thing cannot be
said. This can be inferred by the way he called Safavid king, Shah Abbas II, as
pervasive Shah who drinks wine. In different parts of Seyahatname, he praised the
culture and hospitality of Iranians, but then expressed his deep regret that the
inhabitants of these cities are Shiite (Arabkhani, 2015).

In 1834, the first group of religious missioners from USA came to Urmia and other
Iranian cities. Then, other countries like France, United Kingdom and Russia started
to send their own missioners. Focusing on the children of Christian community, the
missioners began teaching and conducting cultural activities. Gradually, their actions
were expanded to include others from Muslims. The first modern public school of
Iran was inaugurated in the Seer village of Urmia, and more than 50 others had been
opened in Urmia and its surrounding region by 1851. The first school of girls who
had already no opportunity for education was established. The first modern Medical
school of Iran was also founded by Joseph Cochran⁴ at the southwest of Urmia
outside of the traditional city wall, and the first group of modern doctors in Iran were
trained in it. Until the First World War, there were so many American, French and
Russian schools and cultural centers in Urmia. After a series of terrible events in
between 1915-1920, the work of foreign missioners was ended and their buildings
and facilities were bought by the government.

Through its history, Urmia has suffered so many disasters. The most recent ones
were the events of the First World War for which lots of information is available.

⁴ Joseph Plumb Cochran was born in Urmia as his parents were the first-generation American
missionaries who traveled to Iran. He studied medicine at New York Medical College, and turned
back to Urmia in 1878.
Through the WWI, the city was occupied and plundered several times by the Russian Army, the Ottoman Army, the migrant Assyrians and the Kurdish militants. A big part of the traditional bazaar was burned in the fire started by the invasion of Russian Army. A group of Assyrians, who had escaped from the lands of Ottoman Empire, were accepted and settled in Urmia and its surrounding villages. With the support of Russia and the provocation of foreign missioners, they would take the control of region which was in a chaos because of the weakness of central government. With murdering of Mar Shimun Benyamin, a Catholicos Patriarch of the Assyrian church of the east, by Simko Shikak, the leader of a Kurdish militant, Urmia witnessed one of the distressing event of its history in 1918. Regarding different sources and the memories of eyewitnesses, in about three days more than 10000 inhabitants of Urmia and the surrounding villages were massacred by Jilow who were the armed Assyrians. By the sudden and rapid retreat of the Russian Army from the region, most of Jilows had to escape. The Ottoman Army entered Urmia and this time it was the turn of Muslims to revenge the death of their relatives. Most of the native Armenians and Assyrians of Urmia, who had no relation with Jilows, were unfortunately killed in these events. When the Ottoman Army left the city, Simko took the control of the city without any resistance. There was a severe famine and infectious disease outbreak in those years in the region. (Dehgan, 1968).

At the end of the First World War, Urmia and its villages were ruined and abandoned areas. Kasravi, an Iranian historian, stated that there were no one to collect the crops from the gardens and farms around the city (Kaviyanpour, 1966). From the 45% of Christian’s population before the war, only 5 percent has remained and lived in the present city. The sorrowful narratives and memories of those events are still alive in the mind of elderlies. In the early 1920s, Reza shah established the first Pahlavi period as a powerful state, and the security was provided all over the region. Most of the ruined buildings and neighborhoods were totally reconstructed in Urmia. Impressed by the improvements of condition, people changed the name of city from Urmia to Rezaiyeh, as a respect to Reza Shah’s attempts. Of course, it was changed back to Urmia with the Islamic Revolution of 1979.
4.1.3 The Historical Maps and Documents

Except of some descriptions about socio-economic status of Urmia, the urban structure and the spatial characteristics of the city were hardly explained and depicted. It has caused to a lack of information, and the traditional state of city has remained unclear. The first map of Urmia was drawn by Asadollah Khan, the chief of Urmia’s artillery force, in about 1850. It was a schematic drawing presenting the shape of the city as a circle with seven gateways on the periphery (Figure 4.7). Asadollah Khan prepared the map in order to describe the condition of Urmia’s fortification wall, the places which needed restorations, the methods of arming the city with cannons and other suggestions to improve the defensive affairs. As the map was a military document, the socio-economic urban elements like the bazaar and mosques were not depicted. The map includes the main paths from the gateways into the city center, the house of Urmia’s ruler, Egbal’o Dolle, and the military square of Topkhane meydan located inside the citadel, known as Chaharborj. The fortification wall and the defensive ditch which encircled the city were the two main elements of the map shown by red and blue colors.
The first technical map of Urmia was drawn in 1933 by Avans Garibian, an architect of the new-founded municipality (Figure 4.8). It was the time when Reza Shah had started the modernization movement of Iran in all fields as the urbanization. From this period on, the traditional structure of Urmia began to be dramatically transformed. The map presents the urban structure of the traditional Urmia invaded by the new constructed streets that cut through its fabric. Two main streets, Pahlavi and Naderi, crossed at the heart of the city and their intersection node became the new center, known as Markaz. The southwest land of the city, which was once the place of beautiful gardens, was transformed into the military site with a gridiron plan. Pahlavi Street connects two squares: the first one next to the military site known as Ayalat and the second one at the city center, Markaz square, which was once part of the traditional bazaar. The 1933’s map of Urmia includes important information as
the names and approximate location of the 11 neighborhoods and the main buildings like mosques.

Figure 4.8. The first technical map of Urmia in 1933 (source: West Azerbaijan Cultural Heritage Administrative http://www.urmiachtio.ir/)

In 1956, the first aerial photo of Urmia was provided and the cartographic map of the city, which precisely presents the detail of urban structure, was prepared (Figure 4.9). In comparison with the map of 1933, there is no noticeable changes and urban transformation in the 1956’s map. Although new buildings were constructed, the overall structure remained almost intact. Therefore, the 1956’s map is the most reliable reference in order to reconstruct the traditional urban structure of Urmia.
Figure 4.9. The aerial photo and the cartographic map of Urmia in 1956 (source: the archive of West Azerbaijan Cultural Heritage Administrative) the assembling of map parts by the author

The most recent document of Urmia is the Comprehensive Plan of the city that was prepared in 2017. In the present study, the morphological analyses for the current time is done using this map.

Figure 4.10. The comprehensive plan of Urmia prepared in 2017 (source: Urmia Municipality)
4.1.4 The Evolution Process of Urmia

Spiro Kostof (1991) determined four factors in the evolution of organic patterns of cities. He explained the role of topography, land division, Synoecism and the law and social order on the urban form. The figure 4.11 depicts the relation between the mass, vacant areas and the topography of Urmia at the present time. By the first glance, different fabric patterns can be recognized in the various parts of the city. They can be the indication of the different construction times of a district (Conzen, 1960). The organic pattern of historic core, which was cut by the wide and straight streets is recognizable. The darker areas particularly on the north and northwest of historic core are the slums which have been developed unofficially and are still one of the problems of the city.

---

5 Synoecism means the unification of towns, tribes etc. under one capital city or polis.
The diagram in the figure 4.12 presents the evolution process of Urmia from its initial core that consisted of the traditional bazaar and the Jame Mosque. The following developments have been occurred radiating from the historic core that it is still the center of the present city. The limit before the 20th century is considered as the traditional Urmia. The city has been rapidly developed by the waves of immigration from villages and the increasing population of the city since the mid-20th century. The modern neighborhoods for the middle and high-income classes have been developed in the west and southwest suburbs. The pleasant weather of Shahar Chay River and Seer Mountains have charmed people to live there. The northern part of
the city is settled by the low-income class. The historic core has continued to be the administrative and commercial center of Urmia.

Figure 4.12. The evolution process of Urmia through the time (source: Urmia Municipality)

4.1.5 The Main Urban Elements of Traditional Urmia

The urban structure of traditional Iranian Islamic city has three basic elements: the bazaar, the Jame Mosque and the neighborhoods (Habibi, 2000). Soltanzade added three other elements: the square (Meydan), the school (Madrese) and the castle with the fortification wall. The main urban elements of traditional Urmia are studied in the following part.
4.1.5.1 The Covered Bazaar

The origin of the word bazaar comes from Persian bāzār and it refers to “a market or street of shops and stalls in Middle Eastern countries” (Stevenson, 2010). In the most of the cities at the central region of Iran with a hot and arid climate, the traditional bazaar had a linear structure that starts from one gateway, passed through the center and ended on a gateway at the other side of the city (Soltanzade, 1988). The traditional bazaar of Urmia, which is located in a cold and moderate climatic zone, is a complex with a spatial organization similar to a grid pattern. It has configured the central spatial organization of the city.

The traditional bazaar in the Iranian cities was an urban complex including various commercial, socio-cultural, religious and service functions. Therefore, a wide range of buildings such as caravanserai, Madrase (school), mosque, Hammam (Bath) teahouse etc. can be found in it (Rajabi, 2006). At the present time, the traditional bazaar of Urmia includes more than 1000 shop stores with 5 Hammam (public bath), 7 Timche and large Saray⁶ and the great Jame mosque of Urmia with an area of 5000 m². The total area of the complex is about 60000 m² (Nagsh-e Piravash, 2008). Timche is an important element of traditional Iranian bazaar that is a covered and wide space located between the main axis of the covered bazaar (Raste) and a caravanserai. It is used to trade one particular commodity. In the other parts of the bazaar, the tradesmen of an identical profession were gathered in a common place named with that occupation. For instance, the place where jewelers work is called Zargar (goldsmith) Rasta-si. Khan or Saray is a small caravanserai with an open courtyard at the middle of bazaar in which the offices and warehouses of merchants are located. On the figure 4.13, the situation of the Sarays of Haj Ebrahim and Shoja-

⁶ Saray literally means palace; in Iranian traditional bazaar, it refers to a two-story building with the courtyard which provided warehouses in the ground floors and office in upstairs for the merchants. It acted just like a caravanserai with a difference that only valuable small staffs have been brought to Saray.
The traditional bazaar of Urmia was largely reconstructed in the 16th century by the Safavids. In the 19th century, the bazaar was developed and reached its largest size so far (Nagsh-e Piravash, 2008). In the early 20th century, plundering of the bazaar and the consequent fire caused damages and its abandonment for a while. A considerable part of the bazaar has been destructed through the urban modernization of the 1930s by the building of Pahlavi (Imam) Street and Markaz Square. The northern part of bazaar was separated after the interventions and therefore, the complex has lost its integration. At the present time, the traditional bazaar of Urmia is recognized at the southern part of Pahlavi (Imam) Street, and the northern part has physically and functionally changed (Figure 4.14).
4.1.5.2 The Jame Mosque

At the center of historic core and juxtaposed to the traditional bazaar, the Jame Mosque as the most important historic edifice of Urmia is located. It was built in the 13th century by the Ilkhanate dynasty and is a good example of Azari Style, the third architectural approach of traditional Iran in the Islamic period. The remarkable height of the dome, the form of drum on which the dome was constructed and the type of ornaments used for Mihrab are the features that make reference to the style of Azari. The Mihrab of the mosque is one of the most beautiful three-dimensional ornamentation by stucco in Iran (Figure 4.15). In the 18th century the Sahn of mosque was surrounded by small rooms which are used for the religious education.

Figure 4.14. The present state of traditional bazaar of Urmia

Figure 4.15. The historical Jame Mosque of Urmia and the ornamentation of its Mihrab (source: hamshahrionline.ir)
The bazaar and Jame Mosque as the commercial and religious centers have a very strong interrelation with each other in almost all Iranian traditional city. By the close relationship between the tradesmen (Bazariyan) and clerics (Ruhaniyyun), a political force has been shaped that affected the social movements of country in particular times. The Jame Mosque of Urmia has related to the Bazaar from the north by the Attaran (Apothecary) Raste and from the east by Sangfurushan (Stone Craft) Raste. There has been another entrance that is from Egbal street (Figure 4.16).

Figure 4.16. The Sahn of Jame mosque before the interventions and the entrance of mosque from the traditional covered bazaar (Anzali, 2000)

The construction of new streets has segregated the Jame Mosque and decrease its central role in the urban structure of Urmia. After the Islamic revolution in 1979, some interventions were done and a building was constructed inside the Sahn. By the Imam Square project, the restoration and rehabilitation of the Jame mosque of Urmia has been started. It is planned to demolish the added buildings and reconstruct the school of the mosque.
4.1.5.3 The Neighborhoods

The neighborhood (Mahalle) is an important element of the Islamic city. While there was no official management system, the social structure of neighborhood became more important to establish certain mechanisms of human interaction. Therefore, the physical organization of these semi-independent communities was more complex than other societies (Bianca, 2000).

The traditional Urmia had 10 neighborhoods which were established regarding the socio-economic status, religious and the occupation of their inhabitants. Figure 4.17 presents the approximate division of the traditional neighborhoods that is prepared by the author based on the map of Avans Garibiyani and an interview with Mr. Shafipour, the historian and documentary producer. Yurdshah was the largest neighborhood where the castle, governmental buildings and the homes of soldiers and military commanders were located on its east side. The majority of its inhabitants are Christian and perhaps because of that the schools and cultural complexes of American missioners were built in this neighborhood in the late 19th century. If a neighborhood had a gateway inside, the name of both would be the same. Hazaran, Bazarbash and Askar Khan are the examples of these neighborhood. They were more strategic and significant by providing a direct connection between the outside and the center of the city. Hazaran and Bazarbash are the important commercial and administrative neighborhoods of traditional Urmia. Both of them provided the shortest distance between a gateway and the city center. Immediately after the gateways of Hazaran and Bazarbash, there were two mosques. The open space in front of the Bazarbash mosque was called Darvaze Meydan that provided the required place to greet the important guests.

From the 10 neighborhoods, four ones did not have their own gateway. Aq Dash, Mehdi Gadam and Hendu were the neighborhoods without a direct connection with the outside. All of them were relatively small districts in comparison with others. Hendu was a neighborhood located next to the bazaar at the center of city. It was mostly used by the merchants and travelers as its name come from the Indian
merchants who stayed there for trading. In contrast with others, Hendu neighborhood had no connection with the periphery of city.

Figure 4.17. The neighborhoods divisions of Urmia and the important public buildings

The neighborhoods had no physical boundaries and their borders were determined regarding the arrangement of streets and the location of public nodes. Regarding the socio-economic status of the inhabitants, mosques and baths were built as the public facilities which were accessible in a walkable distance. An open space was existed in front of the public buildings that were constructed at the intersection of streets. Regarding the climatic zone of Urmia and its socio-cultural status, these type of open spaces can be considered as the neighborhood centers. As the majority of Muslim population had been Sunni, the articulated meydan like Hosseiniyeh was not
developed in the neighborhoods of Urmia. There was no permanent local bazaar inside the neighborhoods. For Soltanzade, this happened when there was not a long distance to the main bazaar that is generally located at the center of city. It seems that this is true for Urmia as the distances of neighborhood centers to the bazaar did not exceeded than 600 meters (Soltanzade, 1988).

Cemetery was a dominant land use in the traditional urban structure of Urmia and the noticeable pieces of city were occupied by it. Almost each neighborhood had its own cemetery located either along of the main streets or outside of the fortification wall next to a gateway. The religion has been an important factor in the dispersion of cemetery as the non-Muslim have their own separate cemetery. For instance, the cemetery outside of the city wall next to Nogchar neighborhood was used by Christians. Soltanzade believed that due to the gradual expansion of traditional cities the cemeteries which were once located outside of the wall, were found to be inside (Soltanzade, 1988). Almost all of the cemeteries depicted in the figure 4.17 were transformed to public buildings such as schools in the Pahlavi period.

Before the First World War, the religious profile of Urmia was as: 50 percent Muslim, 40 percent Christians, 5 percent Jews and 5 percent from other religious (Dehgan, 1968). Christian populations were inhabited mostly in Nogchar, Mehdi Gadam, Askar khan and Yurdshah neighborhoods. Jewish homes and work places were mostly juxtaposed to the traditional bazaar in Hindu neighborhood. The great St. Mary Church (Naneh Maryam) in Khayyam Street and a small synagogue at the city center, are memories of the past in the present city (Figure 4.19). Along with Azeri, the other Muslim ethnic groups like Kurds and Hazars were also settled in Urmia. In the figure 4.18, the approximate living areas of different religious groups before the 20th century are illustrated.
Through its history, Urmia has been recognized as a multi-ethnic city and is called *Haftadodo Mellat* that means: 72 nations. Although after the First World War the religious profile of the city has totally changed, but there is still a multiplicity of religious, cultures and languages in Urmia. Azeri, Kurds, Armenian, Assyrian,
Persian (whose native language is Farsi) and a small community of Zoroastrian and Jewish are living in the city.

4.1.5.4 The Castle and Fortification Wall

Urmia has been a border city which constantly had a fortification wall and a ditch for defensive affairs before the 20th century. There were seven gateways that provided the connection of the city with the outside territory. The streets between the gateways and the city center were the urban spine of the city. The important gateways had often a public building such as mosque or caravanserai at their entrance. Balo and Hazaran had caravanserais immediately after the entrance and the cemeteries outside of the gates (Figure 4.20).

Figure 4.20. the fortification walls, the gateways and the main urban elements of traditional Urmia
The two images of figure 4.21 are the only things that have remained from the gateways. A triple arch with a retreat from the fortification wall can be seen in both images. The middle arch was the doorway and the two others provided a place for waiting, sitting and lingering. Retreating from the fortification wall, the gateway acted as the threshold of city that invites people.

![Gateways Image]

Figure 4.21. Two pictures of Urmia’s traditional gateways which no longer existed (Anzali, 2000)

Ark⁷ gateway, located at the south part of the city, linked to Chaharborj which was the Urmia’s traditional castle. Its name came from the four towers on its four corners in a rectangular shape. Chaharborj, constructed on a relatively high land, was a self-sufficient complex with various facilities for dwelling of important guests and conducting social activities (Dehgan, 1968). Located among a large garden, Chaharborj has a relatively large courtyard which was used for public ceremonies. The new artillery force of the city was established inside the courtyard in about 1850. It was called by people Topkhane Meydan that means the square of cannon (Figure 4.22). Unfortunately, the square and the castle were demolished in Pahlavi period to build a hospital and a high school.

---

⁷ In Persian, Ark means citadel.
In most of Iranian cities like Tabriz, Ark or the castle of traditional cities was constructed outside the fortification wall near the city. However, in Urmia the castle is inside the city with a particular gateway. This usually happened by the gradual expansion of city as the castle, once located outside of the city, came to be inside (Soltanzade, 1988).

4.2 The Morphological Analysis of Urmia

The morphological analyses are done based on the three principles of form, resolution (scale) and time. Reducing or increasing a scale has a great effect on what can be shown on a map. “Every scale has its natural morphological scope” (Van den Burg, 2004). In order to study the street network and the spatial arrangement of primary elements the analysis should be done in the city level. To conduct the figure-ground analysis and to study the patterns of land-use and the public/private relationships, the analysis need to be done in the scale of neighborhood. The block level provides an appropriate scale to study the pattern of land parcels and the interrelation of open and built up areas. Analyzing the formal characteristics with a typological study is possible in the building level.

Every map represents a point in time and illustrates how the urban structure of a city has changed from past to the present time. The selection of time periods for a morphological analysis depends firstly on the availability of data and secondly on the amount of significant changes in the urban form (Van den Burg, 2004). The
traditional map of Urmia is reconstructed by the author to be the first material of analysis. Since 100 years ago, Urmia has experienced two dramatic changes as the result of constructing new street and urban expansion. The first phase of modernization of the city has started from the 1930s by construction of two main streets and there were no considerable changes until 1965. Two cartographic maps are available from 1956 and 1965 for Urmia. The cartographic map of 1965, which presents detail information of the city after the first interventions on the traditional urban structure, is selected. Through the next 15 years until the Islamic revolution of 1979, the new streets were constructed, and the historic core has completely lost its integrity. As a turning point in the socio-political life of the country, 1979 is selected as the third time. In the next eight years, the war between Iran and Iraq had caused all urban planning activities to be stopped. From then on, the city has experienced a dramatic wave of immigration and its population boosted in the late 1980s. It caused a massive urban expansion on the suburbs. The historic center that was bombarded through the war continued to be changed by construction of the new streets and urban projects. Consequently, the reconstructed traditional map, the 1965 and 1979 maps and the current situation of Urmia based on the comprehensive map of Urmia are the four time periods which are analyzed and compared in different scales.

4.2.1 Analysis of Urban Transformation in the City Level

As the first scale of analysis, Urmia is studied inside a square with 10 km length side (approximate scale: 1/100000) to understand the overall situation of the city, its relation with the natural features and the urban expansion in different periods. The details on the map should be in conformity with its scale. Therefore, the maps were simplified to include only the street network and the spots of built up areas. The fortification wall of traditional Urmia was very close to circle that was more appropriate for defensive affairs. The traditional streets and intercity roads along with the city wall were completely changed through the new network of streets which
are depicted in black color. Along with the expansion of the city in time, the interventions on the historic core have also increased (Figure 4.23).

Since 1979, the settlement areas have stretched at the south and Shahar Chay river has become an important urban element of the city. In order to preserve the agricultural lands gardens, as the most important economic force of Urmia,
construction is still limited in the north and east sides of the city. The red squares on the maps present the scales of next analysis with side length of 3 km (1/30000). This scale makes it possible to analyze how the traditional street network has been transformed through the modernization process of Urmia.

### 4.2.2 The Changes of Street Network

The whole street network of traditional Urmia can be seen in detail inside a square with side length of 3 km. Therefore, this scale is appropriate to study the transformation of street network in the city level. The first intervention on the historic texture was occurred by planning of the cruciate streets, Pahlavi and Naderi, in the early 20th century. It was considered as a symbol of modernization and a response for the demand of car transportation. The streets cut through the traditional tissue and the great bazaar, dividing the city into four sections. Some public buildings and a large part of traditional bazaar were demolished. The intersection point of the two streets at the heart of the city was a roundabout, known as Markaz that is the new center of Urmia. The two famous gardens of the city, Delgosha and Egbal which had been the palaces of previous rulers, were transformed to the new military site of the city. The city wall was gradually demolished and the ditch surrounding the city was filled to be used as a ring road. The trace of ring road still indicates the boundary of traditional Urmia at the present map. To make the transformation of urban structure more understandable the maps are simplified to the main elements. The figure 4.24 presents the main streets of traditional Urmia and the new network which has been built on it.
Pahlavi Street was designed to be the new commercial axis of the city with modern shopping stores and new functions such as theater and cinema. It linked the two new squares of Markaz and Ayalat. The statue of Reza Shah on the horseback was installed at the middle of Markaz, which is the new commercial center next to the traditional bazaar. Ayalat square with the three monumental buildings, the municipality, police department and military headquarter, was the new administrative center of Urmia (Figure 4.25). Like the most of monumental buildings of the first Pahlavi period, the buildings around Ayalat Square were designed by a
German architect who used the Iranian architectural elements and motifs on the façade. The nationalist approach of first Pahlavi and the desire to modernize the society necessitated the physical and symbolic presence of military forces in the city. Pahlavi (Imam) Street that connected the military site to the traditional center apparently indicates the socio-political intentions of the government to have more control on people. From its construction on, the street with the two squares on its both sides have become the place of military parade, national ceremonies and religious rituals.

![Figure 4.25. Ayalat Square of Urmia and its monumental buildings constructed in the early 20th century](image)

The gateways which were once determined the main streets of the city were lost their function. Hazaran and Balo gateways were replaced by two roundabouts which are still called Darvaze that means the gateway. It symbolically maintains the memory of traditional elements at the present city. In the 1960s and 1970s, the traditional structure of Urmia began to be transformed faster according to the new demands and requirements. Three other streets were constructed parallel to the first ones to make a grid on the organic pattern of traditional city. Along with the increasing governmental budgets provided by selling oil, the country experienced an economic boom and an industrial progress. The modern street network was extended in this period, and new districts were developed in the suburbs. The traditional neighborhoods begun to lost their attraction as the high-income class intended to live in the modern districts. The grid pattern of new streets has been completed after the Islamic revolution by adding new ones and widening of the old alleys which have seriously damaged the traditional tissue of Urmia.
The street network is the urban structure of a city as the most permanent element of the built environment. To make a comprehensive study of Urmia, the maps which depict the streets in detail are prepared. Space Syntax analysis is done by the maps of figure 4.26 to study how the traditional urban structure has changed by the modern interventions. The land divisions outside of a historic town is an important factor for the future development as it was explained by Kostof. They are generated by the irrigation system that includes canals to bring water. By adding the division pattern
of agricultural lands, which was drawn using the aerial photo, it is apparent that the expansion of Urmia has been influenced by them.

Figure 4.27. The figure-ground analysis of Urmia in 1965 and the present time

Making a comparison between the figure-ground analysis of 1965 and the current map illustrates how the compacted traditional urban tissue has changed up to present time. (Figure 4.27). Most of the empty areas in the 1965 map are cemeteries which were transformed to schools by constructing a single building at the middle. Except the courtyard of important public buildings like Jame mosque and the castle, it is rarely possible to find a large vacant area on the traditional map. On the current figure-ground analysis, the new car-oriented streets and the projects like Imam square have caused big voids which undermined the traditional integration of urban space. The divided texture of historic part has generated isolated blocks which have lost their role in the social life of the city. Outside of the traditional town, the contemporary urban developments are distinguishable by the regular pattern of street network and the parceling system which is in contrast with the organic pattern of historic tissue.
To better understand the impacts of new street network on the traditional urban structure of Urmia, the Axial Map analysis is conducted. The Integration measure is the most efficient means to study how the morphological logic of a city has been changed by the interventions. The both global and local analyses are done as it is known that the historic cities respond to local better, and the modern city to the global. The differences between the speed of transportation and the distance of movement between traditional and modern cities are determinant in this sense. The global Integration measure is helpful to identify the central axes with the heavy car traffic. The local Integration is appropriate to identify the places which are more accessible for pedestrians (Al-Sayed, 2014). The local Integration analysis is done by the radius of 3 (R3) that is a common for the historic cities.
Figure 4.28. The models of global Integration HH measure by the Axial Map analysis
The models illustrate how the spatial integration of the traditional Urmia has been demolished by the urban modernization. The traditional city had a central spatial organization in which the city center including the covered bazaar, the Jame Mosque, Bugda and Sabze Meydans have the highest global integration values (Figure 4.28). In the local measure, Bugda meydans is specifically displayed as the most integrated element of traditional Urmia (Figure 4.29). By the first modern streets, the spatial organization of the city has considerably changed. Pahlavi Street in the both global and local models is the most integrated element in 1965. A longstanding public space with a powerful socio-economic situation was changed with an unfamiliar urban
element in the traditional Iranian city: the commercial street. By the further development of street network, the historic tissue has been divided into isolated parts which make no relation with each other. The project of Imam square can be considered as an attempt to reorganize the traditional center of Urmia, the role that once played by Bugda meydan. However, this is not possible as the spatial logic and the social background of it has no longer existed.

Table 4.1 The numeric values of global Integration (HH) measure in the four maps of Urmia

<table>
<thead>
<tr>
<th>The maps</th>
<th>Traditional</th>
<th>1965</th>
<th>1979</th>
<th>2017</th>
</tr>
</thead>
<tbody>
<tr>
<td>Integration HH Value</td>
<td>0.61</td>
<td>1.04</td>
<td>1.32</td>
<td>1.64</td>
</tr>
<tr>
<td>Average</td>
<td>0.36</td>
<td>0.33</td>
<td>0.33</td>
<td>0.95</td>
</tr>
<tr>
<td>Minimum</td>
<td>0.90</td>
<td>3.49</td>
<td>3.49</td>
<td>3.12</td>
</tr>
<tr>
<td>Maximum</td>
<td>0.10</td>
<td>0.28</td>
<td>0.33</td>
<td>0.33</td>
</tr>
<tr>
<td>Standard Deviation</td>
<td>0.10</td>
<td>0.28</td>
<td>0.33</td>
<td>0.33</td>
</tr>
</tbody>
</table>

The numeric values of global integration (HH) measure is presented on the table 4.1. It can be seen that the integration values have increased by the construction of new street network and the present time model has the highest average of integration among the four maps. This may be incorrectly interpreted as the urban structure of present Urmia is more integrated than its traditional time. In fact, the average of integration value for a modernized city is often larger than an organic traditional urban pattern. Regarding the nature of calculation methods in Space Syntax, the wide and straight streets are given priority in the Axial Map and their existence increases the total integration of the model. However, the average of integration values is not the only criteria to assess the performance of an urban structure. The value of standard deviation⁸ is also an important factor to understand how well the integration is distributed on the total structure. While after urban modernization the integration values of models have frequently increased from 0.61 to 1.64, the amount of their standard deviation has also increased from 0.10 to 0.33. In spite of a lower

---

⁸ In statistics, the standard deviation is a measure of the amount of variation or dispersion of a set of values. A low standard deviation indicates that the values tend to be close to the mean (also called the expected value) of the set, while a high standard deviation indicates that the values are spread out over a wider range (Bland & Altman, 1996)
integration average, the traditional Urmia presents a more integrated urban structure as a whole. This can be considered as an indication of the hierarchical spatial organization of traditional elements that generates a type of harmony in the organic urban pattern of historic Urmia.

The correlation between the local (HH R3) and global (HH) measures of integration is defined as axial synergy. It reveals the relation between the internal organization of an area with the whole structure of the city. If the value of correlation is calculated more than 0.45, the local order is effective on the organization of whole city; the values between 0.45 and 0.2 indicates an average correlation and lower than 0.2 means that there is no relation between the local and global scales of the system (Kubat, 1997; Eskidemir & Kubat, 2019).

Figure 4.30. The synergy diagram of traditional Urmia and the current map of Urmia
The correlation between the measures of Integration HH R3 and Integration HH, calculated by the scatter plot diagram, shows 0.44 that is a high value and means that the local scale is powerful to make an impact on the global structure (Figure 4.30). The axial synergy of traditional Urmia reveals that Bugda meydan in both global and local scale is the most central urban element of the city. Ali Shahid Mosque and Bath are existed at the middle of the diagram as the center of Bazarbash neighborhood. The cul-de-sac alleys present the lowest values in local and global scales as it is expected. In the current diagram, modern streets are the most integrated elements locally and globally. Ali Shahid neighborhood center obtains more axial synergy that the traditional time as it is located on the edge of a modern street. Imam Square is at the middle of the diagram and shows a lower synergy in respect to the Ali Shahid.

4.2.2.2 The Global and Local Choice Measures by the Segment Map Analysis

The measure of Choice basically presents the potentials for each segment to be selected by pedestrians as the shortest path (when considering a small radius) or selected by drivers (when considering a large radius) or both. “The shortest path refers to the path of least angular changes which has the potential to be a through-movement trajectory” (Al-Sayed, 2014). Choice is calculated by counting the number of times each street segment falls on the shortest path between all pairs of others. It is a powerful measure in forecasting pedestrian and vehicular movement potentials. Case studies suggest that defining a metric radius to localize the measure is especially needed in the Segment Analysis. The metric radius refers to the distance from each segment along all the others in the network. The measure of choice is conducted by the Segment Map analysis in both the global and local scales in the four maps of Urmia.
Figure 4.31. The models of Choice measure by Segment Map T1024 analysis
Conducting the measure of choice in global scale makes no sense for traditional Urmia as it refers to vehicular transportation. In the current map, the models of global Choice present useful information about the patterns of car traffic which is considerably correct (Figure 4.31). The main street network of city center has suffered a heavy car traffic at almost all times of the day. By defining the radius of 500 meters as the appropriate distance for pedestrians, Choice can be a useful measure to identify the potential circulation of pedestrians and their movement pattern. In almost all of the models, the covered bazaar and some of the traditional
urban elements obtain the highest choice values (Figure 4.32). This indicates that the historic elements of the city have a high potential to be selected by pedestrians in the urban experience of Urmia if its circumstances are provided. The quantitative values of measures are presented on the table 4.2 to make a better comparison.

Table 4.2 The numeric values of measures by Axial and Segment map analyses in the four maps of Urmia

<table>
<thead>
<tr>
<th>Measures</th>
<th>Integration HH R3 average</th>
<th>Integration HH average</th>
<th>Line length average</th>
<th>Mean depth average</th>
<th>Connectivity average</th>
<th>T1024 Choice R500 Average</th>
<th>T1024 Choice average</th>
<th>Bugda Meydan integration R3</th>
<th>Imam Square integration R3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Traditional</td>
<td>1.53</td>
<td>0.61</td>
<td>73.88</td>
<td>13.68</td>
<td>3.68</td>
<td>5131</td>
<td>131164</td>
<td>3.29</td>
<td>-</td>
</tr>
<tr>
<td>1965</td>
<td>1.61</td>
<td>1.04</td>
<td>101.41</td>
<td>8.70</td>
<td>3.23</td>
<td>3699</td>
<td>225355</td>
<td>1.73</td>
<td>-</td>
</tr>
<tr>
<td>1979</td>
<td>1.79</td>
<td>1.32</td>
<td>118</td>
<td>7.19</td>
<td>3.63</td>
<td>3694</td>
<td>236667</td>
<td>2.41</td>
<td>-</td>
</tr>
<tr>
<td>2017</td>
<td>2.20</td>
<td>1.64</td>
<td>147</td>
<td>6.26</td>
<td>4.61</td>
<td>3670</td>
<td>256899</td>
<td>-</td>
<td>2.29</td>
</tr>
</tbody>
</table>

4.2.3 The Urban Structure of Traditional Urmia

As the focus of present study is on the urban design practice in the historic core of Urmia, the traditional urban structure needs to be analyzed in more detail. In order to make the morphological analyses more illustrative in the city level, a basic map should be prepared by the reduction of elements. As it can be seen on the figure 4.33, the street network of traditional Urmia can be divided into the three layers: the narrow and cul-de-sac alleys, the secondary network and the main streets. The basic map is prepared by the main streets and other important urban elements of an Islamic city such as the Jame mosque, the covered bazaar, the city walls and the castle (Soltanzade, 1990).
The traditional Urmia had a central spatial organization where the bazaar and Jame mosque created the core of town. In an organic pattern, the main streets connected the seven gateways of the city to the center and produced an *urban spine*. The public realms of Urmia particularly meydans were articulated either along the spine or in the city center. Stemmed from the main streets, the secondary network configured the structure of neighborhoods. On the secondary network, the local public buildings like mosque or bath were configured. In front of these buildings, there were open and wide spaces which became the socio-economic centers of the neighborhoods. Retreating from the public spine and serving to a particular group, they represented the semi-public realm of the traditional Urmia. The narrow and cul-de-sac alleys were the semi-private elements provided the accessibility of dwellings and preserved the intended privacy of the residential territory.

4.2.3.1 The Hierarchical Spatial Organization of Urmia

The spatial organization of Urmia recalls the hierarchical structure of traditional Islamic cities from public to private spaces. The spatial continuum between public and private realms, as Madanipour stated, made the traditional Iranian cities full of spaces that were neither truly public nor truly private (Madanipour, 2003). In the pre-modern Islamic cities, public and private realms coexist and present a constructive struggle in the city space. However, the modernist ideology “resulted in
clearer distinction between public and private space, with fewer ambiguous, semi-private, or semi-public spaces in between” (Dennis, 2008, p.145).

Figure 4.34. The model of Integration HH R3 overlaid on the street network of traditional Urmia

Space Syntax is an appropriate method to examine the hierarchical structure of a building or a city. By the Integration measure of Axial map analysis, it is possible to determine the spatial sequence from most central and accessible elements that are usually the public realms to the most segregated ones which are more protected as private realms. The local Integration measure with the radius of 3 (R3) is an appropriate method to test the hierarchical structure of Urmia. As it can be seen on
the model in the figure 4.34, the hypothesis is demonstrated; the central urban elements and the main streets originated from the gateways are presented with high integration values (red and orange color), the secondary street network with medium values (green color) and the dead-end alleys of neighborhood are depicted as the elements with a low integration values (blue and cold color) as the most segregated realms. Bugda meydan in red color has the highest integration value of the city. This means that it was the destination of more users in comparison with other parts. The centrality and to-movement potential of Bugda meydan made it the important social, economic and administrative center of traditional Urmia.

4.2.3.2 The Interrelation Between Urban Elements

The superimposition of various functional layers on the basic map of traditional Urmia can be illustrative in terms of identifying how the city worked. The layers of public buildings, the cemeteries and meydans are overlaid on the basic map to examine their situations. The location of an urban element in the hierarchical structure of Urmia presents its scale and influence. The important public facilities were typically placed on the main street network and next to the city center. As the focus of present study, the traditional meydans and their relation with other elements are also studies by the analyses (Figure 4.35).
Figure 4.35. The basic map of Urmia and the superimposition of various functions as cemetery, public building and meydan; the side length of square is 3 km

The public buildings which are formed away from the main streets were the neighborhood’s facilities in front of which a small open space was formed as the center. The traditional meydans of Urmia are depicted by different colors regarding their functions: the commercial meydans, the public meydans and neighborhood centers. As it can be seen, the meydans based on their importance were configured in different situations.
In order to better examine the situation of public buildings and the meydans, their layers are superimposed on the Integration model of traditional Urmia (Figure 4.36). As it was explained, Bugda meydan is the most integrated node of the city. This is in conformity with its multifunctional character as a commercial meydan, the place of announcing authoritative orders, collecting tax and the administrative office of Mohtaseb⁹, the security force. Bugda meydan has also played a significant socio-cultural role by its location between two historic mosques of city. Linking the most important urban elements of the city gives a particular character to this small meydan as it is also approved by the Integration model. The orange circles which illustrate the neighborhood centers are typically located on the axes with the blue tones. This indicates their local function that serves to a particular group of people.

---

⁹ “Mohtaseb” (in Persian) was the security watchman responsible for establishing law and order in bazaar.
4.2.3.2.1 The Commercial Axis of Traditional Urmia

The superimposition of the meydans with the buildings which are distinguished based on their exact functions can be helpful to examine the interrelation of open urban spaces with other elements. The figure 4.37 presents that the most of the neighborhood centers were configured in front of the mosques (the top-right map). When the buildings with commercial and administrative functions are overlaid on the layer of meydans (the top-left map), two axes are revealed which can illustrate how the traditional urban structure of Urmia operated.

Figure 4.37. The superimposition of public buildings with meydans and identifying of the commercial and administrative axes in the traditional Urmia
From the four commercial meydans, Bugda and Gapan, were formed next to the traditional bazaar, and the two others, Sabze and Mal meydans, were located on the main street network from bazaar to Toprak Gala gateway. By adding the layer of caravanserais on the map, a commercial axis can be recognized (the bellow-left map). It begins from Hazaran gateway, reaches the bazaar and the great caravanserai of city next to Gapan meydan, passes through Sabze meydan and the accommodation facilities around it and finally terminated in Mal meydan and Toprak Gala gateway. Hazaran presented the shortest distance from a gateway to Mehdizade, the great caravanserai of the city. It was an important entrance for the caravans and travelers. This can be inferred by the relatively large accommodation, immediately after the entrance, to care particularly the camels of traders. Although at the present time, there is no evidence of that, but the neighborhood is still called Shotorban that means cameleer. Some relative jobs have been also formed in the neighborhood using the by-products of camel. The production of traditional kiln (Tandir in Azarish) has been appeared as a long-lasting job (Figure 4.38). A special clay is prepared that is reinforced by the camel wool to get the necessary resistance in high temperature for cooking. At the present time, the traditional kiln is still produced in this place for the villages and the local kitchens.

Figure 4.38. Shotorban Alley of Urmia and the ongoing job of kiln production

Sabze meydan, the other important element of commercial axis, was located next to a cemetery in a close distance from the traditional bazaar. It was used to sell vegetables and nuts which partially continues its function at the present time. Mal meydan was the last urban element that completed the south-north commercial axis
of the city. It was common that some commercial squares were located outside of the residential districts because of their particular functions. The area used to sell sheep, cow and horse (in Persian: Gusfand furushan and in local Azari language: Mal Meydan-e) is an example of these squares. In Urmia, Mal meydan was located at the entrance of Toprak Gala gateway. It did not have any permanent structure as it was active in the particular times of the year.

4.2.3.2.2 The Administrative Axis of Traditional Urmia

The map prepared by Asadollah Khan, the artillery force commander of Urmia in the 1850s, illustrates the administrative and military elements of traditional Urmia. In the schematic drawing, the locations of buildings are not precise. For instance, Topkhane meydan is presented at the almost middle of the city, but it is known that it was located near Ark gateway and inside the castle. However, the map illustrates that the administrative buildings were gathered in Bazarbash neighborhood and close to Ark gateway as the military district of the city (Figure 4.39).

Figure 4.39. The schematic map of Urmia prepared by Asadollah Khan in 1850
The figure 4.40 illustrate the dispersion of governmental buildings and meydans in the traditional city and the formation of the administrative axis. In the present Urmia, the administrative buildings are constructed in a distance from the traditional center. The red squares present the scale of analysis of Bazarbash in the neighborhood level in the part.

Figure 4.40. The administrative axis of traditional Urmia and the dispersion of administrative buildings in the current map

Bazarbash neighborhood were settled by administrative and high-income classes of the city. There were two meydans in the neighborhood with social, administrative and military functions. At the entrance of Bazarbash gateway, there was an open area in front of the mosque which was called Darvaze Meydan (Figure 4.41). It was a place used for greeting ritual to welcome important persons who would enter the town.
The other square was located inside the castle named Topkhane meydan. It was a military square which was changed to a public meydan in particular days of the year for social activities and ceremonies. After arming of Urmia by artillery force in the middle of 19th century, Topkhane meydan (the artillery square) was built inside the historic castle, Chaharborj. Unfortunately, except of a few photos, there is no evidence of the meydan and the castle (Figure 4.42).

According to the photos, it was a rectangular square surrounding with a one-story building and several rooms which were the place of artilleries. As it provides a relatively larger open area, Topkhane meydan was preferred for crowded gatherings in ceremonies like Nowruz, the ancient New Year of Iranians. From Bazarbash gateway to Ark gateway an axis can be considered which includes the three meydans of Darvaze, Bugda and Topkhane and multiple governmental buildings and houses. It has been already discussed that Bugda meydan had a multiple social, commercial and administrative functions. Therefore, it is fair to consider an administrative axis between Bazarbash and Ark gateways.

4.2.4 Sabze Meydan; the Transformation of the Commercial Axis

The pattern of commercial activities has a considerable impact on the everyday experience of a city. The commercial axis of traditional Urmia was existed between
two gateways which crossed from the bazaar and supported by public buildings like caravanserai, bath and mosque. The commercial axis is important as it includes four meydans of the traditional Urmia; Bugda, Gapan, Sabze and Mal meydans. Bugda meydan has been the most important commercial square of Urmia. Locating next to the traditional covered bazaar and Jame mosque, it was the place of gathering and selling of products like wheat and grain. As the Imam Square project is designed on the same site, Bugda meydan is important for the present study and will be analyzed in more details.

On the north side of traditional bazaar and next to an old cemetery, Sabze meydan was existed. It was the place of preparing nuts and the wholesale of fruits and vegetables. Between the meydan and the covered bazaar, there were several facilities that provided accommodation for travelers who came to the city to sell their products. Several caravanserais, teahouses, stable and warehouses were formed particularly around Sabze meydan. In the two interviews with Mr. Shafipour, a well-known historian who is studying on the cultural history of Urmia and producing serial documents for the local television, the transformation of Sabze meydan was discussed. He explained how the buildings at the north side of bazaar have frequently changed their functions as Sabze meydan has formally and functionally transformed for the last 50 years. Studying the evolution and transformation of Sabze meydan is important for the present study to understand the impacts of modernization on a traditional commercial meydan.
Figure 4.43. The dispersion of commercial buildings in the traditional and current Urmia

The figure 4.43 illustrates how the traditional commercial axis has been changed after the construction of new streets. By the urban modernization and the dependence to vehicle transportation, the traditional pattern of trading has not been possible anymore. The traditional bazaar, which suffered serious interventions, has sustained its importance as the commercial center of the city. However, it has to compromise with the modern streets at the edges of which new shops are formed that have competed with the traditional bazaar. Pahlavi (Imam) Street has become an urban node with various socio-cultural facilities and a heavy car traffic. Currently, even the main entrances of bazaar are from that street and Markaz Square. Pahlavi (Imam) Street, which is planned to be a pedestrian path in the comprehensive plan, has become the key socio-economic axis for modern Urmia. In the figure 4.43, the red squares with the side length of 300 meters present the place and the scale of next analyses.
Figure 4.44. The transformation of Sabze meydan; the traditional urban element of Urmia

The figure 4.44 illustrates the transformation of Sabze Meydan through the four periods of time. In its primitive form, Sabze meydand was an open area next to a cemetery at the north side of bazaar (the top-left map). Its exact form is unknown, however, based on the data gathered by field study, it is clear that there was a relatively large area included a Gapan (weighting tools) to weight the vegetables, fruits and nuts. The merchants and farmers, particularly from the villages, came to sell their local products here and buy their requirements from bazaar. The buildings around provided the facilities to accommodate the travelers who stayed at least one
night in Urmia. Therefore, there were several public facilities, teahouses, and lodgings which were repetitively used.

By the urban modernization of the early 20th century, the functional pattern of Sabze Meydan has completely changed as the transportation tools were altered. The travelers started to come Urmia by vehicles and access the bazaar faster and easier than carriages. They were able to do their work and returned to the home in the same day, so there was no need to stay the night in Urmia. The need for accommodation and animal stables was intensely decreased. However, Sabze Meydan did not lost its function and instead became more important. Shahram Street was perhaps the only cul-de-sac modern street which did not connected to the new network (the top-right map). It was built to link Pahlavi Street to Sabze Meydan in the early 20th century and this indicates the importance of the meydan as a commercial square in the first Pahlavi period. The northern part of the cemetery which was divided by Shahram Street became a school and the southern part has been used for commercial activities in which a U-shaped building was built. It became the permanent building of Sabze meydan to keep and sale the expensive commodities like Pistachio. The U-shaped building has maintained its function at the present time and is still used for the nuts wholesale.

The buildings, which were once public accommodation, had changed their function by the 1950s. At the conjunction of Shahram and Pahlavi streets, they turned to be used as garage of vehicles which transported people from rural areas to the city center. People came by minibuses at the morning, sold their products and bought what they needed through the day and turned back to their home at the evening. This story still continues to happen at a small scale along the conjunction of Pahlavi and Shahram Streets where people bring their homemade products like dairy and chickens to sell. The buildings like caravanserais changed their function to workrooms, small factories and warehouses. At the present time, most of them are partially damaged and abandoned.
As the population of Urmia increased, Sabze meydan could not respond to the large-scale needs of vegetables and fruits. In the 1970s, a larger area was allocated outside of the city known as Tarebar meydan for this purpose. From then on, Sabze meydan has lost its important commercial function and used by the vendors and salespersons. The U-shaped building has continued to be used as the nut shops, but the abandoned buildings around make no contribution to this potential (the bottom-left map). In the Comprehensive Plan of Urmia, the open space of meydan is determined as a small park and Shahram street is extended to connect the main network. The site is going to be in a crowded place with a heavy car traffic. Sabze meydan was one of the vital commercial meydans of Urmia which has lost its function and more important its historic character (the bottom-right map). Studying it reveals how the urban elements have physically and functionally changed through time regarding the new requirements and economic relations of the city.

4.2.5 Bazarbash; the Transformation of a Neighborhood

The focus of present study is on the Imam Square project of Urmia which is implementing on the context of historic Bugda meydan that is the intersection point of the traditional commercial and administrative axes. Bazarbash neighborhood provided the shortest distance from a gateway to Bugda meydan. The main part of administrative axis and a part of commercial axis were located inside the neighborhood. It will be helpful to analyze Bazarbash in the scale of neighborhood to examine its transformation through time and its impact on the urban elements.

Bazarbash neighborhood is analyzed by a square with 1 km length side (1/10000) inside which Darvaze and Bugda meydans are existed (Figure 4.45). As it was explained, the expansion of Urmia beyond the city wall has been certainly affected by the pattern of agricultural land divisions. The present analyses make it possible to examine it as part of the land outside of the traditional city wall is included. The alleys which are determined by orange color are parallel to the city wall and present a different pattern in comparison with the rest of city (the top-left map). There are
interesting similarities between them and the pattern of agricultural lands outside of the city wall which are drawn by the aerial photo of the city in 1956.

Figure 4.45. The land parcels pattern of Bazarbash neighborhood; the side length of square is 1 km

These parallel alleys along the city wall indicate the traces of agricultural lands. It can be inferred that in the previous expansion of old Urmia the pattern of land division had affected the organization of alleys. This trend has continued in the contemporary time as it is apparent in the maps of 1979 where the new streets have been constructed regarding the agricultural land parcels (the bottom-left map).
Bazarbash was one of the important neighborhoods of traditional Urmia which had the shortest distance to the center of city, the great bazaar. *Bazar Bash* in the Azeri language means *the beginning of bazaar* and this refers to the close relation of the neighborhood with the city center. The distance between the Bazarbash gateway and the city center was about 600 meters which is not very long. Therefore, it seems that the name of neighborhood is appropriate for its situation and structure as an important entrance. The neighborhood center of Bazarbash was located away from the main street at the junction of two secondary alleys where Ali Shahid Mosque and Bath (Hammam) are placed (Figure 4.46). The placement of the neighborhood center away from the main street can be interpreted as an attempt to provide more privacy for the inhabitants and to specialize the facilities. The inhabitants of neighborhoods were mostly the upper class including shopkeepers, administrative officers and clerics.

![Figure 4.46. The morphological characteristics of traditional Bazarbash and Hazaran neighborhoods](image)

The main street of Bazarbash neighborhood linked two meydans of Darvaze and Bugda with each other. Angular Segment Analysis is a method to examine the
shortest angular depth between one element in comparison to others. Depth represents the minimum number of changes of direction to go from the origin to any other segment in the network. Angular Analysis was found to correspond well with spatial navigation and wayfinding, since users are likely to minimize cognitive distance as they walk through a foreign environment (Al-Sayed, 2014). Bugda Meydan which has been an important socio-economic node of Urmia was selected for the Angular Step Depth analysis. It was done to understand how many changes of direction separate the Meydan from the other elements of network. In the model of Step Depth analysis for Bugda meydan, the blue color depicts the axis that have the lowest value and the shortest angular and topological distance from the meydan (Figure 4.47). Angular Step Depth analysis demonstrates the strategic relationship between Bugda meydan and Bazarbash gateway.

Figure 4.47. Step Depth Analysis of Bughda meydan by Segment Map analysis
Hazaran was another neighborhood which included a gateway and provided a direct connection with the traditional bazaar and the largest caravanserai of the city, Mehdizade. Similar to Bazarbash, there was an open space with a mosque immediately after the Hezaran gateway. Sharing the same name of the neighborhood, Hazaran mosque was located at the one side of open area providing an urban node. Davachi caravanserai provided the accommodation for the traders and animals particularly camels. The space in front of Dash Masjid (Stone Mosque) was the neighborhood center (Figure 4.48).

Figure 4.48. The aerial photo of Bazarbash neighborhood; the length of square side: 1 KM, printed scale: 1/12500 (source: the archive of West Azerbaijan Cultural Heritage Administrative)
The figure 4.48 presents the aerial photos of the studies area. The red squares with the side length of 300 meters indicate the scale of next analysis. Darvaze meydan that located immediately after Bazarbash gateway was a place for greeting of important people. By the urban modernization and the demolition of Urmia city wall, the meydan has lost its character and has gradually become an intersection point of several streets. It was the fortification walls that made the existence of Darvaze meydan meaningful. Without it there is no entrance in front of which an open space could have a particular function. At the present time, Darvaze meydan is a roundabout without a specific geometry to which various streets and alleys open. It is one of the places of Urmia with the lowest legibility that makes the users confused. Figure 4.49 presents how Darvaze meydan, the traditional streets and the land parcels have been transformed through time. In order to better examine the changes of parcels, the next analysis is done by a square with the side length of 100 meters as it is indicated by the red square.
Figure 4.49. The land parcel pattern of Darvaze meydan and Bazarbash neighborhood; the side length of square is 300 meters
The land parcel as the smallest components of urban space is an important element in the morphological analysis. The transformation of the pattern of parcels give significant information about the architecture and socio-economic status of the city. The figure 4.51 present the pattern of land parcels and the relation between mass and void in part of the traditional Bazarbash neighborhood. A comparison is made between the maps of 1965 and the present time to study the transformation of urban fabric.
As it can be seen on the Figure 4.51, the urban fabric of Bazarbash neighborhood in 1965 included larger parcels and bigger houses. It was in conformity with the profile of its inhabitants who were the administrative and high-income class of Urmia. By the expansion of city and the construction of new neighborhoods in the 1970s, the upper-class inhabitants left the historic part and moved to suburbs. The large parcels in most of the time were fragmented to smaller pieces of lands to be easily sold. This also happened when a large house was a heritage of children who would divide it and make their own homes. The new network has also changed the pattern of land parcels. The edges of modern streets have been generally transformed to shop stores, and this has totally affected the configuration and dimension of the parcels. It is more probably to see the smaller parcels alongside of the streets in the present map of Urmia as the street is no longer just a passage but a commercial urban element.
4.2.6 Bugda Meydan; the Transformation of City Center

By the Integration R3 measure of Axial Map analysis, Bugda meydan is recognized as the center of traditional Urmia with the highest value. It is the intersection point of the two traditional axes of Urmia, and therefore conveyed administrative, social and commercial importance (Figure 4.52). The central spatial organization of the city supported the concentration of activities in a small meydan which has the maximum degree of permeability and accessibility. The project of Imam Square has been designed on the site where Bugda meydan and other significant elements of the historic city are existed. Studying Bugda meydan and its transformation in detail makes an appropriate base to analyze the Imam Square project. Therefore, the traditional city center of Urmia is analyzed in the block level through a square with the side length of 500 meters as it is depicted in the figure 4.52.

Figure 4.52. The situation of Bugda Meydan at the intersection of the commercial and administrative axes of traditional Urmia
By its particular position, Bugda meydan organized the central complex of traditional Urmia. A complex which consisted of various urban elements from the covered bazaar to the open spaces of courtyards and the Sahn of Jame Mosque. Three main passages from Bazarbash, Hazaran and Ark gateways made Bugda meydan accessible from the outside of Urmia. The southern side of meydan was bounded with the residential fabric of Bazarbash neighborhood which is a semi-private realm in the hierarchical structure of Iranian Islamic cities. Confrontation between the differences generates a site of tension and conflict that results in generating a boundary (Sack, 1986). The nature and physical characteristics of boundary impact the qualities of spaces on both sides. Madanipour explained how important is the articulation of boundary for the spaces on its both sides. Rather than a clear-cut separation, the intermediate elements generate an appropriate space in which the opposing realms can meet (Madanipour, 2008).

The confrontation between Bazarbash neighborhood and the covered bazaar was articulated by Bugda meydan. The meydan had no exact geometrical shape, and its form has been probably changed by the extension of bazaar on one side and the neighborhood on the other side. However, the qualities like permeability and connectivity have made a unique place which acted as an in-between realm. The spatial condition of boundary that makes the simultaneous acts of separation and connection possible is defined as the in-between space. (Laiprakobsup, 2007). Through a reciprocal relationship, it benefits the opposite sides from each other to provide the opportunities for dialogue and co-existence. Bugda meydan in connection with the Sahn of the Jame Mosque and the covered passages of the bazaar produced a permeable public open space and became the node of urban activities in the traditional Urmia. This particular urban quality was demolished by the street network which has cut the interrelations of urban elements.
Figure 4.53. The pattern of land parcels at the center of Urmia; the side length of square is 500 meters

The figure 4.53 illustrates the transformation of Urmia center in the four periods of time. The traditional map presents Bugda meydan as the concentration node of an organic urban structure. It provides a transitional realm between the neighborhood and the covered bazaar. The meydan articulates the relation between two functionally and formally different urban realms of the city. It separated and at the same time connected the elements providing a dynamic space for everyday activities. With the first interventions, the covered bazaar was divided by the modern street and the northern part has lost its connection with the center. In 1965 (the top-right map),
Bugda meydan was still a vital space in spite of the damages caused by Pahlavi (Imam) Street. The red square on the map presents the scale of next analysis to study how Bugda meydan interacted with the urban elements around. In 1979 (the bottom-left map), with the construction of two new streets of Egbal and Askarabadi, Bugda meydan was opened to the car traffic. The new buildings were constructed to form the edges of Egbal Street. An underground public toilet was constructed in this period at the middle of the meydan which can be seen on the figure 4.54, the aerial photo of Urmia city center in 1979. From this time on, Bugda meydan has lost its morphological characters and therefore its function and importance.

Figure 4.54. The aerial photo of Urmia center in 1979; the side length of square is 250 meters (source: the archive of West Azerbaijan Cultural Heritage Administrative)
Started to be implemented in the 2000s, the Imam Square project aims to rehabilitate and reconstruct the historic center of Urmia by replacing the traditional elements with modern shopping centers and a large square (the bottom-right map of the figure 4.53). With a modernist approach, the project makes no attention to the historic functions of Bugda meydan and its interrelation with the bazaar and neighborhood. Having a small size and an organic form, Bugda meydan was configured based on the logical relationship between urban elements and the necessities of its situation. The aerial photo of 1957 in the figure 4.55 is the oldest photo of Urmia and the best source to study Bugda meydan. The Nolli map is prepared based on this photo to understand the interrelations between various elements in the context.

Figure 4.55. The aerial photo of Urmia center in 1957; the side length of square is 250 meters (source: the archive of West Azerbaijan Cultural Heritage Administrative)
The figure 4.56 is the figure-ground analysis of Urmia city center that presents the enclosed public buildings as open civic spaces to illustrate the dynamic relationship between the urban elements of the traditional Bugda meydan. The main streets from the neighborhoods arrived Bugda meydan and the narrow alley in front of the great caravanserai, then the covered bazaar became accessible. The commercial activities of bazaar have been extended to the meydan culminating in an active urban space. (the left picture of figure 4.57). The two mosques on the two sides reinforced the socio-cultural background of Bugda meydan. The Sahn of Jame Mosque, the courtyard of great caravanserai and the Sarays of bazaar provided open spaces inside.
the compacted tissue of bazaar. They made a pause for resting and lingering among the flow of people and commodity.

The entrance of the great caravanserai was not placed symmetrically regarding its rectangular form. It was located just in front of the main street that arrived from Hazaran gateway to make it easier for caravans to enter. Directly connected with the caravanserai, Gapan meydan was the place of weighting the staffs to get prepared for the sale in the bazaar (the right picture of figure 4.57). It performed like a switching point between the caravanserai and the bazaar. Different elements with various functions were juxtaposed and interacted to configure a whole system. The public open spaces acted like *punctuations* which acknowledge the change of functions and interrupt the boring alignment of spaces. This is the *art of relationship* which was considered by Cullen as the necessity of making a vivid theatre of urban life (Cullen, 1961).

![Figure 4.57. Bugda meydan and the wheat crop in the 19th Century & Gapan meydan in the early 20th Century (Anzali, 2000)](image)

*Tabayon-e Fazayi* as the spatial sequence of urban spaces with different scales, qualities and natures can be seen in the central complex of Urmia (Tavassoli, 1990). Different urban elements were deliberately put together to make a *contrast* by which the *drama of juxtaposition* is produced. A sudden transition of scale and distance were experienced when one exists from the relatively narrow and dark alleys to the wide and shiny area of meydan or courtyards. This makes the experience of urban space more sensational. Entering the Sahn of Jame Mosque from the covered bazaar produce a leap and visual break by the changes of level and lightness. Something
that Cullen named fluctuation that is the stimulation of our sense of position through moving from a wide space to the narrow (Cullen, 1961).

Figure 4.58. The Sahn of Jame mosque in the 1950s (Anzali, 2000)

In the central complex of traditional Urmia, the Sahn of Jame mosque had been an important socio-cultural element (Figure 4.58). It had three entrances: one inside the covered bazaar and two form the alleys at the eastern and southern sides which indirectly connected the mosque to Bugda Meydan. In Fridays, the covered bazaar was totally closed and the Jame Mosque became the place of religious prayer. In other days of a week, the Sahn was a place for gathering and social interaction. It has always been controversial to consider the courtyard of mosque as a public space in the Islamic cities as it may not accessible for all (Kostof, 1991); however, its unique characteristics have made it an important urban element of traditional Iranian city.
4.3 Imam Square Project; an Intervention on the Historical Center of Urmia

During the Iran-Iraq war in the 1980s, a relatively large part of the residential areas in front of the historic Jame Mosque was destructed by a bombardment (Figure 4.5). The historic Bazarbash neighborhood, which was already deserted by its original inhabitants, encountered another disaster. The destructed part remained empty for a long time, which negatively affected the social structure of the neighborhood. It became a place for selling stolen staffs and for gathering of drug dealers and criminal gangs. The decay of the neighborhood affected also other urban elements of the site such as the great caravanserai and Gapan Meydan which had already lost their traditional functions. The notorious fame of Gapan still remained in the minds of most of the residents of the city including the author. As a reaction to this situation, the Jame Mosque was shut in and its doors were closed most of the time. The socio-economic centers of the traditional city were isolated and separated from the everyday life. Known as the eastern part of the traditional bazaar, this site became one of the problematic urban spaces of Urmia in the 1990s. “The urban rehabilitation and regeneration plan of the eastern urban fabric of the traditional bazaar of Urmia” was proposed as the Imam Square project is an important part of it. (Nagsh-e Piravash, 2008). The project was approved in 1994 as the most important intervention planned on the historic urban context of Urmia.
With an area of about 48,000 m², Imam Square would be expected to become the new urban node of the city that “connected the past and future of Urmia” (Nagsh-e Piravash, 2008). It was planned that the project would be implemented in three phases until 2013. The Municipality of Urmia was the first manager of the project, and M. Rezazade Ardabili was the architect who prepared the first design of the Imam Square in 1994 (Figure 4.60). The first plan was predicted Mosalla, which is the place for holding the weekly Friday prayer and other religious activities, inside the Imam Square. The project that was prepared by Rezazade Ardabili was rejected as it included certain functions, which may cause a heavy traffic inside the historic center. The other reason for the rejection was explained as the priority given to the vehicles in the plan that was unacceptable for a public square (Darbandi, 2016).
As the municipality was faced with serious financial difficulties in the expropriation of lands, it was the Ministry of Housing and Urbanism that became the manager of project. Safamanesh et al. Consulting Engineering Office from Tehran was selected for designing the second plan in 1998. The newly established Urban Development and Revitalization Company (UDRC) undertook the implementation of the project, which had now a direct budget from the parliament as a National Plan. However, for unclear reasons, Safamanesh et al. Co. resigned from the project in the phase of the preparation of the plans and a local office, Ide Padir Co. became responsible for preparing the architectural plans and details of the first building, Narvan Shopping Center. While the main part of Narvan was completed in the 2005, Ide Padir Co. also resigned from the project. The plan designed by Safamanesh was criticized for having important problems in terms of construction as it included a 9-meter sunken courtyard in front of the historic Jame Mosque; therefore, it needed to be changed. (The author’s attempts to find the original design of Safamanesh has remained unsuccessful.)

In 2007, Nagsh-e Piravash Consulting Engineering Office, again from Tehran, was selected to make revisions on the plan to propose a new design framework and a three-dimensional sketch of volumes. The main advice that was mentioned in the
report was to pay more attention for the design of Egbal Street as the main axis of Imam Square. The recession of buildings at the conjunction of Egbal and Montazeri streets could create an inviting entrance to the complex. Egbal Street is introduced as a link between the new and old parts of Urmia. Pedestrianization of the street and the attractive social, cultural and commercial functions of the buildings along with it were cited as important factors in the success of the project. It is proposed to design the façade of the buildings on the Egbal axis in the traditionalist style with the materials and elements that refer to the old Urmia. The great caravanserai (Mehdizade), which had been demolished in the first phase, was proposed to be reconsidered in the new design. The traditional alley in front of the caravanserai was also suggested to be preserved and reconstructed to maintain the collective memory of inhabitants. The other suggestions included the provision of enough parking facilities and the revision of some regulations related to the land use and the widening of old alleys to keep the car traffic away from the square.\(^{10}\) Apart from the general advices made by Piravash Co., some useful suggestions were done in terms of reconstructing and preserving the traditional elements (Figure 4.61). However, to what extent these propositions could save the project and solve its problems is arguable. Although it was emphasized to consider the historical identity of Urmia in the design process, the methods for this were not clearly explained and in the proposed three-dimensional sketch it was not recognizable.

\(^{10}\) Nagsh-e Piravash Consulting Engineering Office. (2008) The report of revisions for The urban rehabilitation and regeneration project of the eastern lands of traditional bazaar of Urmia, Sherkate Omran Maskan Sazan
To implement the plan of Nagsh-e Piravash Co., the architectural design of the buildings was done by Behsaz Larze Consulting Engineering Office in 2009. However, there are considerable differences between the two designs. The new design includes multi-storey shopping departments that were designed to increase the financial profit of the project to make it attractive for the investors (Figure 4.62).

The process of land expropriation was conducted during the 2000s (Figure 4.63). Until 2012, the square was paved, and the first building of complex, named Narvan, was completed. The first phase of Imam Square project was finished with the cooperation of an investor and the management of UDRC. Narvan is a four-floor commercial building with two basements that includes retail shops, offices and warehouses.
The first shopping center of the complex, constructed just in front of the busy and favorite traditional bazaar, was not welcomed by the tradespeople. Its offices have been left to Urmia Municipality and the commercial spaces have remained unused so far (Figure 4.64). At the same time, the Iranian Cultural Heritage Organization (ICHO) announced that the Imam Square was designed without paying enough attention to the regulations and considerations of interventions to be applied in the historic area and that the continuation of the project was illegal. The project encountered a big financial risk, and the investor gave up. This first phase of Imam Square has become a big failure for the city managers.

In 2014, the municipality has been again commissioned as the manager of Imam Square project of Urmia. From then on, the design has been frequently revised and the search for an investor continues at the present time. Establishing a balance between the demands for more profit by increasing the areas of commercial functions, on one side, and the regulations, which restrict the “floor area ratio” (FAR) on the other side seems to be difficult. However, what has not been seriously questioned is the placement of such a large-scale square at the center of a middle-
size historic town. While at the first stages it seems that the search for a new “identity” was more prominent, now the more profit to attract investors is the priority of the managers. The creation of a square seems to have constituted an excuse to expropriate people’s houses in Bazarbash neighborhood to construct shopping centers in the historic center of Urmia (Figure 4.65).

![Figure 4.65. A general view of Imam Square and its adjacent buildings](image)

Darbandi et al. who studied the challenges to which Imam Square of Urmia has encountered, state four main reasons for the failure of the project.

- The management mistakes: the type and scale of project proposed without providing financial sources for its implementation
- The forcible process of expropriation of properties without any attempt for providing the cooperation and participation of people
- The multiplicity of managers, conductors and designers of the project
- The neglect of the historic context and the traditional neighborhood (Darbandi, 2016)

The focus of the present study is on the forth item as the others can be the subject of other studies. The interrelation between the traditional urban elements like bazaar, *meydan* and neighborhood has been completely overlooked in the design process of the Imam Square project. This problem was partly resulted by the policies imposed
from the top and partly because of selecting the designers from Tehran who were unfamiliar with Urmia.

The policies to revive the “Islamic identity” have been developed from the top as a design principle in the contemporary Iranian architecture. Making a nostalgic reference to the traditional Islamic society is identified as an attempt to revive the Islamic life style. Juxtaposing the project to the historic monuments of the city such as the covered bazaar and Jame Mosque, which were recognized as the symbols of glorious Islamic culture, might encourage the search for a new identity. In one of the meetings on the Imam Square project, Habib Allahiyan, the vice president of Urmia branch of Roads and Urban Development Ministry, stated that the issue of “identity” should be considered in the designing process in a manner that the project “becomes a reference to our traditional patterns” (Reports of the meetings, 1998). Therefore, it makes sense to consider the Imam Square of Urmia as an attempt to embody a favorite identity by making several references to an archetype of the Islamic Iranian architecture, Nagsh-e Jahan Square in Isfahan (Figure 4.66).

Figure 4.66. Nagsh-e Jahan Square in Isfahan the capital of Safavids in the 17th century

Imam Square of Urmia has been the most ambitious urban project of Urmia which was granted a specific budget from the parliament as a national development plan. Regarding the spatial organization of Urmia and the importance of the city center, the conflict between old and new is almost inevitable. Although the historic core has lost its traditional urban structure, the traditional bazaar and Pahlavi (Imam) Street are still recognized as the socio-economic center of the city. Making an intervention on the southern part of the traditional bazaar was found necessary to reinforce the
center of modern Urmia. The question is how this intervention should be and what should the approaches be toward the design in the historic context. From the large scale of Imam Square and the vast destruction it has caused, it can be inferred that the historic background of Urmia was not taken to account in the design process. The neighborhood has been completely overlooked in the project. It was treated as incompatible with the public realm, a problematic area, which needed to be removed as if it had never existed. The significant role of Bugda Meydan as an in-between space that created a reconciling realm between two opposing forces of public/private was never understood. As a result of this, Imam Square was designed to somehow substitute the traditional Bugda Meydan with a large and grandiose modern square. However, it would never be able to achieve the position once Bugda Meydan owned in the traditional Urmia. This reveals the significance of urban morphological study that needs to be effectively involved in the design process particularly in a historic context.

4.3.1 A comparative analysis between the spatial qualities of Imam Square and traditional Bugda Meydan

The impacts of the new street network on the traditional urban structure of Urmia were already studied through the Axial Map analysis. The figure 4.67 make it possible to have a closer view on the Space Syntax analysis. While Bugda Meydan was the most integrated urban element in the traditional map, it became a relatively segregated space after the construction of Pahlavi Street which attains the highest level of integration in the 1965 map.
In the spatial organization of historic Urmia, Bugda Meydan had a central role. The main streets from the gateways arrived the meydan and the entrances of the covered bazaar were opened to it. Bugda Meydan was a switching point with an in-between character that provided a meeting place for different functions. Residential and commercial elements have made it a successful urban space. With the construction of the new streets, the pattern of Integration of the traditional city has completely changed. The traditional elements like Bugda Meydan have lost their centrality and importance in the city. The integration model of 2017 depicts a low value for Imam
Square that means it will rarely be a destination point in the movement network of the city center. Pahlavi (Imam) Street in red color is still the most integrated and accessible element of the present time. The popularity and crowdedness of the street has demonstrated this analysis.

Regarding the traditional map, there was a very narrow street between the residential units and the bazaar up to the open space in front of Jame Mosque and Bugda Meydan. It was widened and named Egbal Street in the 1970s. The entrance of the caravanserai was placed just in front of the main street to provide a direct movement into the building. The neighborhood and the bazaar which were connected to each other by this narrow alley. This narrow passage preserved the semi-private realm of the neighborhood from the public intrusion and directed all the activities toward Bugda Meydan. The narrow alley is seen as a segregated element with blue color in the model of Integration measure; but it has a rather high value in the model of Choice measure conducted by Segment Map analysis (Figure 4.68).
This means that the narrow alley is not a destination (to-movement), but has the potential to be selected to reach a place (through-movement). In the models of Choice, some passages of the traditional bazaar have the highest values as they provide the shortest distance to important elements of the city. Bugda Meydan in the traditional model has a low value that is logical as it was the target that concentrated the movement network of traditional Urmia. The construction of Egbal and Askarabadi streets in the 1970s has damaged the boundary between the neighborhood and bazaar. The residential parcels were cut through to generate a straight street with a uniform width. The Egbal Street was opened to car traffic and
naturally became a very busy, polluted and noisy path. This caused the neighborhood suffer from some irrecoverable harms and Bugda Meydan has lost its significant urban role. The balance between the public and semi-private realms was demolished by the interventions in this period.

For a pedestrian, the city is experienced by movement with a uniform speed. The spatial arrangement of the built-environment provides different views which are revealed by the changing positions of the spectator. This is what Gordon Cullen in his book, *The Concise Townscape*, named “serial vision” through which the city is experienced as frames of a movie in which you are one of the actor/actress. He emphasized that the elements of a town should be “manipulated” to make an emotional impact.¹¹ Space Syntax provides a method to analyze the visual perception in the urban environment. Isovist, the basic concept of Visual Graph Analysis (VGA), indicates a polygon as the area visible to an observer from a particular point with a 360-degree field of vision. (Al-Sayed, 2014) This provided a description of the space from the point of view of individuals, as they perceive it, interact with it, and move through it. By conducting VGA, the spatial properties of “isovist field” will be attributed to the grid unit of the Visual Graph. Depthmap creates polygons that represent the potential field of view from each certain location. The inter-visibility of grid units is calculated according to how many other locations are visible from each point. (Al-Sayed, 2014) The results are illustrated by a color range that runs from blue (for low) through green and yellow to red (many visible locations).

In order to study the spatial qualities of the historic center of Urmia and its transformation through time, the Visual Graph Analysis will be used. The visibility pattern of urban elements can be studied by the measure of Visual Integration and the potential of an area to be the place of social activities can be evaluated by the measure of Visual Clustering Coefficient. For an area to be a successful public space, high values of both measures are required. It means that an area should be visually integrated and at the same time has a high potential for social interaction to be an appropriate public space.

Figure 4.69. The models of Visual Integration measures by the Visual Graph Analysis (VGA)
The model of Visual Integration of the traditional Urmia measure illustrate that Bugda Meydan and the covered bazaar in red color are the places with high integration value and therefore are more visible and accessible than others (Figure 4.69). The less integrated areas are mostly the cul-de-sac streets, which is reasonable as they were part of the semi-private realm of neighborhood that needed to be visually protected. The visual pattern of the traditional urban elements was extremely changed by the construction of Pahlavi Street. Instead of the places for public activities, the intersections of streets, which are dominated by vehicles traffic are now recognized as the most visually integrated nodes of the city. In the current map of Urmia, Imam Square, which is planned to be the most important public space of modern Urmia has considerably low visual integration value in comparison with Bugda Meydan. This illustrates how deeply the visibility of a historic urban context may change by the reckless interventions. In spite of having larger areas with wider visual field, the current map presents less visually integrated urban spaces. However, the main traditional elements like the covered bazaar, Jame Mosque and Bugda Meydan as the places of urban life obtain high integration values with a better intervisibility character that indicate a stronger spatial relationship between them.
Clustering coefficient is a measure that presents how the visual information is changing within systems. (Al-Sayed, 2014) It is a useful method to identify the areas with high potential to be the place of social activities and also the areas where the decision points are. In the traditional Urmia, Bugda Meydan and the courtyards of public buildings are illustrated by red color (high value) as the places for public activities. In the model of 1965, the meydan and courtyards are still the areas with high clustering coefficient value as well as the new Pahlavi Street (Figure 4.70). However, in the model of 1979, the modern streets in red color have been recognized as the spaces with high potential for social activities and the conjunctions of them in
blue color as the places for decision and movement. The courtyard of Jame mosque was one of the rare traditional elements which still had the potential to be a place of social interactions in 1979. In the current map of Urmia, Imam Square has a rather less clustering correlation value than the traditional Bugda Meydan and the courtyard of Jame Mosque that means it has fewer potential to be a vivid public space.

Table 4.3 The numeric values of measures by VGA to compare the traditional Bugda Meydan and Imam Square project

<table>
<thead>
<tr>
<th>Measures</th>
<th>Visual integration average</th>
<th>Visual clustering coefficient average</th>
<th>Connectivity</th>
<th>Visual mean depth</th>
<th>Bugda Meydan visual integration</th>
<th>Imam Square visual integration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Traditional</td>
<td>1.86</td>
<td>0.80</td>
<td>263</td>
<td>7.55</td>
<td>2.58</td>
<td>-</td>
</tr>
<tr>
<td>1965</td>
<td>2.88</td>
<td>0.83</td>
<td>1251</td>
<td>5.26</td>
<td>2.25</td>
<td>-</td>
</tr>
<tr>
<td>1979</td>
<td>4.52</td>
<td>0.83</td>
<td>1393</td>
<td>3.85</td>
<td>3.60</td>
<td>-</td>
</tr>
<tr>
<td>2017</td>
<td>5.02</td>
<td>0.79</td>
<td>874</td>
<td>3.34</td>
<td>-</td>
<td>4.8</td>
</tr>
</tbody>
</table>

In order to identify the most appropriate public spaces, the correlation between the two measure of Visual Integration and Visual Clustering Coefficient should be mapped. The scatter plot diagram, provided inside the Depthmap, is an effective tool to analyze the correlation of two different measures. The elements with maximum values of aforementioned measures will be selected on the diagram and then illustrated on the maps. The traditional Urmia and the comprehensive plan of the city in 2017 will be compared with each other to understand how the pattern of public spaces have changed after the urban modernization and the recent intervention.
Figure 4.71. The correlation between the measures of Visual Integration and Visual Clustering Coefficient by the scatter plot diagram

As the correlation map of traditional Urmia illustrates, the important urban elements particularly Bugda Meydan and the Sahn of Jame Mosque are the areas with the maximum values of Visual Integration and Visual Clustering Coefficient (Figure 4.71). Therefore, they were visible, accessible, attractive and have a high potential for social activities. Bugda Meydan, the covered bazaar and the Sahn of Jame Mosque were the most populous spaces of traditional Urmia for commercial, administrative and social activities. The correlation map of current Urmia illustrates that the Imam square does not have an appropriate situation to be a successful public space. In comparison with the modern network of streets, it has low values of Visual Integration and Visual Clustering Coefficient, and therefore, the Imam Square is less visible, accessible and attractive to be used as a place of social activities.
The analyses done by Space Syntax demonstrate that the Imam Square project of Urmia was proposed, designed and implemented without paying enough attention to the changing urban structure of Urmia. The square has never achieved the position and the importance that once Bugda Meydan had in the past. In the modern Urmia the pattern of integration and interrelation between urban elements have totally transformed. The project provides no vision for the future of the city. It has also made no contribution to the rehabilitation and reconstruction of traditional urban structure. The Imam Square project of Urmia has failed to integrate with the new city and also has lost the opportunity to reconstruct the damaged interrelation between traditional elements.

4.4 The final discussion on the Imam Square project of Urmia

Urban design is a complicated issue with different social, cultural, political and economic aspects that have substantial impacts on the process. Based on the framework proposed by Steinberg (1996) to evaluate the renovation and rehabilitation projects in the historic urban context, the challenges with which Imam Square of Urmia has encountered can be considered from these perspectives:

1- The political and economic aspects: as there is always a lack of financial resources in the developing countries like Iran, the management of an urban project should be done more carefully. The Imam Square project is a large-scale intervention on a historic residential tissue where there is an ownership problem with the properties. The expropriation process has become more difficult and expensive than it was predicted at the beginning to the extent that the Municipality of Urmia left aside the project in 1996. The managers, contractors and designers of Imam Square have been frequently changed from its beginning and this has made a central system of control almost impossible. The changing decisions caused the waste of time and financial sources.

2- The socio-cultural aspects: the consequence of the urban modernization on the traditional neighborhoods of Urmia was its abandonment, decay and
social problems that have totally changed the profile of their inhabitants. Any intervention on the neighborhood should be done by considering its social structure. No attempt was made to cooperate with the inhabitants of Bazarbash neighborhood for their participation in the Imam Square project. They were dealt as the low-income people who could not make an investment. The compulsory process of land expropriation and the top-down program of the project have made people pessimistic toward the Imam Square project. There have been some claims that the lands were usurped (Gasb) by the government and they should not be used by Muslims based on a religious principle. The Imam Square was designed by making apparent references to Isfahani architectural style that is regarded as the embodiment of Islamic identity. However, this model has nothing to do with the traditional urban structure of Urmia. Therefore, it makes no contribution to narrate the history of the city and its real identity. The tourism industry has been successful in certain cities of the Middle Eastern countries, which preserved their original historic tissue. Nobody would visit an imitation, which makes no sense in a city. Thus, Imam Square project fails to be an attraction to improve the economy of Urmia.

3- Urbanism aspects: The Imam Square is a large-scale intervention on the historic core of Urmia. To understand the current state, it is necessary to study the traditional urban form and its transformation through time. Urban morphological study makes it possible to read the story of changes which was imposed from the early 20th century up to the present time. By the analytical methods of Space Syntax, it is demonstrated that the project of Imam Square is problematic. The large-scale destruction which was done for the placement of project has destroyed the historic fabric of neighborhood without any contribution. It is demonstrated by the Space Syntax analysis that the location of square in respect to the current structure of Urmia is not appropriate for a public space as it is neither visible nor accessible. It seems that the gap in the
knowledge of urban form has culminated in the fundamental morphological problems of the Imam Square and its failure to be a successful urban space.

4.5 The Significance of this Chapter

In the fourth chapter, Urmia and the Imam Square project as one of the main cases of the present thesis study are first analyzed based on the methods of urban morphology. The traditional urban structure of the city, which has never been broadly studied, is considered as the source of understanding the logic of urban form. The analyses are done in four periods of time and in different scales from the city to the block levels. The morphological analyses in the scale of the city make the main axes, i.e. the main thoroughfares of traditional Urmia identifiable. The commercial and administrative axes played significant roles and are critical to realize how the city functioned in the past. The traditional Bugda Meydan was configured in a close relationship with these axes. The same analysis will be done in the next chapter to study other cases as well to understand whether the same pattern existed in other Iranian cities or not. In the third chapter, it was explained that the process of urban modernization in Iran damaged the traditional urban structure almost in the same manner. Studying the transformation of Urmia by the analytical methods of Space Syntax makes it quantifiable to what extent the morphological logic of the city has been changed. The analyses on the whole urban structure are also used to evaluate the urban spaces particularly the Imam Square project in terms of the degree of centrality and accessibility. In the scale of urban block, the architectural qualities of the traditional Bugda Meydan and the current Imam Square are studied by Visual Graph analysis. The models are compared with each other to evaluate how much the qualities like visibility and the potential for social activities have changed as a result of the urban transformation of traditional Urmia throughout the 20th and 21st centuries. As the numerical values are provided, the comparison is aimed to be objective and evidence-based. The methodology used to study Urmia provides the opportunity for a better understanding of the city in its traditional and current states.
The thesis aims to contribute to the field of urban design by developing a method of evaluation the new plans and to make better decisions for urban projects like the Imam Square project, that still continues to be revised. It is realized that Space Syntax can be used as an effective tool in this term to assess urban design projects in the changing urban structure of Iranian cities.
CHAPTER 5

THE CONTEMPORARY MEYDANS IN THE CHANGING HISTORIC CORES OF IRANIAN CITIES

A methodology and technical approaches are developed by the present study to evaluate the Imam Square project on the urban structure of Urmia. While the analytical methods of Space Syntax have been widely used to study the urban transformation of traditional Iranian cities, the urban design projects in the historic urban context have been hardly evaluated. How is it possible to generalize the methodology of the research? The consistency and reliability of the research can be provided by testing it in the other contexts (Groat & Wang, 2013). Therefore, case studies are selected from other Iranian cities. In the selection process, it is attempted to provide cases which present the Isfahani Style as the significant architectural and urbanism movement that is still effective in the architectural discourse of Iran. It has been already explained how Nagsh-e Jahan Square, as an architype of Isfahani Style, inspired the design of Imam Square in Urmia. Therefore, it makes sense to select the cases including the meydans which present the style of Isfahani. Sahibabad Meydan in Tabriz, the capital of Iran in the 15th century, was considered as the starting point of pre-designed geometrical meydans that became a significant element in the urban development (Hanachi & Nejad, 2006). In Qazvin, the second capital of Safavids in the 16th century, this trend continued by Saadetabad Meydan that was constructed as an urban element of the new administrative complex of the city. Isfahan, the third capital and the most important city in the Safavid era, was extensively developed in the 17th century. Nagsh-e Jahan Square played a significant role in the urban development with providing a common place for the government and public activities. After Safavids, Zand meydan in Shiraz was one of the last examples of
governmental meydans constructed according to the principles of Isfahani Style in the late 18th century.

Recently, the rehabilitation and renovation projects of traditional meydans have been designed and implemented in the cities like Tabriz, Isfahan and Shiraz. Aiming to reconstruct the historic meydan in the contemporary city, they have become large-scale interventions on the historic urban context. Having considerable similarities with the Imam Square of Urmia in this term, these projects are selected as the case studies. Urmia has never been the capital of a government or an important administrative city. Therefore, no extensive governmental complex was developed as the castle and some garden-houses were the administrative elements of the city. In order to study the traditional cities, which share more similarity in terms of size, political importance and the climatic zoon with Urmia, Hamadan, Kermanshah and Semnan are selected as the rest of case studies. It is understood that the meydan in each city has its own story and necessitates particular analyzing techniques to be used. The case studies make the scope of Space Syntax methods widened in the present study. For instance, the Convex Map analysis, which is usually used to study the interior spaces of a building, is applied to evaluate the morphological features of Atigh meydan in Isfahan before and after the renovation. It is expected that the cases determine to what extent the methodology is able to be generalized.

5.1 The Renovation Project of Sahibabad Meydan in Tabriz

Located in the northwest of Iran, Tabriz is the most populated city and the center of East Azerbaijan province. It became the capital of Ilkhanate from 1265 to 1306 and Turkoman governments in part of the 14th and 15th century. The traditional urban structure of Tabriz presented a typical Islamic model with the Jame Mosque and the covered bazaar at the center to which the main streets reached from the gateways. As Tabriz was an important city of the Silk Road, the traditional bazaar had been considerably developed and generated a powerful axis between Khiyaban at the east and Davachi and Istanbul gateways at the northwest. Between the castle and the
central governmental buildings, there was the administrative axis of city on which the older meydan of Tabriz, known as Kohne, was located. It had been an important public node connected to the traditional bazaar via some caravanserais (Figure 5.2).

![Diagrams of Tabriz urban structure in 15th century and modern times]

Figure 5.1. The traditional urban structure of Tabriz and the present time map

### 5.1.1 Sahibabad Meydan; an Initial Pattern for the Governmental Meydans in Iran

In the 15th century, by Kara Koyunlu government Tabriz was expanded toward the north at the other side of Aji Chay river in order to develop a new governmental complex. The covered bazaar was extended over the river by two bridges and continued in a linear form to Devechi gateway. The new meydan was configured with various public buildings like bath, mosque, school, mausoleum and caravanserais that surrounded it. The meydan was called Sahibabad, the name of the garden on which it was built. The governmental palaces were arranged on the west side occupying a large area. Sahibabad meydan had a geometrical form but was not flanked with a particular structure and the façade of buildings generated the edges of meydan. It was one of the first pre-designed governmental meydans of Iran which was used to hold military parade, governmental ceremonies and public activities (Hanachi & Nejad, 2006).
The construction of Sahibabad meydan strengthened the commercial axis on the northwest and made Davachi and Istanbul gateways more significant. Most of the governmental buildings were moved and organized around the new meydan. The importance of Kohne (the old) meydan on the administrative axis was going to be decreased. This story was typical in the most of Iranian cities: when a larger and greater meydan had been built, then, the older one started to lose its importance and usually called Sabze meydan that means the place of selling vegetables or "Kohne" that means the "old". On the other hand, the commercial axis of the city by the new administrative complex became more powerful.

In order to understand the initial form of Sahibabad meydan and its transformation in Safavids and Qajar periods, Hanachi and Ahadnejad scrutinized the related historical documents (Hanachi & Nejad, 2006). The miniature of Matrakçı Nasuh, an Ottoman statesman, is a key document depicting the traditional urban elements of Tabriz in the 16th century. There are also some descriptions about the physical features and functions of Sahibabad meydan by the well-known travelers like Tavernier in 1636 and Jean Chardin who sketched an overall cityscape of Tabriz in 1673 (Figure 5.2). By analyzing the drawings and documents, Hanachi and Ahadnejad concluded that the original form of Sahibabad was bigger than what is seen on the 1905’s map and was vertical to Aji Chay river. The changing sociopolitical conditions and the terrible earthquakes have destroyed the buildings of Sahibabad meydan; they were never reconstructed and this makes recognizing the exact form of it impossible.

Figure 5.2. The sketch and miniature of Tabriz by Jean Chardin in 1673 and Matrakçı Nasuh in the 16th century
Located on the Silk Road, Tabriz has been one of the main trading centers of Iran for centuries. To support the caravans and the travelers, Kabud (Blue) mosque and some caravanserais were built outside of the Khiyaban gateway in the 15th century. The covered bazaar of Tabriz was expanded to the extent that it is the largest traditional bazaar of Iran. Linking of Sahibabad meydan with the bazaar increased the socio-political importance of the commercial axis. In the early 16th century, Shah Ismail I, the founder of Safavid dynasty, selected Tabriz as the capital and Sahibabad meydan continued to be the center of government after the Turkomans. Being under the threat particularly from Ottoman army, Tabriz was not very much developed at this period. However, it is believed that the Sahibabad complex became a model for the kings of Safavids in their future urban projects conducted in the second and third capitals, Qazvin and Isfahan. (Jafarpour, 2017)

Figure 5.3. The 1827’s map of Tabriz and the Dar-ol-Saltane map prepared in 1905

In the maps of 1827 and 1905, Sahibabad Meydan is a rectangle that is thought to be smaller than its original size. After the changing of capital, the meydan was still an active urban node in the 19th century thanks to the public buildings and the connection with the traditional bazaar. Closing to the gateways, it was an appropriate place to accommodate traders. Multiple caravanserais, baths and animal stables had been formed to fulfill this mission. The administrative functions of meydan gives its place to the commercial activities.
5.1.2 From a Glorious Meydan to a Daily Marketplace

By the construction of modern streets in the 1930s, the historic tissue of Tabriz started to be transformed. The commercial and administrative axes were broken and Kohne meydan was completely disappeared. Some constructions were built at the middle of Sahibabad meydan as it can be seen in the aerial photo of 1956 (Figure 5.4). This is the sign of changing condition that affected the form and function of urban elements. Daraie street, built in the 1960s at the east side of covered bazaar, destroyed a part of Sahibabad meydan and separated the Sahib-ol-Amr mosque from the complex. The traditional commercial axis was no longer existed by the modern street network and the meydan started to lose its urban role. The new streets have absorbed the activities by the fast transportation possibility and easy access. In the new morphological logic of Tabriz, Sahibabad meydan could not maintain its existence as an open public space.

Figure 5.4. The transformation of Sahibabad meydan through time and the renovation project of it

In the aerial photo of 2003, the connecting bridges between the traditional bazaar and Sahibabad meydan was demolished (Figure 5.4). This indicates that the meydan is no longer a part of the great bazaar where an intensive the commodity flows existed. The meydan is disappeared as it was totally filled with the small shops. The connection between two sides of the river has been provided by Daraie street which has served the meydan itself. Sahibabad meydan has become the place of selling vegetables and nuts, just like a typical Sabze Meydan existed in other Iranian cities. The magnificent meydan of the 15th century, which is believed to be a model for Nagsh-e Jahan square, has completely lost its function, position and therefore its morphological characteristics. There was no need for a large open area when there
was no administrative body to manage and use it. The decline of the complex started by in the middle of 16\textsuperscript{th} century by changing of the capital and completed by the urban modernization in the contemporary time.

5.1.3 Evaluation of the Renovation Project of Sahibabad Meydan

In the 2000s, a sort of projects under the title of “Restructuring the Historic Silk Axis of Tabriz” were designed by Bavand Consulting Engineers in different sections of the traditional commercial axis (Bavand Co. 2004). The large-scale project starts from Beheshti, a new square at the intersection of two main streets outside of the border of traditional Tabriz and ends by the rehabilitation and renovation of Sahibabad Meydan. Between the two meydans, the shopping centers were designed next to Kabud mosque and on the western side of traditional bazaar (Figure 5.5). The traditional commercial axis was supposed to be reorganized by the two meydans symbolized the beginning and end of it (Bavand Co. 2004).
Figure 5.5. The different sites of the project of Restructuring the Historic Silk Axis of Tabriz designed in the 2000s (Bavand Co. 2004).

The focus of present study is on “The rehabilitation and renovation project of Sahibabad complex” to evaluate its situation in the city and its impacts on the surrounding urban elements. The first phase of the project including the renovation of two traditional market bridges and a multi-story shopping center was completed in 2010. In the second phase, it was planned to expropriate the 70 shops inside the meydan and to close Daraie street to the car traffic in order to restore the destructed part of meydan. For the last ten years, the project has been stopped and the space of meydan has remained intact. The expropriation process of existing shop stores has become impossible as the new shopping center is empty and unused. The first phase
of project has not satisfied the financial expectations, so its continue would be recognized as risky and uncertain.

In order to evaluate the renovation project of Sahibabad complex, Space Syntax is used. To understand the situation of Sahibabad meydan in the urban structure of Tabriz, the Axial map analysis is needed. Roshani and Sagafi (2016) prepared the models of Integration of Tabriz in the four time periods: 1907, 1947, 1970 and 2013 (Figure 5.6). The models illustrate how the traditional urban structure of Tabriz has lost its integration and connectivity by urban modernization and uneven expansion (Roshani & Sagafi, 2016). However, the study has important shortcomings as the local Integration measures (R2 or R3) that is necessary to analyze the traditional city were not conducted. The standard deviation of Integration values which is a significant indicator of homogenous structure was also overlooked in the analyses. Additionally, the image quality of the models is inappropriate to zoom in the urban elements as the subject of present study is Sahibabad meydan. Therefore, the Axial Map analysis is repeated to have a close look on the spatial qualities of Sahibabad meydan.

![Figure 5.6. The global Integration Rn models of Tabriz by Axial map analysis (Roshani & Sagafi, 2016)](image)

The local Integration (R3) measure is conducted for the three states of meydan in the 19th century, the present time and when the renovation project will be completed. There are also two scenarios for the future: the conduction of project with closing of Daraee Street as it was part of the Sahibabad complex or without closing it because of the traffic consideration that is more probable. The model of Integration (R3) illustrates that in 1905 the Raste Bazaar as the main passage from which other
branches of traditional bazaar stemmed is the element with the highest integration value. It was the main element of commercial axis that extended to Sahibabad Meydan through the bridges. Being on the main axis of the city, Sahibabad was strongly integrated with the city in spite of the river between.

![Image 1](image1.png)

**Figure 5.7.** The models of local Integration R3 for the historic core of Tabriz in the three periods

By the construction of new streets, the commercial axis collapsed and the modern network has become the most integrated element of the present time. “Restructuring the Historic Silk Axis of Tabriz” has been a project aimed to reorganize the traditional structure and to economically revive the city. The shopping centers proposed from Beheshti square to Sahibabad Meydan were completed, but the meydan itself has not started. The third model illustrates how the integration pattern of city will change after the completion of Sahibabad project.

![Image 2](image2.png)

Table 5.1 The numerical values of measures by Axial Map analysis for the traditional and current maps of Tabriz

<table>
<thead>
<tr>
<th>Measures maps</th>
<th>Integration HH R3 average</th>
<th>Integration HH average</th>
<th>Sahibabad Meydan integration R3</th>
<th>Daraie Street integration R3</th>
<th>Line length average</th>
<th>Mean depth average</th>
<th>Connectivity average</th>
</tr>
</thead>
<tbody>
<tr>
<td>Traditional map</td>
<td>1.38 Standard Deviation: 0.54</td>
<td>0.74 Standard Deviation: 0.17</td>
<td>2.46 -</td>
<td>91</td>
<td>9.25</td>
<td>2.99</td>
<td></td>
</tr>
<tr>
<td>Current map</td>
<td>1.72 Standard Deviation: 0.74</td>
<td>1.30 Standard Deviation: 0.50</td>
<td>2.06 3.67</td>
<td>90</td>
<td>7.08</td>
<td>3.48</td>
<td></td>
</tr>
</tbody>
</table>
Figure 5.8. The enlargement of the Integration R3 model for the site of Sahibabad meydan

To have a better look, the Integration models are enlarged in the figure 5.8 and the numerical values are presented in the tables 5.1 and 5.2 to make a comparison between them. The values are written for both the whole structure of city and the axes inside the limit of Sahibabad Meydan.

Table 5.2 the comparison between the values of Integration measure for the whole Tabriz and the site of Sahibabad meydan

<table>
<thead>
<tr>
<th>Measures</th>
<th>Axial map analysis Integration HH R3 values</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Average</td>
</tr>
<tr>
<td>The whole city structure</td>
<td></td>
</tr>
<tr>
<td>1905</td>
<td>1.38</td>
</tr>
<tr>
<td>Present time</td>
<td>1.72</td>
</tr>
<tr>
<td>After project completion</td>
<td>1.72</td>
</tr>
<tr>
<td>Sahibabad meydan</td>
<td></td>
</tr>
<tr>
<td>1905</td>
<td>2.27</td>
</tr>
<tr>
<td>Present time</td>
<td>1.98</td>
</tr>
<tr>
<td>After project completion</td>
<td>2.58</td>
</tr>
</tbody>
</table>

The average of Integration value in the present time is more than the traditional structure. This always happens as the modern straight axes make more connections and cause an increase the Integration value. To recognize the overall integration of the city, standard deviation should also be considered to evaluate how homogeneous is an urban structure. If standard deviation increases along with the Integration, this means that a small number of elements obtained very high values whereas others remained segregated. The standard deviation (0.74) of present map is higher than the
traditional map (0.54) that means the overall integration of Tabriz has been decreased. Sahibabad meydan is one of the few elements that its average of integration value has decreased from 2.27 in 1905 to 1.98 in the present time, in spite of the growth in the whole integration of the city. This indicates that the traditional urban elements have lost their importance in the modern city.

If the project of Sahibabad meydan was completed, the whole integration of Tabriz would not be significantly changed as the average of both times is 1.72. However, the meydan shows considerable increase in the Integration values from 1.98 in the present time to 2.58 after the project completion. If Daraie street will be closed down by reconstructing the courtyard of Saheb-ol-Amr mosque, it contributes to the integration level of Sahibabad. However, it seems to be so difficult to shut down Daraie street as it is one of the main exits of the heavy-traffic traditional bazaar. The comprehensive traffic plan of Tabriz, in the left image of figure 5.9, prepared in 2013 almost a decade after designing of the project, demonstrates it (Naghsh-e-Mohit Co., 2013). Regarding its width and crowdedness, Daraie street was identifies as a second-degree traffic path in the plan.

![Figure 5.9](image)

The main circulation of commodities can no longer been done by the traditional channels. The volume of loads and the increasing population of city are out of the capacity of historic axis. The heavy traffic of cars on the both sides of reconstructed bridges can be seen on the left aerial photo of figure 5.9. The reconstructed market-bridges are trapped between the streets with heavy car traffics. They are supposed to link the traditional bazaar to the newly built shopping stores on the other side of Aji.
Chay river. However, in practice the car traffic makes interruptions on the movement by generating an insecure space and prevents the fluid circulation of pedestrians between the both sides. One of the key reasons behind the failure of new shopping center in the Sahibabad complex is the physical reconstruction without paying enough attention to the new functional circumstances.

The recent discussions of managers have emphasized on the renovation of Sahibabad Meydan by removing the existing buildings, but there is no intent to close Daraie street. The connection of Sahibabad meydan to the traditional bazaar could never functionally supersede Daraie street that serves to a large zone. If Daraie street is not closed by the reconstruction of Saheb-ol-Amr mosque, the meydan will not attain the integration value calculated in the table 5.1. It is assumed that Sahibabad meydan will be remained on the backside of the street without enough visibility and accessibility to be a successful public space. To evaluate this hypothesis, the Visual Graph Analysis (VGA) will be conducted in two different states as Daraie street is closed or not to analyze the visibility of Sahibabad meydan.

Figure 5.10. The models of visual integration measure conducted by VGA for Sahibabad complex of Tabriz

The Visual Integration models illustrate that after the completion of the project, the meydan will have a visibility pattern similar to the traditional Sahibabad Meydan in 1905 (Figure 5.10). The two branches of traditional bazaar in red color are the most visually integrated elements. The reconstructed meydan in connection with the bazaar obtains a high value as well. The fourth model presents the model of Visual Integration of the complex when the project is completed without closing of Daraei Street. This time the visibility pattern is very similar to the present model where the
renovation of Sahibabad meydan has not been completed. This means that without closing the modern street, the reconstruction of meydan will not cause an increase in the visibility and centrality of it.

![Figure 5.11. The models of visual Clustering Coefficient conducted by VGA for Sahibabad complex of Tabriz](image)

The models of Visual Clustering Coefficient illustrate the areas with high potential for social interactions by warm colors and the areas with decision making characteristics by blue tones. The room-like and wide spaces are preferred in this measure. The numerical values of both measures can be seen on the table 5.3 to make a better comparison.

Table 5.3 The numerical values of measures by VGA in different states before and after the completion of the renovation of Sahibabad Meydan

<table>
<thead>
<tr>
<th>Measures maps</th>
<th>Visual integration average</th>
<th>Visual clustering coefficient average</th>
<th>Connectivity</th>
<th>Visual mean depth</th>
<th>Sahibabad Meydan visual integration</th>
<th>Renovated meydan visual integration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Traditional map</td>
<td>3.23</td>
<td>0.86</td>
<td>336</td>
<td>4.59</td>
<td>4.49</td>
<td>-</td>
</tr>
<tr>
<td>Current map</td>
<td>4.62</td>
<td>0.84</td>
<td>1269</td>
<td>3.82</td>
<td>4.17</td>
<td>-</td>
</tr>
<tr>
<td>Completion of Sahibabad project</td>
<td>3.72</td>
<td>0.85</td>
<td>944</td>
<td>4.32</td>
<td>-</td>
<td>5.12</td>
</tr>
<tr>
<td>Completion of the project without closing Daraie Street</td>
<td>5.06</td>
<td>0.85</td>
<td>1270</td>
<td>3.82</td>
<td>-</td>
<td>5.17</td>
</tr>
</tbody>
</table>

As it can be seen on the models, the courtyards of caravanserais, part of streets and the space of meydan in the first, third and fourth maps are recognized as appropriate place for social activities (Figure 5.11). However, it was demonstrated that having the physical qualities cannot be enough to be a successful urban space (Hillier, 1992).
The centrality, accessibility and visibility are also important in this sense. To identify the spaces which possess the both characters, the correlation analysis between the measure of Visual Integration and Visual Clustering Coefficient measures is done by the scatter plot diagram of Depthmap. The aim is to determine the areas which are visible, accessible and at the same time have a high potential for social activities.

Figure 5.12. The correlation between the measures of visual Integration and Clustering Coefficient by scatter plot diagram

The scatter plot diagrams depict that the correlation between the measures of visual Integration and Clustering Coefficient is trivial. However, it is not important for this analysis. The diagrams make it possible to identify the elements with high values of both measures. The red dots framed inside the black box presents these elements which can be also seen on the map. By selecting the dots, their locations on the map can be determined. In the 19th century map, Sahibabad meydan and a part of Raste
bazaar were the urban elements which have the potential to be public spaces (the left side diagram and map in the figure 5.12). In the present time, Daraie street is recognized as the most visually integrated element with a high Clustering Coefficient value (the right side diagram and map in the figure 5.12).

Figure 5.13. The correlation between the measures of visual Integration and Clustering Coefficient by scatter plot diagram

In the figure 5.13, the same analysis is done on the models that presents the conditions after the completion of project (the left diagram and image), and the renovation of Sahibabad Meydan without closing Daraee Street (the left diagram and image). It can be seen to have a successful public space as the traditional Sahibabad Meydan, the renovation should be done by limitation of the car traffic from the modern streets. If the project is done without restricting of Daraie street, the condition will extremely change. In spite of its renovation and interrelation with the bazaar, Sahibabad meydan will continue to be a relatively segregated space.
The logic of current cities has been changed socially, functionally and thus morphologically. The new circulation pattern of modern city generates different spatial relations and social performance. A single street which was imposed on a historic urban context transforms the physical characteristics and thus the pattern of behavior. Space Syntax as a method of analysis can contribute to get a more realistic approach toward the designing of urban space in the contemporary city.

5.2 Saadetabad Meydan in Qazvin

Located in the north-central region of Iran, Qazvin is the largest city and center of the Province of Qazvin. It has a Mediterranean climate with hot summers. As the city was located on the Silk Road, it was an important trading center of Iran. Qazvin was selected as the second capital of Safavids empire between 1555-1595. Thus, the city also found an administrative importance in the 16th century.

5.2.1 The Traditional Urban Structure and Its Transformation

By analyzing the urban elements of traditional structure, it can be inferred that the city had two axes. Between Khandag Bar and Rasht gateways, the commercial axis consists of the covered bazaar and several caravanserais was existed. From Tehran to Panbe Rise gateways, the administrative axis of traditional Qazvin including the governmental palaces and official buildings can be recognized (Figure 5.14). The two axes met each other at the center of the city where a large meydan was constructed in the 16th century when the city was the capital of Iran in the by Safavid era. The development of Qazvin under Safavids was based on a predesigned plan. The Jame Mosque which was an older building (11th century) at the southern part connected to the newly-built governmental complex by a straight street named Khiyaban. Being the symbol of Safavids’ urbanism, this greenery wide axis reached Aali Gapu, (literally means “high door”) which was the entrance of the palaces. Khiyaban was used for official ceremonies and for greeting of important guests.
Because of the several gardens, palaces and administrative complexes, Qazvin was one of the largest traditional cities of Iran.

Figure 5.14. The transformation of urban structure of Qazvin through time

The modernization of Qazvin was started in the mid-19th century very earlier than other Iranian cities. Being close to the capital of Qajar dynasty, Tehran, the city had become exposed to Western urban prototypes before than others. In the 1919’s map, three straight streets can be distinguished as they are apparently different from traditional ones (Figure 5.15). In the 1930s, the urban modernization of Qazvin was started by widening and extending the previous streets. The straight streets from Tehran gateway was extended and the other east-west axis between Rasht and Panbe Rise gateways was widened. Two major north-south streets were built partially on the old routes and partially by cutting the historic tissue. The fortification wall was destroyed and became a ring road around the historic core. The street network has been completed by adding some minor streets perpendicular to the main ones. Qazvin has been one of the most rapidly-growing cities of the country in the late 20th century with major economic and industrial connections to the capital. The new developments have been mostly done on the north part of the city toward the mountains as the southern plain has been used for agriculture.
To better understand the urban transformation of Qazvin after modernization, the Axial Map analysis is helpful. It was already done by Karimi (1998) and is used in the present study (Figure 5.16). As it can be seen on the models of global Integration, the commercial axis is the most integrated element of the traditional map. The city center, where the bazaar and governmental palaces were gathered, is illustrated by the warm colors as the area with high integration value. In the present time map, the new grid of streets is recognized as the most integrated elements. It has broken down the connections between traditional elements and changed the historic tissue to some segregated blocks presented in blue tones as the areas with the lowest integration value. This physical segregation, similar to other Iranian traditional cities, has culminated in the social segregation as the historic core lost its users and attraction. In the analyses done by Karimi, there is no evidence of Saadetabad meydan as it was not existed in the map of 1919. In order to study the meydan, older maps are needed to be analyzed.
Saadetabad Meydan; the Formation of a Governmental Center

When the capital of Safavids was transferred from Tabriz to Qazvin in the 16th century, the new governmental complex including a meydan started to be built. The meydan was called Saadatabad as the garden in which it was developed was owned by Saadet clan. The 16th century map of the city is reconstructed by Dizani (2012) who confirmed that Saadatabad meydan was established between the bazaar and palace complex (Dizani, 2012). The meydan was precisely configured between the commercial and administrative axes of traditional Qazvin (the top-left map of figure 5.18). It acted as an intermediate realm to connect the administrative complex to the bazaar. This spatial organization pattern can be seen in the most of the developments of Iranian cities after the 16th century. The significant role of meydan started to be weakened when the capital was transferred to Isfahan. The governmental importance of Qazvin decreased, but the city kept to be a significant trading center. In the map of 1919, there is no trace of Saadatabad meydan and also a large part of the governmental palaces was occupied by the bazaar (the top-right map of figure 5.17).
Figure 5.17. The disappearance of traditional Saadetabad meydan (Dizani, 2012) and the formation of a new meydan in modern Qazvin

Although the administrative importance of Qazvin was declined by the change of capital, the commercial activities increased as the result of its strategic location on the Silk Road. In the 19th century, Qazvin flourished as a center of trade because of “the growing importance of the trade routes through Trebizond and over the Caspian Sea” (Bosworth, 2007). Qazvin ranked equally with Tehran, the capital of Iran in
Qajar period, in the extent of its commerce and contained perhaps as many thriving and wealthy merchants from all parts of the country as any other city in Persia (Yarahmadi et al. 2018). The bazaar needed to be enlarged according to the requirements which was a typical issue in the traditional Iranian cities. Saadetabad meydan and part of the palace complex was gradually swallowed. It is interesting that Saadetabad meydan shares the same story with Sahibabad Meydan in Tabriz. Both of them were once the governmental center to hold the official ceremonies of capital and to represent the power of king. Their mission was finished by changing the political state. The morphological transformation of meydans took place according to the new socio-political and economic relations of the society. Another similarity is the lack of an articulated edge to define the limits of meydans to perhaps prevent future interventions. Nagsh-e Jahan Square of Isfahan, which was built after these meydan, was flanked by a two-story shopping stores and has been remained intact since its construction in the 17th century.

5.2.3 Azadi square; the new public space of modern Qazvin

As it can be seen on the aerial photo of 1956 (the bottom-left image of figure 5.17), Chehelsutun Garden, the Shah Tahmasb’s palace, was dissected with the construction of first modern street. The detached part of the garden became a new urban space which was named Sabze Meydan in the early 20th century and then Azadi Square after the Islamic Revolution (Figure 5.18). This isolated greenery area had none of the characteristics of the traditional Iranian meydan. It is not an intermediate realm to connect important urban elements. It was a residual piece of land remained from the modernization process which has changed the morphological logic of Qazvin. It is interesting that inside the new logic of urban form, Azadi Square has become a successful urban element for the modern city. It is recognized as the most important public space of Qazvin and a part of its identity by people and the city managers (Gazvin Municipality, 2018). It is worth to say that the historic garden and Chehelsutun Palace have a considerable impact on the success of Azadi Square. In
2017, the street which divided the garden was closed to car traffic in the limit of Azadi Square and the two sides joined with each other to make a large urban space, something between park and meydan. A new type of public space in the historic urban context has been formed in the modern Qazvin regarding the new circumstances. This is a natural process of urban transformation as the result of the morphological change of the city.

Figure 5.18. Azadi Square of Qazvin in 1930s and at the present time

5.3 The Renovation Project of Atigh Meydan in Isfahan

The renovation of the historic Atigh Meydan has been a controversial issue among architects and urban designers since its design in the 2000s. A historic layer which was formed through centuries has been removed to reconstruct the large scale meydan of the 12th century. Having considerable similarities with the Imam Square project of Urmia, Atigh meydan has also failed to fulfill the socio-economic expectations after its completion in 2012. Consequently, the luxury shopping stores has remained empty and the renovated square is reappropriated by the rejected users, the vendors and salespersons.

Thanks to its geographical position at the center of Iran, Isfahan was selected as the capital twice in different periods of time. The first time was in the Seljukian era (1037–1194) when it became the most important city of the country in the mid-11th century. Isfahan presented a typical model of Islamic city by the great Jame Mosque and administrative buildings at the center of city organized around a public meydan.
(Pakzad, 2011). The main streets converged from the six gateways into the center and the neighborhoods were configured between them (the top-left map of the figure 5.19). The covered linear bazaar started from a gateway on the north and extended to another on the south generating the commercial axis of the city. The meydan was encircled by the covered bazaar at the both sides.

Figure 5.19. The evolution of Isfahan’s historic core from the 12th to the present time

About five hundred years later, Isfahan became again the capital of Iran by Shah Abbas the Great who had ambitious dreams which were impossible to be achieved in the old city. After Tabriz and Qazvin, Isfahan was the third capital of Safavid empire (1502–1736). The largest urban development project of traditional Iran was
conducted in the early 17th century (the top-right map of the figure 5.19). It was based on a pre-designed gridiron plan including two important urban elements: a rectangular massive square and a straight street known as Chaharbagh (literally means four gardens). The garden palaces and administrative buildings were built on the both sides of axis and the rows of trees were planted along it generating a greenery pathway. Chaharbagh, which was also implemented in the other cities, determined the direction of future development. The geometric plan of Safavids had been hardly seen in the former traditional Iranian city. However, it never rejected the existing organic fabric of the old city and completely integrated with it. Without making any damage, the new developments were done by extending the commercial axis outside of the city wall along the existing trade road.

5.3.1 The Transformation of Atigh Meydan in the Challenge with Nagsh-e Jahan Square

Nagsh-e Jahan square was the most magnificent urban space of the time. It is a huge rectangle (560 meters long and 160 meters wide) encircled by two-story shops which are punctuated with important administrative and religious edifices at the three sides. Nagsh-e Jahan Square became the new center of government representing the power of king and the place for military ceremonies and social activities. Decreasing its administrative significance, the Seljukian meydan began to be called Atigh or Kohna meydan that means ancient and old. Juxtaposed with the great Jame Mosque and encircled by the covered bazaar, Atigh meydan continued to be the religious and public center of the city. Therefore, it is fair to say that Isfahan had two centers which were characterized by two meydans in the 17th century. A powerful urban structure was formed by the covered bazaar linking the two centers as an urban spine. Atigh meydan maintained its significance as a public space even more than Nagsh-e Jahan (Falamaki, 1978), however, its form started to be transformed regarding the new circumstances.
There is no document to identify the original form of Atigh meydan in the 12th century and Seljukian era. From descriptions of the travelogues, it is estimated to be a relatively large space configured between the two branches of covered bazaar on one side and the great Jame mosque at the other side (Pakzad, 2000). However, this is based on a hypothesis and cannot be verified. In the schematic map of Pascal Coste, drawn in 1840, the Atigh meydan was not even mentioned and the focus was on Nagsh-e Jahan which is depicted by details. The oldest visual evidence of the meydan is the 1923’s map on which the urban structure of Isfahan is illustrated with considerable details and the meydan was depicted as a relatively small open space (Figure 5.20).

It is assumed that the large part of Atigh meydan was filled in Qajar period (19th century) with a network of streets and small shops. From then on, the remained open space was called Sabze Meydan instead of Atigh meydan. It continued to be an active commercial center of the city through the 19th century (Pakzad, 2000). Supporting by the great Jame mosque as the most favorite religious place of Isfahan, the Sabze Meydan kept its existence in a different form and function. Atigh meydan in the 19th century presented the typical model of traditional commercial meydans which
existed as an in-between space to make different sort of activities possible (the left map in the figure 5.21). Without any particular geometry, Sabze meydan was configured based on the interrelation with the bazaar, neighborhood and Jame mosque.

By the construction of the modern streets in the early 20th century, the traditional urban structure of Isfahan began to be changed. The two new streets cut through the north and east side of Sabze meydan, split up the tissue and broke down the traditional context (the bottom-left map of the figure 5.19). The meydan disconnected from the important urban elements particularly the Jame Mosque. The edge of new streets has drawn favorite commercial activities to itself and Sabze Meydan remained isolated on the backward with as unwilling appearance. Losing its morphological characteristic, the meydan became a place for vendors, salespersons and retail dealers (the middle map of the figure 5.21).

Figure 5.21. Three states of Atigh meydan from 19th century to the present time

About two decades ago, the renovation and rehabilitation project of Atigh meydan was designed and then complemented in 2012. Hadi Mirmiran, the designer of the project, stated that in order to return the historic importance of meydan and to remove the spoiled structures and inappropriate activities of the site, physical intervention should be done. He frequently mentioned the state of meydan in the Seljukian era as the final model of design (Mirmiran, 2009). However, as it was mentioned, there is no evidence to identify the exact form of Atigh meydan in the 12th century. The renovation project of Atigh Meydan includes a large open area between the two
branches of covered linear bazaar which is supposed to represent the original form of Seljukian meydan. Mirmiran stated that in order to harmonize the edges of meydan, the shopping units which their form and proportion inspired from Nagsh-e Jahan square were designed (Mirmiran, 2009). In spite of its trapezoid shape, the new meydan is encircled by a two-story skin which was not common in the Iranian architecture before the 16th century. This apparently indicates the approach of designer to create a monumental urban space. When it was started to be implemented in 2009, the massive scale of project, the expropriation process of lands and the erasing of existing context has made the renovation project of Atigh Meydan a controversial issue. The manager of ICOMOS (International Council on Monuments and Sites) branch of Iran, Mehdi Hojat, was one of the main opponent of the project during its implementation. He believed that the scale and type of intervention and also the functional program like a multi-story underground parking and shopping stores in this valuable historic site are not acceptable (Hodjat, 2009). The debates between city managers and scholars was raised to the extent that the name of project has changed to Imam Ali Square.

5.3.2 Evaluation of the Renovation Project of Atigh Meydan (Imam Ali Square)

The present study aims to evaluate the renovation project of Atigh meydan from a morphological point of view. Therefore, the transformation process of meydan needs to be analyzed in different periods of time regarding the changing condition. The renovation project of Atigh meydan has been an attempt to reorganize the connection between the two historic centers of Isfahan. The impacts of this new project on the urban structure of the city can be studied by Space Syntax. The Axial map analysis of Isfahan has been already done by Sadeghi et.al. (2014) in the four time periods: the 12th century (Seljuk empire) the 17th century (Safavid empire) the 1970s (Pahlavi era) the present time (After the complementation of renovation project of Atigh meydan) (Sadeghi et al. 2014). She made a comparison between the models to
evaluate how the renovation of Atigh meydan has changed the integration pattern of Isfahan. The Integration models illustrate that the linear covered bazaar and Atigh meydan (in red color) were the most integrated elements of Isfahan in the 12th and 17th centuries (the top-left and top-right models in the figure 5.22). This indicates that the extensive urban development in the Safavid era had no negative impact on the old structure of the city. Nagsh-e Jahan square and Chaharbag street were integrated to the old city and made the commercial axis more important. By the urban modernization of the 20th century, the two streets which crossed at the center of the city became the most integrated elements of contemporary Isfahan (the bottom-left model in the figure 5.22). By conducting the renovation project of Atigh meydan, car transportation is provided through underpasses. Sadeghi et.al. (2014) discussed that the Integration model of present time map confirms that by reconnecting the two traditional meydan, the linear covered bazaar received a higher integration value (the bottom-right model in the figure 5.22). However, its influence on the overall structure of traditional Isfahan is trivial (Sadeghi et al. 2014).
The study of Sadeghi et.al provides the useful analyses to study the 12\textsuperscript{th} and 17\textsuperscript{th} urban structure of Isfahan and to assess how the renovation of the historic meydan has affected the contemporary city. However, the state of Atigh meydan in the 19\textsuperscript{th} century was not considered in the analysis. The impacts of renovated meydan on the urban structure was compared with the time when there was no trace of it.

The present study discusses that the 19\textsuperscript{th} century state of Atigh Meydan is also significant as it was the result of socio-economic changes of the city. It was a part of
the evolution history of Isfahan which should be studied to have a comprehensive understanding of the meydan and its changing role. Removing a historic layer of a city and selecting a particular period of time cannot be acceptable from urban morphological point of view. This was also ignored in the design process of the renovation project of Atigh meydan.

Figure 5.23. The transformation of Atigh meydan through time

The transformation of Atigh meydan from 12th century to the present time is illustrated in the figure 5.23. As it was explained, the original form of meydan cannot be verified. It is known that its size started to get smaller after the Seljuk empire. The administrative importance of Atigh meydan was reduced in the 17th century when the new governmental center was constructed in Nagsh-e Jahan square. As there was a strong connection between the two centers by the covered bazaar, Atigh meydan had kept its commercial and public roles until the 20th century. The 1923’s map of Isfahan illustrates a relatively small open space surrounded by an interwoven network of streets stemmed from the covered bazaar. It is a typical pattern for the expansion of bazaar in the Iranian traditional city. Through the 18th and 19th century, Isfahan was no longer the capital of Iran but an important trading city on the Silk Road. There was no need to a large open space which was once used for the governmental ceremonies. Just like what happened in Sahibabad and Saadetabad Meydans, the commercial activities were expanded and occupied the empty space of Atigh Meydan. The map of 19th century illustrates that the meydan was still an active urban space with a new shape and social role. Even after the construction of modern streets, the remained open areas had its own users as vendors and retail dealers who were considered disgusting by city managers. “Returning the past importance of Atigh meydan” has been a phrase frequently used to defend the renovation project
(Mirmiran, 2009). A large and monumental meydan has been built to revive the historic importance of an urban space in the structure of a contemporary city. From this point of view, the renovation project of Atigh Meydan is very similar to the Imam Square project of Urmia. The other similarity is the failure of both projects to satisfy the expectations.

The urban modernization of early 20th century and the renovation project of 2012 are both a sudden changes of urban structure of Isfahan. To understand the present state, it makes sense to study the evolution process of an urban space. A comparison is done between the 19th century state of Atigh Meydan based on the 1923’s map and its present time form after the renovation. The aim is to evaluate the physical parameters, functionality and morphological characteristics of meydan in the two different periods of time (Figure 5.24). As the first parameter, the area of open space in both maps was calculated. The figure-ground relation illustrate that the present time meydan includes a very larger open space in comparison the 19th century.

![Comparison of morphological parameters of Atigh meydan in the 1923’s map and the present time](image)

Figure 5.24. The comparison of morphological parameters of Atigh meydan in the 1923’s map and the present time.

By conducting the three analyzing methods of Space Syntax, the other physical characteristics of meydan are studied (Figure 5.24). The numerical quantities are
presented on the table 5.2. The Axial Map Analysis reveals morphological parameters like the intensity of axes inside the meydan, the average of axes’ length and the average of connectivity values. The number of axes and their length inside the limit of meydan can be an indicator to identify how many changes in direction should be done to move between the different parts of space. The larger the axes count, the further the changes of direction are in an area. As it can be seen, the 1923’s meydan has more axes as it includes winding and twisty streets. The longer the length of axes, the straighter is the movement in a space. The present time meydan has a larger average of axes length and this shows that there are longer paths which can be walked with no need to change the direction. The number of convex spaces is also an important determinant of spatial organization. The larger the count of convex spaces, the more encircled areas are accessible for activities. In this terms, the 1923’s meydan included more room-like areas to accommodate various functions.

Table 5.4. The numerical values of morphological parameters

<table>
<thead>
<tr>
<th>Measures maps</th>
<th>Total area</th>
<th>Area of open space</th>
<th>Axes count</th>
<th>Axes av. length</th>
<th>Axes av. connectivity</th>
<th>Convex count</th>
<th>Convex av. connectivity</th>
<th>Isovist area</th>
</tr>
</thead>
<tbody>
<tr>
<td>1923</td>
<td>55400</td>
<td>24000</td>
<td>26</td>
<td>176</td>
<td>8.4</td>
<td>72</td>
<td>3.12</td>
<td>4540</td>
</tr>
<tr>
<td>2019</td>
<td>55400</td>
<td>42200</td>
<td>15</td>
<td>231</td>
<td>7.6</td>
<td>33</td>
<td>3.03</td>
<td>22100</td>
</tr>
</tbody>
</table>

The connectivity is a local measure which indicates the spatial relationship between elements in Space Syntax. In both Axial map and Convex map analyses, the average of connectivity is higher in the 1923’s map. Although the difference is not very significant, but it indicates that the physical access between urban spaces in the present state of meydan is less that previous pattern. The 360-degree visual field is evaluated by selecting a point at the middle of both meydans and conducting the isovist measure. As it can be seen on the table, the isovist area of present time is very larger than the 1923 map. As the current meydan has a massive open space inside, the visual field of a person standing at its middle is wider. This brings to the fore other factors like the degree of enclosure, scale and proportion of the meydan.

The morphological parameters reveal that there are significant differences between the spatial organization of two meydans. The 19\textsuperscript{th} century state of Atigh meydan
included further room-like open and closed spaces through which the circulation was done by more and shorter axes. This is very similar to the physical structure of the traditional Iranian bazaar in which the covered passages and open spaces of courtyards generate an intertwined urban tissue. On the other hand, Imam Ali square presents a large open space with long movement axes and vast visual fields. It presents a monumental space which is more appropriate for ceremonies and rituals than the commercial activities. However, unlike the Seljukian era, at the present time there is no institution to organize and manage such events in the renovated project, the Imam Ali square. Through time, the behavior pattern and the social profile of the users have been changed and the new form of meydan is not in congruence with its socio-economic context.

Figure 5.25. The models of Integration R3 by Axial Map analysis in the Atigh meydan of Isfahan

The local Integration measure with the radius of three (R3) is conducted by a square with side length of 600 meters (1/6000) inside which the whole meydan can be framed (Figure 5.25). The most integrated elements of 1923’s map are the linear covered bazaar in red color and Sabze meydan is illustrated in orange with lower integration value. In the present time, some axes inside the meydan have a higher integration value than the covered bazaar. This means that the two branches of covered bazaar in the 1923’s map were the important elements between which Sabze meydan had a complementary role. The deals which could not be done inside the
bazaar were extended to the open space of meydan. Selling of Wheat, as it is written on the map, was one of them. However, the current meydan has recognized more important than the covered bazaar of its edges. This indicates that independent from the bazaar, the present Atigh Meydan (Imam Ali Square) presents an autonomous character.

![Maps of Atigh Meydan](image)

**Figure 5.26.** The number of buildings in the convex maps and the superimposition of the axial with the convex maps in the 1923 and current maps of Atigh Meydan

The measures of convex and axial articulation are effective tools to evaluate the how much the urban street network is broken up. The convex articulation is calculated by dividing the number of convex spaces, which are generated on the street network, by the number of buildings that surround the streets. The axial articulation is also calculated by dividing the number of axes to the number of buildings. Both measures indicate the pattern of an urban space as the lower values present lesser break up and more synchrony. The axial integration is another syntactic measure that is calculated by dividing the number of axes by the number of convex spaces. Low values indicate a higher degree of axial integration of convex spaces and vice versa (Kubat, 1997;
The comparison between the syntactic measures of Atigh meydan of Isfahan in 1923 and 2019 illustrates that the traditional structure of the meydan had a lesser broken up pattern with more synchrony. The higher value of axial integration in the current structure of Atigh meydan presents less conformity between axial and convex characteristics of spaces (Figure 5.26).

Table 5.5 The numerical values of syntactic measures for the two states of Atigh Meydan

<table>
<thead>
<tr>
<th>Measures</th>
<th>Convex articulation</th>
<th>Axial articulation</th>
<th>Axial integration</th>
</tr>
</thead>
<tbody>
<tr>
<td>maps</td>
<td>1923</td>
<td>2.11</td>
<td>0.85</td>
</tr>
<tr>
<td></td>
<td>2019</td>
<td>2.5</td>
<td>0.92</td>
</tr>
</tbody>
</table>

The analyses proved that Sabze meydan of the 19th century has the morphological characteristics which were appropriate for the commercial activities (Table 5.5). By a low value of convex articulation and axial integration the 1923’s map presents a network of streets which were well adapted to the new function as the supporting element of bazaar and responded to the socio-economic change of the context. The Imam Ali Square provides a monumental and massive open space to be used for activities; the question is which types of activities? About six years after the implementation of the project, this question still makes sense.

There is a little doubt that an intervention should be made to rehabilitate the condition of the 20th century Atigh (Sabze) Meydan after the construction of modern streets. As the result of spatial segregation, it became a deprived area with various physical
and social problems. However, it was still an alive urban space used as an informal daily market. By a modernist approach, the existing context has been removed to reconstruct the 12th century state of Atigh meydan. The small cheap shops of previous meydan have been substituted by the expensive luxury stores which are still mostly empty after about six years (Figure 5.27). The intents of designer to make a second Nagsh-e Jahan was perhaps a terrible mistake that has caused the present failure. Neither the historical importance of Atigh meydan nor its morphological characteristics are comparable with Nagsh-e Jahan which has been a monumental urban space with an exotic architecture.

In an interview, Asghar Badri, the manager of The Revitalization Center of Historic Sites, discussed how the project of Imam Ali Square has failed to fulfill the financial expectations. He stated that the traditional bazaar of Isfahan had a widespread regional influence in the past as it was the professional center for handicrafts and industries. The economic pattern of modern Isfahan has completely changed and the traditional bazaar is not powerful as the past. A large-scale urban project like Imam Ali Square needs to be in connection with the new financial centers and commodity flows (Badri, 2017). However, the meydan makes no connection with the modern street network which is still the most integrated element of the city (Sadeghi et.al. 2014). Deprived from the new street network, the only chance of Imam Ali Square was to be a continuous of the traditional covered bazaar which is very successful at the other end, Nagsh-e Jahan square. Badri added that Sabze meydan had been a daily market place which served to a particular social class before the implementation of project. These activities were considered as a cancer tumor which needed to be exited. The operation has been done badly and culminates in a metastasis. The vendors, who used Sabze meydan, has dispersed to other historic parts of city after the construction of Imam Ali square (Badri, 2017). Recently, the open space of meydan has been divided by lines to return the vendors and retail dealers to their previous place. Ironically, the meydan is reappropriated by the people who was the real users of the context (Figure 5.28).
The projects of meydan has been always considered as a chance to represent the Islamic identity on one hand and making profit on the other hand. These intentions caused an ignorance of the context and the new logic of the modern city. The how of interventions on the historic context needs to be thought more carefully. Urban morphological study is a reliable method to read the transformation process of urban spaces regarding the social changes. No part of this process should be overlooked as the piece of a puzzle. The story of Atigh meydan was not read well and its changed role after the 17th century was not considered by the designers. This culminates in an ambitious project that has failed to fulfill the expectations. The Space Syntax analyses provides useful information in terms of the position of an urban element in the overall structure of city and also its physical characteristics. The Axial, Convex and Visual graph analyses can be used to identify the morphological differences between the two urban spaces.

5.4 Zand Meydan of Shiraz

Located in the southwest of Iran, Shiraz is the fifth-most-populous city of Iran and the center of Fars Province. Having a moderate climate and relatively high precipitation, it has been famous for the beautiful flower gardens. After the entrance of Islam, Shiraz has been a regional trade center for over a thousand years. By the 13th century, the city had grown into one of the largest and most popular Islamic cities of the time (Lockhart 1939). During this period, Shiraz became a leading center for the arts and poetry due to the encouragement of its ruler and the presence of many
Persian scholars and artists. Through its history, natural disasters, unstable social conditions and political conflict brought disorder, destruction and great loss of life, while phases of peace and prosperity resulted in urban development and population growth.

5.4.1 The Traditional Developmental Axes of the City

Bonyadi explained the evolution process of Shiraz through the developmental axes which determined the direction of expansion. The commercial axis of bazaar was perpendicularly crossed by other axes which formed in various periods of time. Shiraz became the capital of Buyid dynasty who ruled a large part of Iran in the 10th century. The initial urban structure of the city included the Jame Mosque at the center and the linear bazaar extended from north to the south. The first axis of development was formed from the Jame Mosque toward the west and reached the governmental palaces (the top-left map of the figure 5.29). Salghurids dynasty ruled Shiraz after Buyids in the 12th century when the city was expanded by another axis which was again perpendicular to the bazaar (the top-right map of the figure 5.29). A new mosque and a palace were built on the Salghurids axis which provided the connection between the traditional bazaar and new urban elements. (Bonyadi, 1997)
5.4.2 Zand Meydan; Configuration of the Governmental Center

In the Safavid era, Shiraz experienced an enormous expansion and obtained its largest size before the modern time. A new developmental axis was formed from Khan school at the east side of bazaar to a governmental meydan, known as Shah, which was attached to Chaharbagh (garden-axis) as the promenade of governmental palaces (the bottom-left map of the figure 5.29). There were public buildings like a hospital (Dar-ol-Shafa) and bath (Hammam) around the meydan. The pattern of
spatial organization is very similar to the urban development project of Safavids in Isfahan. Because of the devastating wars and natural disasters in the next years, there is no evidence of Safavid meydan and its buildings, unfortunately.

Figure 5.30. The traditional map of Shiraz and the axonometric drawing of Zand complex (Tavassoli & Bonyadi, 1992)

Shiraz was occupied and plundered several times after Safavids and it became an abandoned city. When the city was selected as the capital of Zand dynasty (1751 to 1794), most of the palaces, gardens and public buildings were ruined. (Bonyadi, 1997) Karim Khan, the founder of Zand government, inspired by earlier plans by Shah Abbas for Isfahan, initiated a large urban project to make Shiraz appropriate for the administrative affairs of his government (Lockhart 1939, Clarke 1963). The forth developmental axis of traditional Shiraz was formed right on the ruined palaces of Chaharbagh (the bottom-right map of the figure 5.29). Like the previous ones, the Zand axis was perpendicular to the linear bazaar which was frequently extended by the expansion of Shiraz. On the authority of the king, a new public center consisting of a meydan, a walled citadel, a palace with public buildings was configured. The garden-axis became a determinant factor in the spatial organization of Shiraz as it provided the ground on which other urban elements were configured. (Mansuri & Arabsalgar, 2015) These autocratic developments can be easily distinguished because of their unique geometric design and spatial arrangements (Kheirabadi
Similar to the urban development of Safavids in Isfahan, the newly built areas left the old city intact and integrated with its organic pattern (Izadi 2008). In fact, the urbanization and architecture of Zand era was a continuation of Safavids and the Isfahani style. Bonyadi believed that the urban project of Karim Khan was humbler and more functional in comparison with the architecture of Safavids. The governmental meydan was encircled by a one-story building with a relatively simple architecture as it can be seen in the reconstructed axonometric drawing in the right image of the figure 5.30. It was formed between the covered bazaar and the governmental palace linking the commercial axis to the administrative one. The left image of the figure 5.30 is the traditional urban structure of Shiraz on which the red squares present the scales of the next analyses.

5.4.3 The Transformation of Zand Meydan with Urban Modernization

The modernization process of Shiraz has been explained in the three time periods; started by Reza Khan in the first Pahlavi era (1920-1941); a period of radical city expansion in the late 1960s-1970s; and the post-revolutionary period (1979-present) (Kermani, 2017). The street widening act of 1933 authorized municipalities to widen narrow passageways in the historical core. It was applied to construct two east-west parallel avenues, the norther one is named Karim-Khan boulevard and the southern one Lutfali Khan Street (the right map of the figure 5.31). These streets were partially laid on the existing ones, but their major part cut through the compact historic fabric and interrupted the main branches of the bazaar. The two new streets immediately became the axes of development to the west outside the old core. A ring road was also built on the fortification wall which determines the boundary of the historic core in the modern city. As it was happened in the other Iranian cities, the construction of new streets produced isolated blocks in the historic tissue which had physical and social problems. The city center was gradually abandoned by the middle classes in favor of the newer districts and fell into rapid social decline. The first modem
buildings, such as Municipality, Court of Justice and bank, were built in the open spaces of Zand meydan and military barracks (the right image of the figure 5.32).

![Figure 5.31. The traditional urban structure of Shiraz reconstructed by Tavassoli and Bonyadi (1992) – Plan of Shiraz after the superimposition of an orthogonal grid of streets](image)

The increase in the price of oil during the 1960s and 1970s accelerated the pace of industrialization and modernization, which led to the growth of the population and the migration of the rural population to cities to join the new labor force. The rapid expansion of urban areas changed the main characteristics of old Shiraz and decreased the significance of historic core.
In order to understand the impacts of modernization on the traditional urban structure of Shiraz, the Integration measure can be a useful method. The Integration models of Shiraz with Axial Map Analysis was already done by Karimi (1998). The Integration model of traditional Shiraz present the linear covered bazaar as the most integrated urban element of the city (Figure 5.33). The hierarchical structure of an Islamic city can be seen in the model as the main streets which linked the gateways to the city center are in warm colors and the secondary allays of neighborhood are mostly blue. This structure was completely changed after the construction of new streets and by transforming of city wall to a ring road. The street, which has been superimposed right on the historic Zandian axis, is recognized as the most integrated element of the modern Shiraz. Named as Karim Khan boulevard, it is the most attractive axis of the city in which important elements like Bagh-e Nazar (the palace), Ark-e Karim Khani (the castle), Karim Khan mosque and also the Zand meydan are aligned. The traditional covered bazaar was dissected by the street and is accessible from both sides of it.

Figure 5.33 The global Integration Rn models of Shiraz based on its traditional and the 1990s’ map (Karimi, 1998)
5.4.4  Evaluation of the renewal project of Karim Khan complex

In 1990, a comprehensive plan for the historic core of Shiraz was suggested to be prepared by the Ministry of Housing and Urban Development. The project was designed by Hadi Mirmiran, who also designed the renovation project of Atigh meydan in Isfahan. The aims of renovation of the historic core of Shiraz were explained as revitalizing the functional, historical, spatial and economic role of the old city center (Naghsh-e-Jahan-Pars, 1993). The renovation plan for Karim Khan complex and two neighborhoods (Moordestan and Astaneh) were designed (Figure 5.34). The focus of present study is on the Zand meydan as an important component of Karim Khan complex.

Figure 5.34 The comprehensive plan for the historical core of Shiraz and the details of renewal plan for Karim Khan complex Source: (Naghsh-e-Jahan-Pars 1993)

By the first glance, there are similarities between the projects of Karim Khan complex in Shiraz and Atigh meydan of Isfahan. In both of them, the site is closed to the car traffic by the underground pathways. The destructed buildings and the broken traditional axes are renovated in both of them. Bagh-e Nazar palace, which was dissected by a new street, is reconstructed. The space of meydan and the area in front of Vakil mosque are planned to be cleaned from the existing constructions except the building of bank-e Melli which is a first Pahlavi edifice and worth to preserve. In 1998, the underpasses as a part of the project was implemented, but it does not mean that the site was completely closed to the vehicles. In 2005, the
buildings inside the Zand meydan was removed and the space of meydan got bigger. In the present time, the part of the street between the castle and garden-palace has been paved to be used as pedestrian pathway. In the rest of street, the car traffic is running freely although by some time limitations.

In 2015, a competition was conducted by the Urban Development and Revitalization Company for redesigning of the same site and the urban fabric on the north side of Zand meydan. The Mirmiran’s plan along with new suggestions were among the documents of the competition which are available in the internet page of memarnews.com (Figure 5.35). It is interesting that the date of competition coincided with the completion of Imam Ali Square (Atigh Meydan) in Isfahan which has been a controversial urban design experience. It seems that the fear of confronting with the same results, particularly the financial failure, drew the city managers to explore new possibilities.

As it can be seen in the suggested plans, the scale of destruction of existing buildings was reduced and new alternatives for the car traffic were proposed. These indicates that Mirmiran’s plan which was a completely return to the 18th century has been questioned. The large financial resources particularly for expropriation of the lands and the problems arose by the limitation of vehicle traffic are the issues that intended to be reviewed.

Figure 5.35. The new suggestion which were among the documents of competition
The results of 2015’s competition has never announced by organizing committee perhaps because of the economic problems with which Iran has encountered by the political sanctions since 2016. The state of Karim Khan complex of Shiraz including Zand meydan has been remained intact since 2005 up to present time. To make an evaluation of Karim Khan complex, the analytical methods of Space Syntax are used. As there have been some changes in the spatial organization and traffic limitations of the site, the Axial map analysis, which was already done by Karimi in 1998, is repeated in the level of neighborhood, a square with the side length of 1 km. Mirmiran’s project is also analyzed to examine its impacts on the historic core of Shiraz, if it was implemented.
The local Integration measure with the radius of 3 (R3) is conducted for the maps in the figure 5.36. In the traditional Shiraz, the linear bazaar is recognized as the most integrated urban element as it was in the global Integration model of Karimi. The meydan is a secondary element in comparison with others. In 1998, Karim Khan Boulevard (3.68) had the highest level of integration. The space of meydan in that time was still occupied by the buildings. In spite of being divided, the covered bazaar (3.18) was still an integrated element in the map of 1998 (the top-right model in the figure 5.35). In the model of present time map, Karim Khan Boulevard (3.10) is no longer the most integrated element and the covered bazaar (3.25) forges ahead. It means that the interventions and the traffic limitations have affected the spatial configuration of the site. However, other modern streets still have the highest mean of Integration among urban elements. Zand meydan (2.7), which has been partially renewed, has an integration value higher than the mean integration values of the map (1.5) (the bottom-left model in the figure 5.35). In the model of Integration for the Mirmiran’s plan, the now pedestrian axis of Karim Khan is the dominant element of the complex that crosses through the reconstructed traditional buildings and Bagh-e Nazar palace. The car traffic limitation of the axis is provided by the barricades at its two ends which prohibit the extension of lines in the Axial Map. In spite of these limitations, the pedestrian axis of Karim Khan (3.00) obtains a high integration value in comparison with the mean of all values (1.48). Zand meydan (2.6) which is now in its original size and the reconnected covered bazaar (3.16) present the same value of integration as in the current map. This is important because the both elements will lose their connection with the powerful boulevard and it will totally affect their integration. The most integrated elements of the model are still the new streets, one parallel and the other perpendicular to Karim Khan axis. To summarize, the plan designed by Mirmiran has positive aspects as it will renovate the historical Zand axis which is also powerful in terms of integration and centrality in the modern Shiraz. However, there are more dominant circulation passages which can be the strong
opponents of the complex. Of course, it depends on the functional details of the project for which enough information is not accessible (Table 5.6).

Table 5.6 The numerical values of measures by Axial Map analysis for the main elements of Karim Khan complex of Shiraz

<table>
<thead>
<tr>
<th>Measures</th>
<th>Integration HH average</th>
<th>Integration HH R3</th>
<th>Zand Meydan integration R3</th>
<th>Karim Khan Street integration R3</th>
<th>Line length average</th>
<th>Mean depth average</th>
<th>Connectivity average</th>
</tr>
</thead>
<tbody>
<tr>
<td>Traditional map</td>
<td>1.67</td>
<td>0.92</td>
<td>2.80</td>
<td>-</td>
<td>111</td>
<td>7.23</td>
<td>3.92</td>
</tr>
<tr>
<td></td>
<td>Standard Deviation: 0.55</td>
<td>Standard Deviation: 0.18</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Current map</td>
<td>1.50</td>
<td>1.03</td>
<td>2.45</td>
<td>3.10</td>
<td>75</td>
<td>7.14</td>
<td>3.20</td>
</tr>
<tr>
<td></td>
<td>Standard Deviation: 0.66</td>
<td>Standard Deviation: 0.28</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Completion of Karim Khan Project</td>
<td>1.48</td>
<td>0.96</td>
<td>2.65</td>
<td>3</td>
<td>73</td>
<td>7.52</td>
<td>3.15</td>
</tr>
<tr>
<td></td>
<td>Standard Deviation: 0.66</td>
<td>Standard Deviation: 0.26</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The Visual Graph Analysis of the historic core of Shiraz is done to evaluate the visibility of Zand meydan in the traditional city, current time and in the Mirmiran’s designed project. As the scale of analysis, 500 meters, is relatively large for VGA the units of grid are determined as 3.5 meters.

Figure 5.37. The visual integration models by VGA for the Karim Khan complex of Shiraz
The visual integration models illustrate that Zand meydan had a high degree of visibility in comparison with other elements (Figure 5.37). By the construction of Karim Khan boulevard and the spatial reduction of meydan, the pattern of visibility has completely changed. Instead of the meydan that remains at the back side of the buildings, the boulevard obtains more integration values. If the plan designed by Mirmiran was implemented, the meydan would be again at the center of views. However, it would have a rival that is Bagh-e Nazar garden through which the pedestrian axis will pass.

![Traditional][2019][According to the project designed by Mirmiran]

Figure 5.38. The models of visual Clustering Coefficient by VGA for the Karim Khan complex of Shiraz

The models of Visual Clustering Correlation measure illustrate the spaces with high potential for social activities (Figure 5.38). The numerical values of two measures can be found on the table 5.6 to make a better comparison between the two states of meydan.

Table 5.7 The numerical values of measures by VGA for Zand Meydan of Shiraz before and after the renovation

<table>
<thead>
<tr>
<th>Measures</th>
<th>Visual integration average</th>
<th>Visual clustering coefficient average</th>
<th>Connectivity</th>
<th>Visual mean depth</th>
<th>Zand Meydan visual integration</th>
<th>Renovated meydan visual integration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Traditional map</td>
<td>6.32</td>
<td>0.85</td>
<td>1702</td>
<td>2.93</td>
<td>8.40</td>
<td>-</td>
</tr>
<tr>
<td>Current map</td>
<td>7.23</td>
<td>0.79</td>
<td>910</td>
<td>2.53</td>
<td>8.14</td>
<td>-</td>
</tr>
<tr>
<td>Completion of Karim Khan Project</td>
<td>6.54</td>
<td>0.76</td>
<td>1319</td>
<td>2.86</td>
<td>-</td>
<td>8.80</td>
</tr>
</tbody>
</table>
However, having a high value of Clustering Coefficient is not sufficient to be a successful public. The centrality is also important an important factor for a place to be seen and used by people. Therefore, the correlation between the two measures of Visual Integration and Visual Clustering Coefficient will be illustrative to identify spaces which are both visible and appropriate for social activities. To do this, the scatter plot diagram will be used to analyze the correlation between the two measures. After selecting the visual graph units with high values of the both measure, their related area can be determined on the maps.

![Diagram](image)

**Figure 5.39.** The correlation between visual integration and visual clustering correlation measures

The red color on the scatter plot diagram and the maps presents the areas with high values of clustering coefficient and visual integration (Figure 5.39). In the traditional map, a large part of Zand meydan and Bagh-e Nazar palace are visually central with high potential to be a place of activities. At the present time map a small part of meydan, which has been released from buildings, is marked with red color, however, Karim Khan boulevard is the area with highest values of the visual integration and clustering coefficient. The Mirmiran’s plan apparently affected the Zand meydan on which the area in red color is increased considerably.
5.5 Sabze Meydan of Kermanshah

Kermanshah, located on the northwest of Iran, has been on the historic Silk Road between Hamedan and Baghdad and therefore was an important trading center. It is a middle-size border city which was once adjacent to the Ottoman empire and at the present time near the boundary of Iraq. Being at a high altitude, Kermanshah stands on a fertile plain with a cold and mild climate. The site and location of the city has been admired by many travelers, because of its natural beauty and fine environment (Lockhart 1960, 101). Kermanshah is very similar to Urmia in terms of the size, juxtaposition to border and demographic aspects as both city have had a multi-ethnic society with a considerable Sunni population. The both cities have never been neither an industrial nor a political center of Iran. Of course, Kermanshah was more strategic than Urmia as it was located on the trade road which was important from economic and military points of views. The city was surrounded by a fortification wall in the 16th and 17th centuries, but in the late 19th century it was not a walled city any more.

5.5.1 The Traditional Sabze Meydan of Kermanshah

The most important urban element of traditional Kermanshah was the linear bazaar which extended from the north to the south generated the commercial axis. Other urban elements such as caravanserais, the public meydan (called Sabze meydan) and the governmental complex including the palace and a military barrack were interconnected by the bazaar. The situation of Sabze meydan is determined by red color on the figure 5.40.
Figure 5.40. The walled city of Kermanshah in the 18th century (Mahyar, et al. 1999) and the map of city century without fortification wall in the late 19th century (Karimi, 1998)

The map prepared by Cherikof colonel in 1850s provides details of Kermanshah as the fortification wall, gateways, public buildings and neighborhoods. The large number of caravansaries is the sign of high rate of merchants and traders who visited the city. Jackson (1906), an American scholar, who visited Kermanshah in 1903 gives a general picture of the city:

“There are a number of public squares and buildings… Among them may be mentioned the Governor's Palace, whose high towers overlook the meydan (Sabze meydan). In the midst of this square is a reservoir, and around the plaza are shops adjoining the bazaar. The arsenal itself is behind the palace, and to the south is another square called Meydān-I Sarbaz Khānih, or “Barrack Square” (Figure 5.41), because the soldiers’ quarters are built around it and it serves as a parade-ground” (cited in Pakseresht, 2018).
5.5.2 The destruction of Sabze meydan by urban modernization

The urban modernization of Kermanshah began in the 1930’s with the building of a long and wide street (Clarke and Clark, 1969, 22). The street, called Modarres todays, crossed the old structure from the north to south-west split the covered bazaar and destroyed part of Sabze meydan. It passed through the heart of the historic core and destroyed the hierarchical structure of neighborhoods. The new street was built regardless of the precedent form, socio-economic structure of the central part of the city (Clarke and Clark 1969). The traditional Sabze meydan happened to be the edge of new street and in the coming years have been built as its façade. Gradually, two other streets were built parallel to the first one and other modern streets linked to create a grid form. This new street network has become the main structure of the new city without any attention to the topography of the region and because of that the accessibility problem was emerged in some part of the city (Kermanshah master plan, 1973). In this regard, an article was issued in February 28, 1942 in the National Newsletter of Kermanshah with the title of: “The municipality does not think about the city”. It addressed how the first modern street of Kermanshah was constructed regardless of topography which caused various problems in terms of the different levels between the homes and the street (Bagherpour, 1942).
The evolution process of Kermanshah and the modern streets added to the traditional structure through time (Pakseresht, 2018)

The evolution process of Kermanshah is depicted in the diagram above (Figure 5.42). As it can be seen, after the construction of first north-south modern street in 1930s, two more boulevards were added parallel to it until 1970. The urban development of Iranian cities accelerated by a dramatic rise in the population of urban environment in the 1970s. It caused three key transformation programs: development of new residential neighborhood, infrastructural and industrial changes, and the programs for urban regeneration (Ehlers, 1991). The extension of new streets outside the old core determined the direction of city development. The regular pattern of these areas has generated a contrast between the old and new urban forms- as well as the old and new social and economic patterns of inhabitancy.
In the figure 5.43, the traditional commercial and administrative axes of Kermanshah are depicted. The meydan was configured at the intersection of two important axes of the city that is completely in congruence with the spatial pattern of the traditional Iranian meydans. The governmental buildings on the west, the Jame mosque on the north and the covered bazaar were gathered by the Sabze meydan at the center of Kermanshah. This made a prominent urban element and an active public space. The edges of meydan was articulated by a one-story building consisted of shop stores in the late 18th century.

To understand the urban transformation of Kermanshah through modernization process, the Integration measure of Space Syntax can be a useful method. The Axial map analysis of the city was done by Karimi (1998) and its global integration models will be used in the present study (Figure 5.44). He superimposed the layer of public buildings on the integration model to determine the position of urban elements on the urban structure. As it is obvious in the models below, the linear bazaar is recognized as the most integrated element of traditional Kermanshah by obtaining the higher values at the city center. By modernization of the city, the new street network, which is depicted in warm colors, has changed the integration pattern and become the most integrated elements of present city.
5.5.3 Planning of the New Meydan on the Sabze Meydan Street

After construction of new streets, the covered bazaar was no longer the significant commercial center of the city. The inaccessibility for car traffic make its decay faster in the modern city. Worried about their customers, many retailers decided to leave the traditional bazaar and move to the edges of the modern street to be closer to the resources and to join in the new lifestyle and modern culture (Madanipour, 1998).

The open space of traditional Sabze meydan at the edge of Modarres street was filled with a commercial building. The traditional street next to the meydan, which was once a part of the commercial axis, has been widened and named Sabze meydan street. In the 1990s, a relatively wide space on the street has been generated by two U-shaped buildings on the opposite sides (Figure 5.45). The buildings consist of shopping stores in the ground floor and offices in the upper flats. Nowadays, the widened space of Sabze meydan street is considered as a memory of the vanished meydan. Sometimes, it is mistakenly taken to account as the traditional Sabze meydan itself. However, there is no functional and morphological similarities between the new and original meydan.
The transformation of traditional Sabze meydan in the center of Kermanshah through time

Regarding the aerial photo of the present time, the new meydan is used as the parking lot of the nearby shopping center. However, a plan was approved in 2006 by the municipality to make Modarres street a pedestrian pathway. According to the plan, the end of Sabze meydan street will be closed to car traffic and be used as a greenery public space. Closeness to the traditional bazaar and the presence of City Council was supposed to strengthen its potential to be a socio-economic center (Figure 5.46).
Evaluating of this new urban element (will be mentioned as new meydan) and making a comparison with the traditional Sabze meydan in the historic core of Kermanshah can be useful in terms of identifying the spatial potentials of each space. To have a better look on the city center, the Integration models are zoomed to the scale of 500 meters. As Karimi (1998) used the map of 1996, there are some differences between the models and the current map of the city (Figure 5.47). For instance, the U-shaped buildings and the aforementioned wide space of new meydan was not existed on this models below.

Figure 5.47. The global integration model of the historic core of Kermanshah in the scale of 500 meters (Karimi, 1998)

As it can be seen on the models, the traditional Sabze meydan, which was configured in between of most central elements of Kermanshah, has a high level of Integration after the covered bazaar. By the urban modernization, the traditional urban logic was damaged. The traditional urban elements including the present Sabze Meydan Street have lost their position and integration. The modern streets are recognized as the most integrated element of the present Kermanshah. In order to better understand the spatial qualities of two meydans, Visual Graph Analysis of Space Syntax will be done.
The models of visual integration measure illustrate that the parts of covered bazaar in the traditional map which are presented by warm colors were the most visually accessible areas of Kermanshah (Figure 5.48). The space of Sabze meydan was on the second stage with a relatively high integration value. In the current model, Modarres street, which is in red and orange color, has the highest visual integration value. The new meydan with green and blue colors present a lower but acceptable integration value. In fact, both meydans are in the same colors as the range of their visual integration values are very close to each other. Thanks to the high integration of Modarres street, the new meydan obtains a satisfactory visibility and accessibility. However, this is not enough to be a successful public space. In order to evaluate the potentials of meydans to act as the place of activities, the visual Clustering Coefficient measure is a useful method.
The models of visual clustering coefficient measure illustrate that in the traditional map the open spaces and the courtyards of public buildings with high values were the spaces appropriate for resting and social activities (Figure 5.49). Particularly, Sabze meydan with the largest area in red color presents a high potential to be an open public space. In the current map, this potential is attributed mostly to the new streets. Only a small part of the new meydan is recognized with a high value of clustering coefficient. This is what Sitte explained as “the degree of enclosure” which is an inseparable quality of public open spaces. The new meydan at the center of Kermanshah, with the wide street crossed through it, lacks the quality of being enclosure. The numerical values of both measures can be seen on the table 5.8 to make a better comparison.

Table 5.8 The numeric values of measures by VGA for the traditional and new form of Sabze Meydan in Kermanshah

<table>
<thead>
<tr>
<th>Measures maps</th>
<th>Visual integration average</th>
<th>Visual clustering coefficient average</th>
<th>Connectivity</th>
<th>Visual mean depth</th>
<th>Sabze Meydan clustering coefficient</th>
<th>New Meydan clustering coefficient</th>
</tr>
</thead>
<tbody>
<tr>
<td>Traditional map</td>
<td>2.33</td>
<td>0.86</td>
<td>221</td>
<td>5.41</td>
<td>0.92</td>
<td>-</td>
</tr>
<tr>
<td>Current map</td>
<td>3.85</td>
<td>0.81</td>
<td>605</td>
<td>3.98</td>
<td>-</td>
<td>0.80</td>
</tr>
</tbody>
</table>
In order to be a successful public space, an area should be both visually central, accessible and at the same time visually stable that can be considered as the enclosure quality of a space. This means that the high values of both visual Integration and Clustering Coefficient measures are necessary at the same time. To identify these areas, the correlation between the two measures will be analyzed using the scatter plot diagram which is prepared by Depthmap program itself.

![Blank](image)

**Figure 5.50. The correlation between visual Integration and Clustering Coefficient measures by the scatter plot diagram**

The selected dots on the diagram, which are framed inside a black rectangle, had the maximum values of Integration and Clustering Coefficient (Figure 5.50). The equivalent areas of the selected dots can be seen on the maps with red color. These are the intended spaces with high visibility and having the potential for social activities. In the traditional Kermanshah, the covered bazaar and part of Sabze meydan are recognized as the spaces which fulfil the quality to become a public
place. In the current map, Modarres street is recognized as the urban element with a high Integration and Clustering Coefficient values. Although it has a high value of visual integration, the space of new meydan lacks the quality of being a room-like urban space.

5.6 Tirandaz Meydan of Semnan

Semnan is the capital city of Semnan province, and is a typical model of traditional Iranian cities in the warm and dry climate. The city is situated on the foothills of the Elburze, the northern mountains of Iran, to the border of central desert. The city was established on the historic Silk Road as a trade town since there is no other main occupation for the people who live in this location. The summers in Semnan are so long and hot, and the winters are dry and cold that is typical for a desert city; springs and falls seasons are too short with a relatively good weather. The form of old Semnan was close to a rectangle to which a citadel (Ark) was attached on the northwestern part (Figure 5.51).

![Figure 5.51. The traditional urban structure of Semnan and its important elements (Tavassoli, 1992)](image)

The functional center of traditional Semnan was not located at the physical center of city. As it can be seen on the maps, Semnan has never developed toward west and south as there has been agricultural lands. The directions of development for the city has been the east and particularly in the contemporary time toward the north which
has a better weather condition because of the mountains. At the present time, the historic core is completely out of the physical center that is rarely seen as extreme as Semnan in other Iranian cities. The city has been developed in one direction and thus, the old settlement remains as a peripheral area instead of having a central position. This has negatively affected the traditional urban spaces along with the other physical and social problems which are common in the other historic cities of Iran.

5.6.1 The Traditional Urban Complex of City Center

The traditional urban structure of the Semnan was based on two cruciate streets, one in east-west and the other in north-south directions, which intersected at the center generating the most important public realms of the city. The north-west axis was the linear covered bazaar started from a gateway near the castle, passed through the city center and ended at another gateway on the west side (Figure 5.52).
The center of traditional Semnan was an urban complex including the important commercial, social and religious elements (Figure 5.52). The meydan as the complementary open space next to the linear covered bazaar was a significant component of the complex. An interwoven spatial organization is generated by the courtyards of Yahya shrine, Jame and Soltani mosques interrelated through the alleys of neighborhood and the passages of covered bazaar. At the intersection of streets, a covered space named Tekye-i Pahne was produced that is used as Hosseiniyeh. The drawing above presents the state of complex after construction of the new street which dissected the meydan from the other public elements.

5.6.2 The Transformation of Traditional Meydan by the Urban Modernization

The modernization of Semnan is very similar to the other plans implemented in Iranian cities from the early 20th century. Initially two perpendicular streets crossed at the center of old city; then two pairs of streets were built parallel to them. The
result was a simple grid without the slightest regard to the form of the old city. The first modern street destroyed part of traditional bazaar and cut up its connection with the public buildings. The organizational role of bazaar was damaged at the city center. The public meydan of Semnan has also remained on the north side of new street and lost its connection with the religious buildings. The modern city of Semnan is a fast-growing city which is deserting the old area. The historic core has not in a good physical condition at the present time. The weak integration of modern neighborhood with the historic core that is the result of inappropriate planning, is realized as the main reason for the decline of the old urban fabric of Semnan. (Karimi, 1998) In 1967, the first master plan was prepared by the ministry for the city of Semnan. The plan presented new suggestions for the historic core to be reconstructed. Paying no attention to the urban morphology of Semnan, the master plan was unsuccessful to solve the problems, and instead some of the suggestions make the condition worse.

In order to understand the impacts of modernization on the traditional urban structure of Semnan, Karimi conducted the Axial Map analysis (Figure 5.54). The models of global integration measure illustrate that in the traditional Semnan, the covered bazaar particularly at the center of city is the most integrated element. The
hierarchical structure of the city from the main streets to the cul-de-sac alleys is apparent regarding the spectrum of colors from red to blue. By overlaying of the modern street network, the hierarchical structure and the centrality of main traditional elements have been completely lost. The new streets have become the most integrated elements which pay no attention to the urban logic of traditional Semnan.

Figure 5.55. The states of meydan in the traditional and current maps of Semnan

5.6.3 Tirandaz Meydan; A Traditional Meydan in The Modernized City

The focus of present study in on the public meydan of traditional Semnan and its transformation through the urban modernization. Although new street dissected the meydan from the central traditional complex, it has continued to exist with a new function and a morphological character (Figure 5.55). In 1972, the traditional meydan was reconstructed and expanded by a U-shaped building. Its edges were articulated by arcades and greenery areas with a water pool were built at the middle. About 60 shops have been built around the meydan and it has been opened to car traffic. From then on, the meydan was called Tirandaz which was the name of person who supported this urban project (Figure 5.56).
To understand how the spatial qualities of meydan has been changed from traditional city to the present time, Space Syntax analysis will be used. The city center of Semnan will be analyzed in the scale of 500 meters. In the first step, it is helpful to have a close look at the global Integration models prepared by Karimi (1998). As it can be seen on models of figure 5.57, the meydan in the traditional map includes elements with higher integration value (in orange color) in comparison with the 1996’s model (green color). The interconnections between the meydan, covered bazaar and the religious complex caused a high integration value and centrality for the meydan. Losing the spatial connections with important urban elements has made the meydan a relatively segregated space. Construction of new shop stores around the meydan with a traditionalist architecture has perhaps conserved its presence, but it caused the meydan lost its connection with the covered bazaar. Ignoring the strong interrelationship between the two urban elements has made the meydan an independence urban element which can never be seen in the traditional architecture. The entrances of public meydan are from the streets at the south and north of it. These may explain the present condition of meydan that is occupied by cars as the parking lot of the street. According to an interview, most of the deep-rooted shopkeepers have left the meydan as it has not preferred by people to visit. The reconstructed historic meydan after about 45 years has become a deprived urban space that its physical and social condition is not satisfactory.
Figure 5.57. The models of global integration of Semnan’s city center in traditional and 1996’s maps

The Visual Graph Analysis can be an appropriate method to evaluate the visibility and spatial qualities of meydan in its two different states. The models of visual integration measure illustrate that part of meydan and the covered bazaar were the most central areas of traditional Semnan (Figure 5.58). The new street and particularly its intersection with others are recognized as the most visually integrated realms of present map.
The models of Visual Clustering Coefficient measure determine the areas with high potential to act as places of social interactions. In the traditional Semnan, the meydan and courtyards of public buildings are the spaces with high value of clustering coefficient (Figure 5.59). This indicates that they are room-like open spaces with the potential to be used as resting places. The present time model depicts the modern streets, part of meydan and the courtyards of traditional public buildings as the spaces appropriate for public activities. To identify the areas with a real potential for public activities, it is necessary to determine spaces which possess the high values of both measures. Therefore, the correlation between visual integration and visual clustering coefficient will be analyzed by the scatter plot diagram.

In order to make a better comparison, the statistical data of two measures can be found on the table 5.9.

Table 5.9 The numeric values of measures by VGA for the Tirandaz Meydan of Semnan

<table>
<thead>
<tr>
<th>Measures maps</th>
<th>Visual integration average</th>
<th>Visual clustering coefficient average</th>
<th>Connectivity</th>
<th>Visual mean depth</th>
<th>Tirandaz Meydan visual integration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Traditional map</td>
<td>2.60</td>
<td>0.83</td>
<td>245</td>
<td>5.24</td>
<td>3.55</td>
</tr>
<tr>
<td>Current map</td>
<td>4.27</td>
<td>0.82</td>
<td>775</td>
<td>3.91</td>
<td>4.40</td>
</tr>
</tbody>
</table>
As it can be seen in the figure 5.60, the points with high values of visual integration and clustering coefficient are selected on the scatter plot diagram and framed inside a black box. The equivalent area of dots is depicted by red color on the maps. In the traditional map, the meydan is recognized as an urban element which was both more visible than others and had a higher potential to be a public space. The courtyards of religious buildings were not selected as they cannot fulfill the all requirements of being a successful public space. This is also valid for the meydan in the present time map. In spite of its high value of clustering coefficient, the current meydan is not recognized as a public space.

Figure 5.60. The correlation between Visual Integration and Clustering Coefficient measures by the scatter plot diagram

The results of analysis indicate how important is the spatial relationship between urban elements with different characteristics. The spatial sequence of urban spaces which was established in the Iranian traditional cities provided spaces with different
qualities. The traditional city center of Semnan was a network of interwoven open and covered public spaces which reinforced and supported each other. This is what considered as the “art of relationship” which has been lost in the modern city by breaking the spatial connections.

5.7 A Modern Square on the Historic Urban Context of Hamadan

Hamadan or Ecbatana, as its ancient name, is the center of Hamadan Province located at the west of Iran on the northern slopes of Mount Alwand. Being located at a very high altitude, the climate of the city is cold in winter and moderate in summer. The city is believed to be among the oldest Iranian cities as the capital of the Medes and then a summer capital of the Achaemenids. It is thought that the city was built by Diaku, the founder and the first king of Median government in the 7th century BC. Hamadan was an important city on the historic Silk road connecting Mesopotamia with the East (Bosworth, 2007). The abundance of water and fertility of the land are also among the other advantages of the city. After the entrance of Islam in the 7th century, Hamadan like other Iranian cities had an eventful history. It was completely destroyed for several times such as in the Timurid invasion. It is known that the city had an extensive fortification wall as Matrakçı Nasuh, a statesman of the Ottoman Empire, depicted it in the 16th century. However, in the 1851’s map there are just some remains of the wall and in the 1919’s map there is no evidence of it as the city perhaps lost its military and strategic importance (Figure 5.61).
Figure 5.61. The miniature painting of Hamadan by Matrakçı Nasuh and the 1851’s map produced by Russian army (Ebrahim Zarei, 2011).

Figure 5.62. The 1919’s map of Hamadan produced by the Mesopotamian Expeditionary Force, the map of Royal Geographical Society (Karimi, 1998) – The current state of the city and its extent
5.7.1 The Plan of Karl Frisch and Its Comparison with the Haussmannian Paris

As it can be seen on the maps of figure 5.62, there were two rivers that one of them crossed from the middle of Hamadan. The archeological site, which has been thought to be the historic city of Ecbatana, is located at the left side of the river. The caravanserais and public facilities started from the gateway on the north toward the city center in which the Jame mosque was built. The public buildings continued in the southwest of the city and therefore, the commercial axis of traditional Hamadan can be determined. The urban modernization of Hamadan was one of the most severe transformation imposed on a traditional city in Iran. Designed by Karl Frisch, a German engineer invited to Iran in the 1930s, the master plan can be defined as so simple and extremely brutal: a large circular roundabout with the diameter of 150 was built right at the historic center of the city next to the traditional covered bazaar, and then other six streets with the same width of 30 meters were constructed radially from the central square toward the old urban fabric (Mojhda-Consultants 1984, 78). The geometrical plan that is a product of engineering had no consideration in respect to the traditional structure of Hamadan. The further developments of the city have also been in conformity with the radial organization (Figure 5.63). Therefore, the historic core has still been at the physical center of modern Hamadan. In 2017, the central square (with the diameter of 150 meters) that provides a large open space and the two streets from the six ones have been closed to car traffic to be used as pedestrian pathways. Being the new public node of Hamadan, they are depicted in red color on the present time map in the figure 5.63.
To understand the devastating impacts of Frisch’s plan on the spatial structure of Hamadan, the Axial Map analysis can be an appropriate method. The models of global Integration measures prepared by Karimi (1998) illustrate that the center of traditional Hamadan including the bazaar, Jame mosque and public buildings was the most integrated area (Figure 5.64). The hierarchical organization of the city from public to private realms is also apparent in the traditional model. By the construction of new plan, the radial streets absorbed the integration values of the city producing segregated blocks of historic tissue. It can be seen that the ring roads have less integration value that the radial streets.
While often a grid plan was used to make the historic core accessible, this time a radial organization was implemented for an Iranian city in the early 20th century. It seems that along with providing easy transportation for vehicles, there was also an intention to monumentalize the main square of city where the statue of Reza Shah was installed. This modern pattern was gradually completed by the new ring roads; the first one inside the old core, again by cutting through the old fabric; and the second one outside the modern city. Apart from these concentric rings there are no major connections between the radial streets. Therefore, the blocks of historic tissue have been trapped between the network of new streets without any chance to interact with each other. Similar to other Iranian cities, modernized in the first Pahlavi, the new public buildings were built around the new square. In the central square of Hamadan, six buildings were constructed in harmony with the Baroque architectural style. The statue of Reza Shah at the center of square could be seen from the all six streets. The mausoleum of Avicenna (Abu Ali Sina), the father of early modern medicine lived in the 11th century, was also designed and built in a square located in the south (Figure 5.65).

The radical urban modernization of Hamadan was criticized even by the compatriot of Frisch. The German archaeologist, Ernest Herzfeld, who had supported the
modernization movement of Iran and even had a personal collaboration with the government, described: “It is a system of ruining established authorities of old, without replacing them with anything at all. Everything we see [is] a methodical destruction... The result is a vacuum. One day the consequences will appear” (Grigor, 2016).

Figure 5.65. The central modern square of Hamadan with the statue of Reza Shah and the mausoleum of Avicenna located in the southern square

The radial plan, architectural style of the buildings and the monumental elements which were constructed at the end of wide streets recall the urban spaces of Paris in the late 19th century. The historic structure of Paris was completely changed by the urban projects conducted between 1853 to 1870 by Baron Haussmann under the reign of Napoleon III. It is known as an extreme case of state-led modernization and top-down planning (Barthelemy et.al. 2013) as the modernization process of Iranian city was in the early 20th century. The wide and monumental boulevards of Paris with lines of trees and uniform facades of the buildings created impressive perspectives that its charm has continued even at the present time. Great squares with radiating avenues generated majestic vistas that terminated by large public edifices. Haussmann implemented the project which was based on a total modernization of the central area through the clearance of congested ‘unhealthy slums’ and the provision of numerous parks and recreation areas.

Paris started to be noticed in Iran by the Qajar kings particularly Naser al-Din Shah (1831-1896) who traveled three times to the Europe. The travelogue of the king was full of admiring the beauty and splendor of the city. (Kiani, 1986) Reza Shah had a
close relationship with Europe particularly Germany from which several engineers, architects, archaeologists and missioners came Iran. There is no evidence to show that Karl Frisch, the German planner of Hamadan, inspired from the Haussmannian Paris. The financial support, comprehensive approach and the extent of operations done for rebuilding of the French capital was also incomparable with any other Iranian city. However, there are undeniable similarities between the plans, methods of intervention and aims of the leaders (Figure 5.66).

Figure 5.66. The radial plan of modern streets implemented in Paris by Haussmann in 19th century and Hamadan by Frisch in the early 20th century

The large-scale urban reconstruction of Paris conveyed a political importance for Louis-Napoleon, who became the Second Empire after the coup d’état of 1851. His intention to make a centralized structure of power was embodied in the extensive control over Paris. The opening of wide and straight axes intercepting at right angles, where barracks were to be located, would facilitate the flow of military force and impede the construction of barricades in Paris, thus maintaining the public order (Cavalcanti, 1997). This is also can be seen in the urban modernization of most of Iranian cities where the main street connected new military base to the traditional city center. The Napoleon III’s ambitious plan to build the most beautiful city in the world became a pattern for many European cities, although with different degrees and extent.
In spite of the similarities between the urban transformation of Paris and Iranian cities, there are important differences. The full-scale transformation of Paris brought about the modernization of the sanitary infrastructure, such as gas, lighting and transport services, and the expansion of the collector sewers. (Cavalcanti, 1997) The reorganization of block system in Paris and regeneration of urban fabric alongside of construction new streets showed a high level of authority, competence and financial support assigned by the king for the capital. The reconstruction of Paris reinforced social segregation in the city, because it became increasingly bourgeois. The demolition of lower-class houses in the city led to an increase in rents and the workers were forced to move to the suburbs as they could not afford the expensive housing costs in the center of city. (Cavalcanti, 1997) Conversely, in the Iranian cities, the social segregation was happened completely in the opposite direction. Through building the new streets, the parcels at their edges were constructed. However, there was no plan for the traditional tissue on the backside of modern streets. The historic neighborhoods of Iranian cities became physically segregated and this culminated to their abandoned and decay. Unlike Paris, the high-income classes in Iran has moved to the new neighborhoods on the periphery of the cities.

5.7.2 Evaluation of the Pedestrianization Project of Modern Central Square as the New Public Space

Today, a few people talked about the brutal interventions done on the urban structure of Paris. Haussmannian elements are now themselves the history of Paris and create one of the most beautiful cities of the world. With the same story, the central square of Hamadan is now recognized as a historic urban space with a classic architecture. (Haggi, 2015) Prepared in 1988, the first master plan of Hamadan after the Islamic revolution suggested to close the central square and parts of the streets around to the car traffic to make appropriate spaces for public activities. The reduction of vehicle usage and environmental pollution, encouraging of people to use bicycle and having
a pedestrian oriented design have been the aims of project. After about 30 years, the plan was conducted by the municipality of Hamadan (Figure 5.67).

![Diagram of Hamadan city center]

1. Friday mosque, 2. Bazaar, 3. Carvanarayes, 4. Residential quarters,

Figure 5.67. The traditional and present time state of Hamadan city center

In 2017, the central square of Hamadan and the two streets on the north that reaches the archeological site of Ecbatana and the south which ends to the mausoleum of Avicenna were paved to be used as pedestrian pathways. The geometric plan, which was once implemented to facilitate the car traffic in the organic fabric of the city, is now closed to vehicles (Figure 5.68). It has become a typical task in the modern cities to convert the transportation streets to pedestrian pathways to have more sustainable cities. However, it may have some disadvantages including: rerouting of vehicle traffic to other streets, potential reduction in retail activity, an increase in noise and air pollution on nearby streets, disruption of bus routes and delivery of goods, potential parking problems for visitors and employees and a potential high cost of installation and maintenance (TENC, 1998). The central square used to be the traffic circulation node of Hamadan. By closing it, the movement among the radiating streets are possible either through the ring road, which is in a 700-meter distance from the center, or the trapped traditional tissue between them. The narrow alleys of traditional city have been subjected to the load of heavy car traffic and therefore, have been planned to be widened.
To evaluate the general traffic pattern of Hamadan, a transdisciplinary research needs to be done that is not possible in the present study. However, the impacts of closing modern streets to car traffic on the nearby traditional alleys can be examined by the Axial Map analysis. To do it two maps are prepared: the first one is the state of city center before the pedestrianization project of 2017 and the other is the present time state after traffic limitations. The scale of analysis is in a square with 3 Kilometer length of side which encompasses the traditional city of Hamadan. The models of global Integration HH measure present considerable changes in the integration pattern of Hamadan before and after the project of 2017. While the radiating streets were the most integrated elements of Hamadan in the 2016’s map, the ring road has become the most integrated street of the present time (Figure 5.69).

Table 5.10 The numeric values of measures by Axial Map and Segment Map analyses for the Imam Square project of Hamadan

<table>
<thead>
<tr>
<th>Measures maps</th>
<th>Integration HH R3 average</th>
<th>Integration HH average</th>
<th>Line length average</th>
<th>Mean depth average</th>
<th>Connectivity average</th>
<th>T1024 Choice R500 Average</th>
<th>T1024 Choice average</th>
<th>Old fabric before the project Choice R500</th>
<th>Old fabric after the project Choice R500</th>
</tr>
</thead>
<tbody>
<tr>
<td>2016</td>
<td>2.01</td>
<td>1.55</td>
<td>322</td>
<td>5.62</td>
<td>4.27</td>
<td>964</td>
<td>114781</td>
<td>1417</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>Standard deviation: 0.34</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2019</td>
<td>1.91</td>
<td>1.13</td>
<td>230</td>
<td>7.18</td>
<td>4.21</td>
<td>950</td>
<td>120343</td>
<td>-</td>
<td>1479</td>
</tr>
<tr>
<td></td>
<td>Standard deviation: 0.18</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
As it can be seen on the table 5.10, the mean values of integration in 2016’s model is 1.55 and in the 2019’s model is 1.13. This means that by removing the central intersection point and the two streets, the overall integration value of the city is reduced. However, the other important factor that should be taken to account is standard deviation that is 0.34 for the 2016’s model and 0.18 for the 2019’s model. A low standard deviation indicates that the values tend to be close to the mean of the set, while a high standard deviation indicates that the values are spread out over a wider range (Bland & Altman, 1996). Although the total integration value after pedestrianization of streets has decreased, but the overall structure of Hamadan has become more integrated and united. There are also noticeable changes in the integration values of traditional alleys located between the modern streets. By selecting the axes in the traditional tissue, their average of integration value can be compared with the total average of model. The average of traditional elements in both maps are higher than the mean values of total model (1.73 in the model of 2016 and 1.24 in 2019’s model) and show no meaningful change.

The other measure which makes sense in this analysis is the Choice measure. It examines “how likely an axial line or a street segment is to be passed through on all shortest routes from all spaces to all other spaces in the entire system” (Hillier et al.)
Spaces that record high global choice are located on the shortest paths from all origins to all destinations. This presents a powerful measure to predict the pedestrian and vehicular movement potentials. The models of Choice measures are prepared by the Segment Map analysis for the two maps (Figure 5.70). The model of 2016 illustrates that the radiating streets in red color were the axes with high level of choice and therefore, had a heavy car traffic. The other elements of map which are showed in blue color have considerably lower values. In the model of 2019, two radiating streets are still the more preferred axes with the highest value of choice. However, the warm colors started to be seen in other elements such as the ring road and traditional allays. This is demonstrated by the numerical values as well. While in the model of 2016 the average of Choice values in the traditional elements is 1417, in the 2019’s model the average has increased to 1479. The results indicate that the traditional streets are selected in the present time more than in 2016. The limitations have drawn the everyday traffic of city to the traditional tissue of neighborhoods.

Figure 5.70. The models of Choice measure implemented for the 2016 and 2019 maps of Hamadan

The traditional urban structure of Hamadan dramatically lost its integration and spatial logic by the modernist planning in the 1920s. The morphological characteristics of the city has changed to the extent that its historic tissue can be sacrificed for the sake of a contemporary public space. The Space Syntax analyses
demonstrated that the new project has made no contribution to the traditional urban elements of Hamadan, but it has made the modern city more integrated. Ironically, the modernist urban elements which are frequently criticized by the Islamic Republic are represented as the most important public node of the city.

5.8 The Significance of this Chapter

The fifth chapter includes several cases from traditional Iranian cities which are analyzed by the use of the same methodology applied in the case Urmia in the previous chapter. The analytical methods of Space Syntax have been used to evaluate the urban design projects in the historic Western cities like London, but they have been rarely applied in the context of Iranian cities. Space Syntax is a method generated in the Great Britain and is founded on the concepts developed to study the cities of Europe. It has been applied throughout the world as in the Islamic cities with an urban model very similar to the traditional Iranian cities. However, it should be emphasized that the radical transformation has totally changed the pattern of urban spaces in Iran. Using the same method already tested in the cities that maintain their old structure can be questionable. The present study confirms that the computational analyses are applicable in the changing historic context of Iran to evaluate how new interventions may affect the urban structure. The experience of Imam Square demonstrates that the implementation of new projects which are supposed to solve the problems of old centers can themselves become problematic issue if the morphological transformation of the city was not considered.

It was realized that there have been multiple urban projects of *meydan* in the historic cores of various Iranian cities. In order to generalize the methodology of the thesis, these projects are appropriate cases to provide the necessary consistency and reliability. The analyses provide meaningful results when a comparison is made between the traditional and present time states of the *meydans* in the renovation projects studied. It is revealed that the specific structure of the traditional cities supported the existence of *meydan* as an in-between space that organized and linked
the main urban elements. As the traditional urban structures have been damaged to the extent that the urban spaces have lost their morphological characteristics, the renovation or restitution of a historic meydan makes no contribution and perhaps causes new problems as in the case of Atigh Meydan in Isfahan. The significance of analytical methods of Space Syntax is shown in this point as the present state of Atigh Meydan could be predicted before the implementation of the renovation project. The same analyses in the case of Sahibabad Meydan in Tabriz that is not completed yet illustrate that the renovation of the traditional meydan will not satisfy the expectations if the modern circulation pattern is not changed. The Visual Graph analysis demonstrates that the meydan will be a segregated urban element, if the project is not fully reconstructed to close the modern street of Daraie. The methods of analysis of Space Syntax help us to evaluate the future impact of an urban project by making comparisons between its different spatial organizations. Therefore, the methodology developed in the present thesis may serve the urban designers to have an objective approach and to revise their decisions accordingly.
CHAPTER 6

CONCLUSION

In Iran, the traditionalist movement in architecture was initiated in the late 1960s by a group of designers who are known as the second generation of Iranian architects. Contrary to the first generation who followed the modernist principles, this second generation regarded the historical architectural heritage as a source of inspiration. Presenting the first wave of the postmodern approach, significant buildings were designed in this understanding, inspired from the historic Iranian architecture. After the Islamic Revolution in 1979, tradition and identity became the key concerns in the Iranian cultural context. Returning to the lost Islamic lifestyle and traditional values has been considered as the only way to confront westernization and globalization.

Architecture and urban design were perceived as significant tools that could change the behavior of human beings and their lifestyle by designing an appropriate built environment. After a period of economic recession during the Iran-Iraq war, the traditionalist approach was reintroduced in the 1990s by a group of younger people who are named as the late second generation of Iranian architects. It was the time when the organizations responsible for the conservation of historic heritage were formed and seriously began to consider the traditional cities. The necessity for adopting a wholistic area-based approach in conservation was felt and the traditional urban spaces started to be rehabilitated through the preparation of conservation plans. A series of urban design competitions were held and the architects like Mirmiran and Sheikh Zeineddin won the competitions held for the renovation of Atigh Meydan in Isfahan and Sahibabad Meydan in Tabriz. The meydan as a significant element in the tradition of Iranian urbanism was reconsidered as a type of urban public space that represents the identity of historic Iranian cities, with the objectives to reorganize the fragmented city centers and to provide a new public open spaces. In the case of Imam Square of Urmia, however, the absence of a traditional meydan as large as the
planned one did not constitute an obstacle to design a large-scale urban project in the midst of the historic fabric of the city.

The traditionalist architectural movement in Iran was a critical reaction to the modernist architecture and planning that began to change the historic cities, starting from the first modernization intervention in the early 20th century onwards. Inspire from the postmodern movements that emerged in the West, such as critical regionalism, the second generation of Iranian architects looked after a new interpretation of the traditional values in the modern era. Rejecting the formal imitation of the past, they attempted to reinterpret the spatial qualities hidden in the historic architecture. This attitude produced successful examples of modern interpretation of Iranian vernacular architecture, but the same success has not been achieved in the urban design projects. The present study proposed a methodological approach to evaluate the projects of meydan that have been implemented in the historic cores of cities, and which have triggered controversial debates for the last two decades. The traditionalist approach in the design process of meydans has been celebrated as the opportunity to rehabilitate the historic urban structure and to reconstruct a new identity for the city. However, in practice, these projects have often been confronted with a number of problems that resulted in stopping the implementation, as in the cases of like Imam Square of Urmia and Sahibabad Meydan of Tabriz. Other projects that were completed, like Atigh Meydan of Isfahan, has also encountered various socio-economic problems. These urban design projects, which were appreciated as representing the return to authentic traditional values of Iran, have failed to satisfy the expectations in the contemporary city. The hypothesis argued in this thesis is that these meydans were designed without adequate consideration of the changing morphology of the Iranian city. The current urban structures of cities like Isfahan, Tabriz and Shiraz no longer act as their traditional form. Urban morphology is considered as an appropriate method to study the transformation process of a city and its physical characteristics regarding the socio-economic relations. It is illustrated that the interventions have changed the
morphological logic of the Iranian cities to the extent that a single urban project is unable to recover it.

The morphological analyses reveal that the traditional Iranian cities were organized regarding two significant elements: the commercial and administrative axes. The important urban elements including meydans were configured in connection with the axes and produced the main public realm of the city. A hierarchical structure was formed by the secondary street network stemmed from the axes into the semi-public realm of neighborhoods. The traditional urban structure of Iranian cities was extremely changed by the construction of a network of car-oriented thoroughfares. In the case of Atigh Meydan, the designer aimed to reorganize the traditional commercial axis of Isfahan which was once the most significant element of the old city. By removing the modern streets from the ground level, the covered bazaar is enabled to reconnect the center of the city with Nagsh-e Jahan Square. However, a question is arisen as to how important is this axis in the current structure of Isfahan. The renovated Atigh Meydan (Imam Ali Square) is a large scale project with multiple shopping stores and a monumental open public space. How this historic urban space, which had disappeared for centuries, would function after the renovation in completely new circumstances. To respond these questions, the present study applies the analytical methods of Space Syntax that provides quantified values to evaluate the characteristics of an urban structure.

6.1 The Contributions of the Present Study to the Contemporary Urban Design Practice in Historic Context

The historic cores of cities form nodes where the most significant urban elements are concentrated and they usually serve as the main socio-economic centers of today’s cities. Regarding the new requirements of the modern city and to benefit from its potential, the historic center is planned to be renovated, rehabilitated and reorganized. Squares, plazas or meydans are favorite urban spaces that are supposed to be public open places for gatherings and social activities. Multiple competitions
have been held specifically for squares or *meydans* in different cities around the world as the recent “Taksim Meydan Urban Design Competition” in Istanbul. In Iranian traditional cities, the projects of *meydan* have been introduced for restructuring the historic cores of cities. In these urban design projects *for* meydans, monumentality has been desired by the city managers to make an opportunity to represent the identity of a city, to create new landmarks and make edifices more visible. A group of Iranian architects, who are known as the late second generation, won the competitions of *meydan* mostly held in the 1990s. Unlike the first generation, who followed the International Style and the modernist approach, these architects emphasized the values of traditional Iranian architecture and attempted to make a new interpretation of the past for the present time. The appreciated buildings were designed by these architects that are the proper examples of the traditionalist approach in Iran. However, urban design practice, particularly the projects of *meydan*, has been the subject of controversial debates. The present study is an evaluation of the projects of meydan designed in the historic urban context of traditional Iranian cities. The aim is to identify the reasons behind the problems to which the projects have been encountered.

Roman *forums* and the *agora* are the ancient forms of the public square that is known as an European concept. In the 16th century, a new style in architecture and urbanism started to be formed in Iran. It was named by Pirnia as Isfahani Style that is the fourth style of the Islamic period. Contrary to the organic pattern of the existing cities, the urban development areas of the cities were designed based on a geometric plan. The traditional *meydan* found a new appearance and received more importance. It became a significant urban element configured at the intersection of the commercial and administrative axes to link the principal realms of the city. Nagsh-e Jahan Square of Isfahan with its geometric form, articulated edges and unique position that connects the traditional covered bazaar to the administrative axis, has become a model for *meydan projects* implemented in the present time. It was part of the new plan for the urban development of Isfahan that was well-integrated with the old structure. The urban development practice of Iran between the 16th to the 18th century included
valuable experiences which could be a model for the contemporary urban design practice. However, the reckless interventions of the early 20th century had damaged the traditional structure of Iranian cities and made it so problematic to integrate the future developments. The projects of meydan can be considered as an attempt to renovate the traditional axis of the cities like Isfahan, Tabriz and Shiraz. As the new network of streets were imposed on the traditional urban structure of historic cities, the historic axes have been cut off at different points and the interrelation of elements was lost. The meydan as an intermediate element played a significant role in the integration of traditional urban structure. The project of Atigh Meydan, to some extent, was the renovation of the covered bazaar that had lost its connection with the old center of Isfahan and the great Jame Mosque. The renovation project of Sahibabad Meydan was proposed as a part of the larger project that aimed to reconstruct the traditional commercial axis of Tabriz. Zand Meydan was an important element of the traditional administrative axis of Shiraz. Inside the rehabilitation and renovation project of Karim Khan complex, Zand Meydan was supposed to take on its historic role as a reconciling realm between the covered bazaar and administrative castle.

Mirmiran was the designer of Atigh and Zand projects in Isfahan and Shiraz. Sahibabad Meydan of Tabriz was designed by Zeinoddin. Both of the architects belong to the second generation of Iranian architecture who considered the tradition as a source of inspiration. It was a movement that started in the 1960s and reached its apex in the 1970s by the architects such as Kamran Diba who designed the buildings like Tehran Museum of Contemporary Art that is a successful example of the Iranian traditionalism. The second wave of the movement arose in the 1990s after the Islamic Revolution and a period of socio-economic recession in the country. Hadi Mirmiran, Hossein Zeinoddin, Darab Diba and Mehdi Alizade are the significant figures of this movement who have influenced the mainstream of Iranian architecture for the last two decades. Avoiding the imitation of historic forms, they represent a conceptual interpretation of the past with a modern language. These features reveal the impacts of Critical Regionalism that criticize the modernist principles that ignore
the context and the blind imitation of postmodern architecture. The doctrines of Critical Regionalism were considered by the aforementioned architects to represent a new understanding of Iranian traditional architecture that is appropriate for the present time. It is fair to say that they are generally successful in designing individual buildings. However, the same success could not be achieved in urban design projects.

In the renovation projects of *meydans*, the aim was to bring back the formal characteristics of the traditional urban space. In the projects of Atigh and Zand *meydans*, the architect Mirmiran removed the car traffic by underpasses and made a considerable attempt to return the spatial organization close to its historic form. The traditional covered bazaar was extended on the both sides of Atigh Meydan and a large urban space with articulated edges, shopping stores and a multi-story car parking were formed. Zand Meydan was also attempted to be restored by removing the buildings inside it, reconnecting the covered bazaar and strengthening the administrative axis. In the renovation project of Sahibabad Meydan in Tabriz, Zeinoddin followed a similar path by eliminating the constructions inside the *meydan* and connecting the traditional covered bazaar on both sides of the river to bring back the lost importance of the traditional commercial axis. The project of Imam Square project in Urmia is totally different from the aforementioned cases of renovation. This time, a completely new urban space was designed which had no precedent in the traditional city. However, it is apparent that the designer was under the influence of the model of Isfahani Style. From this point of view, there is a common feature between the main cases selected for the present study. In all of them, a postmodern approach was adopted by the designers either to renovate the traditional *meydan* or to design based on a pre-defined traditional model.

The present study contributes to understand how a traditional urban element may act in the urban structure of contemporary Iranian cities. Urban morphology is the main method of the thesis applied to analyze the characteristics of Iranian cities. It is understood that two commercial and administrative axes constituted the traditional urban spines, which were damaged by a series of urban interventions since the last century. The projects of *meydan* were supposed to renovate and reorganize the
traditional public spaces; but, are they powerful enough to recover the lost structure of the cities? This question could not be responded without making an extensive analysis. The present study demonstrates that urban morphology and Space Syntax are effective tools to evaluate urban design projects with respect to the changing structure of historic cities. The complexity of a city and the multiple factors that affect the issue of urban practice necessitate applying quantitative research methods to help the designers in making better decisions. In the particular case of Iranian cities where a vulnerable traditional urban fabric exists, the condition can be much more complex and multifaceted.

The urban modernization of historic Iranian cities was typically done by imposing a car-oriented street network to facilitate transportation in the city center. The traditional structure has been affected to the extent that its morphological logic is generally unreadable, and the historic urban fabric plays no important role in the new economic relationship of the city. In the project of Imam Square, the urban fabric that was found problematic was completely removed to be replaced by a large urban space. The morphological analyses illustrate the historic importance of the project’s site as the place of the traditional Bugda Meydan. Demonstrating by the Space Syntax analyses, Bugda Meydan was recognized as the most central, visible and accessible urban space of historic Urmia organizing the interrelations between the commercial, residential, religious and administrative realms. The Imam Square has never achieved this position in the modernized current structure of Urmia. The significance of the present study can be recognized as the ability to predict some aspects of urban design projects before their implementation. In the case of Imam Square of Urmia, this prediction could have prevented the massive destruction of the traditional neighborhood and to make better decisions for the future of traditional Bugda Meydan.

As the historic urban fabric of Iranian cities are made of problematic areas, similar interventions will continue to be made in the future. These projects can be evaluated by the methodology proposed in the thesis, which provided meaningful results in the case studies. Particularly in the historic urban context of Iranian cities, where the
renovation of urban spaces was considered as a subject of conservation, it is significant to evaluate the project in terms of its relationship with the current city. Significant traditional elements like the commercial axes and governmental meydans may become less visible and accessible as the morphological characteristics of the historic city no longer exist. Therefore, the orthodox traditionalist attitude and the value that was given to historic forms are not enough to make a functioning, vivid public space. The present study demonstrates that the urban morphological studies and Space Syntax can provide an objective approach to guide the urban design process in making more appropriate decisions.

6.2 The Final Evaluation of the Studied Cases

By The cases selected in the present study are the projects of meydan in the historic cores of traditional Iranian cities selected. These projects were approved by the responsible organizations like the Organization of Cultural Heritage to be constructed as a part of the conservation and rehabilitation program of the historic sites. In the case of Imam Square in Urmia, the existing historic fabric was simply removed for the sake of a new urban space that was supposed to reorganize the traditional center. It seems that the system of values regarding the historic urban environment should be changed in the Iranian context. The urban fabric is a significant component of a city that creates the particular character of a city. The stories of people who lived and shaped the environment are hidden inside the tissue of neighborhoods. When the urban fabric and the pattern of the land parcels are widely modified, the nature of the historic site is obviously going to be changed. As it includes less magnificent historic edifices, the traditional urban fabric of cities like Urmia is treated as worthless. Therefore, the only physical properties which still narrate the history of the city remain under the threat of being eliminated in the urban design projects.

The Imam Square of Urmia could have been a successful project, if the fundamental differences between the morphological logic of the contemporary city and its
traditional form were considered. To analyze its structure, the traditional map of Urmia is reconstructed based on the historic documents. With its unique morphological character, Bugda Meydan was presumed as the center of the city that is also confirmed by the Axial Map analysis. The new square, implemented at the same place, could never achieve the centrality and accessibility of the traditional meydan. The Axial Map analysis illustrates the isolated and segregated position of Imam Square with respect to the modern elements of Urmia. With the use of Visual Graph Analysis, the visibility and the potential for social activities were examined for both of the spaces. The correlation analysis confirmed how significant the visibility and the accessibility are for the performance of a public space. Being less visible in respect to the surrounding streets is certainly one of the main reasons for the failure of Imam Square. By applying the same method, other cases of meydan projects were evaluated. It is revealed that the traditional states of meydans are more visible and accessible with more potential for public activities in comparison with the new projects. This analysis provides the urban designers and architects with a tool to evaluate their plans by making comparisons between the different states and alternatives.

The analytical methods of Space Syntax, with its ability to calculate the physical interrelation of urban elements, makes it possible to evaluate the situations in the changing structure of the city. This becomes more crucial in the Iranian city where the traditional urban structure was transformed to a large extent and a new order has been established in the current time. Besides the attempt to recover the traditional urban elements, it is important to consider the morphological logic of the present city. Otherwise, the project may not act as it was expected and the financial failure may prevent its continuation. The modern avenues and streets at the city center are the principal urban elements of the current structure. This has been demonstrated by both the field studies and the Space Syntax analyses. Even the traditional covered bazaar that is still an active and favorite urban element is threatened by the luxury shopping stores articulated along the wide and easy access avenues. Pahlavi (Imam) Street of Urmia is the most integrated element of the present city that is in close
competition with the traditional covered bazaar. The Imam Square is located on the backside of the traditional bazaar and completely remains out of the pedestrian flow. Any intervention needs to consider the new patterns of movement and the struggle between the old and new urban elements.

In the renovation project of Atigh Meydan in Isfahan, it was planned to reconstruct the traditional form of meydan. The two branches of the covered bazaar are reconnected by which the historic commercial axis of the city is reorganized to some extent. Regarding the Axial Map analysis, the renovation of Atigh Meydan has increased the Integration value of the covered bazaar and therefore its degree of accessibility has also increased. However, the analyses illustrate that this makes no significant impact on the whole structure of Isfahan. The city has been changed to the extent that the renovation of a historic urban space cannot recover its traditional form. There is no doubt that the project of Atigh Meydan makes a positive impact on the relationship between the traditional urban elements. The controversial aspect of the project is its large size that was provided by removing the existing urban fabric which itself had a historic value. The large-scale project had a considerable economic dimension with multi-story shopping stores and car parking. In contemporary Isfahan, the traditional covered bazaar does not have the capacity to support such a project as there have been fundamental changes in the economic structure of the city. There was also a substantial change in the socio-cultural dimension of Atigh Meydan since the 19th century. It was the site of small stores, retailers, peddlers and dealers to respond the needs of the low-income class. Atigh Meydan was renovated by erasing the existing historic layer to make a monumental public space that could not be integrated within the existing social context. The unsuccessful experience of Atigh Meydan in Isfahan has caused the renovation projects of Sahibabad complex in Tabriz and Zand Meydan in Shiraz to be stopped.

The present study proposes a methodological approach to evaluate the urban design projects in general and particularly the projects of meydan in the traditional urban context of Iranian cities. The preliminary question of the research was the failure of the projects which were designed to restore the historic structure of the cities. The
thesis study focused on the question why the traditionalist approach of the designers could not result in the provision of successful public *meydans*. The findings of the thesis point out the importance of urban morphological study for the design practice, particularly in the historic city. The fundamental differences between the traditional urban structure and the modernized contemporary city are emphasized and quantifiably measured by the analytical methods of Space Syntax. The study contributes to studies on the Iranian cities to be more precisely understood, and the urban design projects to be more objectively evaluated with respect to the contemporary structure of cities. The applied methods can be generalized to any type of intervention that aims to change, renovate and rehabilitate the urban structure in historic context.

### 6.2.1 The Configuration Pattern of Traditional Meydans as the Design Diagram

The morphological studies reveal that the traditional meydans of Iranian cities were configured based on spatial patterns. Prior to the geometry and scale of a meydan, making a proper interrelation with urban elements was more significant. This is the point which was already emphasized by Sitte as *the art of relationship*. Two types of meydans have been analyzed in the present study: the governmental and public meydans. The governmental meydans were mostly configured in the capital cities like Tabriz, Qazvin, Isfahan and Shiraz through a pre-designed urban development. The public meydans were usually older and smaller than the governmental meydans with no pre-defined shape.

The figure 5.1 presents the configuration pattern of the governmental *meydans* in the aforementioned cities. The commercial axis, the location of Jame Mosque and the administrative complex are depicted in the diagrams. Whenever a new government seized the power and started to build its own complex, the bazaar was extended to connect the center of the preexisting city with the new development. In the Iranian traditional city, the covered bazaar was the heart of urban life and consisted of the
social, religious and public facilities other than its commercial spaces. The flexibility of Bazaar allowed the central and linear spatial organizations to be formed.

Figure 6.1. The governmental meydans of Tabriz, Qazvin, Isfahan and Shiraz

The governmental meydans were formed between the administrative zone including the king’s palace and official buildings on one side and the covered bazaar on the other side. It was the point where the commercial and administrative axes of the traditional city intersected and granted a unique morphological character to the meydan. New religious and public buildings usually carrying the name of the king were developed to reinforce the social aspects of the complex that became the second center of the city while the first one was located near the Jame mosque. The traditional governmental meydans provided a link between the ruling class and the
ordinary people. The administrative affairs and social functions met in a common place providing the opportunity for a wide variety of activities. The meydan became a multi-functional public place where people could do shopping, resting, playing and participating in the official and religious ceremonies.

Figure 6.2. The pattern of configuration of public meydan in Iranian cities

The configuration pattern of traditional public meydans in Urmia, Semnan, Kermanshah and Isfahan is depicted in the figure 5.2. In comparison with the governmental meydans, the public meydans have a relatively small size with an organic form. They were located near the Jame mosque at the old center of the city and had a close relationship with the covered bazaar. As it can be seen, the meydan was formed on the commercial axis of the traditional city. Most of the time, the public meydan was flanked by the shop stores and the trading activities of bazaar were overflowed out to the open space of meydan. It was a complementary element
that organized the functions which were not possible in the compact space of the covered bazaar. It has been common to call the public meydan as Sabze meydan (the place of selling vegetables and nuts) or Bugda meydan (the place of selling wheat) as in the case of Urmia.

These patterns are also significant for the contemporary urban design practice. They include valuable lessons to be learned to make conscious interventions on the historic urban context. The present study confirms that Space Syntax, which is based on the interrelations of spaces, calculates high axial integration for the linear covered bazaar and high visual integration for the traditional meydans almost in all of the cases. Therefore, there is objective evidences that illustrate how traditional urban elements acted better in terms of providing appropriate public spaces. The traditional urban structure no longer existed in the Iranian cities, but the analytical methods can contribute to examine how new intervention may affect it. The present study provides the methodological approach to recognize the unique characters of traditional Iranian cities and to evaluate the impacts of new urban design projects on them.

6.3 A Methodological Approach to Evaluate Urban Design Projects

The principles of modernist planning were a response to the intolerable condition of crowded industrial cities. Extremely occupied by the sanitary consideration, the functional division makes sprawled urban settlements with undefined open areas and wide highways between. In the 1960s, the sprawled structure of the modern cities that was seriously questioned. The historic cities started to be reconsidered to identify the specific architectural qualities of urban spaces. It was recognized that the attempt to make an integrated urban environment could not be achieved by the international standards that prioritize the presence of vehicles without paying attention to the context. Camillo Sitte, Gordon Cullen and Rob Krier made studies on historic urban spaces which were systematically overlooked by modernist urbanism. Their studies offered new methods to illustrate the hidden aesthetic
qualities of historic European cities in particular. The spatial qualities of urban space and their three-dimensional character were analyzed to highlight the architectural aspects of the city. It was revealed how important the perception of a person is to discover the aesthetic quality of the built environment. From this point of view, Sitte, Cullen and Krier made influential criticisms of modernist urbanism by proposing new methods to study urban spaces. Their classical studies are still relevant in the present time as the main principles of these studies are applied to develop new analytical methods like Space Syntax.

While archeological excavations were already started in the 1920s, the traditional Iranian cities were considered as the subject of research in the 1970s. After the revolution, scholars like Tavassoli, Soltanzade, Habibi and Pakzad began to study the urbanism history of Iran and the urban structure of traditional cities. From the methodological point of view, they were apparently under the influence of European urban studies. Alongside analyzing the spatial qualities, the interventions that negatively changed the traditional urban structure were illustrated by scholars like Tavassoli (1992). He is one of the figures who attempted to suggest design solutions to reorganize the historic Iranian urban spaces. His approach toward the traditional city obviously indicates the influence of Sitte and Cullen. Tavassoli prepared a series of sketches that illustrate the sequential visual perception of a person in motion as Cullen did in his studies on townscape. The way of analyzing the plan of urban spaces by making an emphasis on the important buildings is also very similar to the study that had been introduced Sitte. The typological study of Krier was also considered by Iranian researchers like Soltanzade (1990) to prepare a classification of urban spaces particularly _meydans_ based on the functional and the physical aspects. The methods of urban morphological study were applied by the Iranian researchers to understand the qualities of traditional cities. These studies constituted the main sources of the conservation and renovation projects of Iran some of which are analyzed in the thesis.

In spite of the attempts made to analyze the traditional Iranian cities, there is still a lack of information on other cities like Urmia that are less known than the cities like
Yazd and Isfahan. There is also a shortage of studies that illustrate the morphological characteristics of the current Iranian city by examining its transformation process from the traditional structure to the modernized urban environment. It is very critical for an urban designer to be familiar with the significant changes that a traditional city has undergone. The morphological analyses are done in the present study based on a specific method. The squares in different scales are used to frame the area of analysis in particular periods of time, thus the comparable graphics are presented to illustrate how the urban form has changed through time. These frames narrate the story of the physical transformation of the urban spaces that were the reflection of changing socio-economic circumstances. Without considering the morphological characteristics of the historic city in the past and current time, making an intervention can not be faultless. The present study proves that the renovation of a historic meydan is not just the physical reconstruction of it, but the integration of it with the current city and its new role are issues which should be considered as well.

In order to have an objective approach, the analytical methods of Space Syntax are used to evaluate the case studies. The format of morphological analyses with the same scale and periods of time are applied in the analyses of Space Syntax. This allows testing the hypotheses which were already made by the methods of urban morphology. The hierarchical structure of Urmia is demonstrated by the Integration measure of Axial Map Analysis, and the significant role of the commercial and administrative axes are confirmed by their high integration values. Space Syntax makes it possible to convert architectural qualities to quantitative values. Therefore, making a comparison between the different states of the same urban space, for instance before and after the implementation of a plan, is possible more effectively. This feature makes more sense in the studying of the historic urban context of Iranian cities, where the qualities and character of the traditional structure have been totally changed. Based on the numerical values, comparisons can be made between the old and the new to trace the changes of the city through time. In all of the studied Iranian cases, the Axial Map analysis proved that the new street network has destroyed the hierarchical urban structure of cities. It is now understood that any attempt to
rehabilitate the traditional urban structure of Iranian cities should take into consideration the priority of streets. A new project can be evaluated in this way to examine its impacts on the current structure.

Developed in the 1980s, Space Syntax is a relatively new method in urban studies which was mostly founded on the architectural aspects of urban spaces. Movement and occupation are the two significant actions used to prepare the analyzing maps of Space Syntax. The Axial map is the graphical representation of the circulation network by lines that refer to Sitte’s notion of the line of traffic and line of vision. The positions of buildings, streets and urban furniture with respect to the public spaces particularly plazas were elaborately analyzed by Sitte. These physical features are also significant in the Axial Map as the projection of a building into the street can change the organization of axes. The enclosure character of plazas, which was emphasized by Sitte, is considered in the Convex Map that is another analyzing graph of Space Syntax. Visual perception plays a significant role in our understanding of the built environment. To have a sense of enclosure, the visual field of a spectator should not escape to a particular extent. This quality is also considered in Space Syntax by analyzing the visibility plan of space with Visual Graph Analysis (VGA). The analysis is based on the calculation of the fields of isovist for each unit of space. Cullen proposed the concepts of serial vision and existing/emerging views to indicate how movement can change our perception of the environment. Visual Clustering Coefficient is a measure based on the calculation of changing visual information by moving from one point to the others to assess the potential of an urban space for social activities. Visual Integration allows evaluating the inter-visibility of urban elements in the block level. It is an effective instrument to evaluate the quality of being visible that refers to accessibility and attractiveness of a public space. The correlation between the two measures is a method of analysis proposed by the present study. There is no meaningful mathematical correlation between the two variables that means there are many parts of spaces, which are visually central with a high Visual Integration value but at the same time are not appropriate for the social activities such as the car-oriented streets with a low Visual Clustering Coefficient.
value. Conversely, multiple areas with high potential for social activities are less visible and accessible in comparison with others. Therefore, the correlation diagram of scatter plot is used to determine the areas with maximum values of both measures which are also illustrated on the map. In this analysis, it is demonstrated that the large-scale meydan projects are not necessarily successful public spaces. At the urban block level, these analyses can help the designer to foresee how centrically a place will be seen by the spectators and also how much potential it has to hold social activities.

Space Syntax is considered as a complementary method for urban morphology in the present study. The morphological logic of traditional Iranian cities is illustrated by the main functional axes that organized significant urban elements like meydans. Then, the measures of Space Syntax are applied to provide strong evidences for the hypothesis regarding the qualities and functionality of urban spaces. It is emphasized that the urban design projects should be analyzed in different levels from city to the scale of block. It is necessary to understand the position of an urban space in respect to the whole structure of the city to evaluate its degree of accessibility. In the larger scales, the analyses can reveal the architectural qualities such as visibility and the potential for public activities. The repeatability of the results in a number of case studies indicates the reliability of this methodology. The present study confirms that urban morphology and Space Syntax are efficient tools to illustrate the possible impacts of an urban intervention on the historic urban context.
REFERENCES


Bahrini, F., Bell, S., & Mokhtarzadeh, S. (2017). The relationship between the distribution and use patterns of parks and their spatial accessibility at the city


Bavand Consulting Engineers. (2004). The preliminary reports of studying for the project of “Restructuring the Historic Silk Axis of Tabriz”, Organization of Urban Rehabilitation and Renewal of Northwest of Iran


346


Dennis R., 2008, Cities in modernity; Representations and productions of metropolitan space, 1840-1930, Cambridge University Press


Ebrahim Zarei, M. (2011). in Persian: Sakhtare kalbodi-fazae shahre Hamadan az agaze doreye eslamı ta payane Qajar [Studying the spatial structure of Hamadan based on the historic documents from the advent of Islam to the Qajar period]. Nameye Bastanshenasi, 1, (1)


347


Habibi, S. M. (2000). in Persian: *Az Shar ta Shahr; tahlili tarikhi az mafhume shahr ve simaye kalbodiye an* [From Shar to the city; a historical analysis of the city and its physical image], Tehran, The University of Tehran.


Ministry of Roads and Urban Development of Iran. (1998). In Persian: Gozareshate jalasate porojeye Imam-e Urumiye [Reports of the meetings of Imam Project of Urmia]. The archive of MRUD


Paczad, J. (2011). In Persian: Tarikhe shahr ve shahrneshini dar Iran az agaz ta doreye Qajar [History of Iranian City, from Begin to Qajar Dynasty]. The University of Tehran


Roshani, M. Sagafi, A. (2016). in Persian: Tahlile tatbigiye sakhtare asliye shahre Tabriz; az avakhere doreye Qajar ta moaser ba estefade az Space Syntax [A
Comparative Analysis of Urban Structure of Tabriz City from the Late Qajar Period to the Present Time by Space Syntax. *The Journal of Anjoman Memari ve Shahrsazi Iran*, 12, 57-72

Rowe, C. and Koetter, F., (1978), *Collage City*, the MIT Press


Soltanzadeh, H. (1993). in Persian: *Fazahaye Vurudi dar Memariye Sonnatiye Iran* [The entrances and its spatial features in the traditional architecture of Iran]. Shahrdari publication, Tehran


CURRICULUM VITAE

PERSONAL INFORMATION

Surname, Name: SOLEİMANİ, Meysam
Nationality: Iranian
Date and Place of Birth: 21 September 1981, Iran/Urmia
Marital Status: Married
Phone: +90 5315140339
e-mail: Meysam.soleimani@btu.edu.tr

EDUCATION

<table>
<thead>
<tr>
<th>Degree</th>
<th>Institution</th>
<th>Year of Graduation</th>
</tr>
</thead>
<tbody>
<tr>
<td>MS</td>
<td>IAUT Architecture</td>
<td>2007</td>
</tr>
<tr>
<td>BS</td>
<td>IAUT Architecture</td>
<td>2004</td>
</tr>
<tr>
<td>High School</td>
<td>Molavi High school, Urmia</td>
<td>1999</td>
</tr>
</tbody>
</table>

WORK EXPERIENCE

<table>
<thead>
<tr>
<th>Year</th>
<th>Place</th>
<th>Enrollment</th>
</tr>
</thead>
<tbody>
<tr>
<td>2019-Present</td>
<td>BTÜ</td>
<td>Lecturer</td>
</tr>
<tr>
<td>2015-2019</td>
<td>HEI of Afagh</td>
<td>Chairman</td>
</tr>
<tr>
<td>2013-2015</td>
<td>IAU of Urmia</td>
<td>Lecturer</td>
</tr>
</tbody>
</table>

FOREIGN LANGUAGES

Advanced English, Fluent Turkish, Persian (native)

PUBLICATIONS


