

**A LOGICAL ARGUMENTATION ON APARTMENT
TYPE DWELLINGS: The Case of Istanbul, Feneryolu
between 1950 – 2020**

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TYPE DWELLINGS: The Case of Istanbul, Feneryolu
between 1950 – 2020**

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*To My Dear Parents,
Nimet and Ali*

ABSTRACT

A LOGICAL ARGUMENTATION ON APARTMENT TYPE DWELLINGS: The Case of Istanbul, Feneryolu between 1950 – 2020

This study endeavours to demonstrate how spatial arrangement in the modernised Turkish apartment-type dwelling has evolved depending on infrastructural, legislative, technological, and social factors. The aim of this study is to shed light on the diversity in the spatial configurations of apartment-type dwellings in Istanbul between 1950-2020 and the relationship between syntactic transformations, semantic values, and the historical breaking points. It is explicit that the transformation in residential interiors is linked to social transformations as well as external factors. Housing policies in Turkey, industrialisation, standardisation and transition to mass production in construction materials, apartmentisation, modernisation in domestic life, change in family structure and their impact on the interior space are all taken into significant consideration in this study. Furthermore, in the theoretical discussion section, the meaning of space, society – space and the formation of dwelling are discussed.

As a case study, the transformations in the spatial configuration of Istanbul-Feneryolu residences from the 1950s, when the first apartment type residences were seen in the neighbourhood, to 2020 are examined. External factors, which are the radical cause of the change in housing forms, were defined as the breaking point and divided the seventy-year period into 4 periods. These periods are 1950-1965, 1965-1980, 1980-2000, and 2000-2020.

In analyses conducted with Syntax 2D software, mean isovist area, perimeter, compactness, circularity, radial mean, standard deviation, mean depth, and integration parameters are utilised. The dwellings are examined over four periods and three functional areas for each apartment, namely Living Area, Bedroom Area and Service Area. The relationship is established between the syntactic values of the functional areas and the infrastructural, legislative, technological, and social factors of the periods.

One example of this is the living area gained a central importance in the plan scheme and became the unit where socialisation is highest. In the service area, a new unit, 'corridor', which is the only multipermeable unit in the planning scheme, emerged. Furthermore, with the increasing the importance of social spaces such as the kitchen, the syntactic values of the Service Area increased in general, except for the mean depth value. Due to land subdivision works, appropriate and rational plan solutions were produced in accordance with the land geometry. As a result of this, the bedroom areas became secondary units with high depth value, although residential users spend time individually in bedroom areas thanks to the introduction of heating systems, internet, and smart phones.

Briefly, this study scrutinizes the relation of syntactic transformation in the Living Area, Service Area, and Bedroom Area of the apartment type dwellings with the infrastructural, legislative, technological, and social factors.

KEYWORDS

Housing in Turkey, Apartment Buildings, Spatial Organisations, Space Syntax



ÖZET

Bu çalışma, modernize edilmiş Türk apartman tipi konutlarında mekânsal düzenlemenin altyapı, yasal, teknolojik ve sosyal faktörlere bağlı olarak nasıl geliştiğini ortaya koymaya çalışmaktadır. Bu çalışmanın amacı, 1950-2020 yılları arasında İstanbul'daki apartman tipi konutların mekânsal konfigürasyonlarındaki çeşitliliğe, sözdizimsel (syntactic) dönüşümler ve anlamsal değerler arasındaki ilişkiye ve tarihsel kırılma noktalarına ışık tutmaktır. Konut iç mekânlarındaki dönüşümün dış etkenlerin yanı sıra toplumsal dönüşümlerle de bağlantılı olduğu açıktır. Türkiye'de konut politikaları, sanayileşme, yapı malzemelerinde standardlaşma ve seri üretime geçiş, apartmanlaşma, ev yaşamında modernleşme, aile yapısındaki değişim ve bunların iç mekâna etkileri tez kapsamında dikkate alınmaktadır. Ayrıca teorik tartışma bölümünde mekânın anlamı, toplum-mekân ilişkileri ve konut'un biçimlenmesi tartışılmaktadır.

Bu tezde İstanbul-Feneryolu mahallesindeki ilk apartman tipi konutların görüldüğü 1950'lerden 2020 yılına kadar apartman tipi konutların mekânsal konfigürasyonundaki dönüşümleri incelenmiştir. Konut formlarındaki değişimin radikal nedeni olan dış etkenler birer kırılma noktaları olarak belirlenmiş ve yetmiş yıllık süreci dört döneme ayırmıştır. Bu dönemler 1950-1965, 1965-1980, 1980-2000 ve 2000-2020'dir.

Syntax 2D yazılımı ile yapılan analizlerde ortalama eş görüş alanı (mean isovist area), çevre (perimeter), kompaktlık (compactness), dairesellik (circularity), radyal ortalama (radial mean), standart sapma (standard deviation), ortalama derinlik (mean depth) ve integrasyon (integration) parametreleri kullanılmaktadır. Konutlar, Yaşam

Alanı, Yatak Odası Alanı ve Hizmet Alanı olmak üzere her bir daire için üç işlevsel alan ve dört dönem üzerinden incelenmiştir. İşlevsel alanların sözdizimsel değerleri ile dönemlerin altyapısal, yasal, teknolojik ve sosyal faktörleri arasında ilişki kurulmuştur.

Örneğin; Yaşam Alanı plan şemasında merkezi bir önem kazanmış ve sosyalleşmenin en yüksek olduğu birim haline gelmiştir. Hizmet Alanı'nda, planlama şemasındaki tek "çok geçirgen" ve yeni bir birim olan 'koridor' ortaya çıkmıştır. Ayrıca mutfak gibi sosyal mekânların öneminin artmasıyla birlikte ortalama derinlik değeri dışında Hizmet Alanının sözdizimsel değerleri genel olarak artmıştır. Parselasyon çalışmaları nedeniyle arazi geometrisine uygun ve akılcı plan çözümleri üretilmiştir. Bunun sonucunda ve ısıtma sistemleri, internet ve akıllı telefonların devreye girmesi ile konut kullanıcılarının yatak odalarında bireysel olarak vakit geçirmesi, yatak odalarını derinlik değeri nispeten yüksek ikincil birimler haline getirmiştir.

Özetle bu çalışma apartman tipi konutların Yaşam Alanı, Hizmet Alanı ve Yatak Odası Alanındaki sözdizimsel dönüşümün altyapısal, yasal, teknolojik ve sosyal faktörlerle ilişkisini irdelemektedir.

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Türkiye’de Konut, Apartman Binaları, Mekânsal Organizasyon, Mekân Sözdizimi

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Each dwelling has its own story. The actions, behaviours, and cultures in dwellings specialise or personalise a house and make it a "home" for dwellers. However, in both this year and the year before it, due to covid19, the dwelling has become not only a "home" but also our school, office, and library. The fact that I had to write the whole thesis at home during curfews and quarantine helped me to better understand how important concepts such as space syntax and the use of space are for dwellings. The process I had to undertake showed me that I made the right decision in choosing this thesis topic.

I would like to express my deepest gratitude to Professor Alper Ünlü, who supported and guided me with his ideas, broadened my horizons, and introduced me to the world of Space Syntax. His work ethic and friendly attitudes against his students have been and will always continue to be an example for me along my journey. I am also grateful to Assist Prof Dr Nevset Gül Çanakcıoğlu and Assoc Prof Dr Mehmet Emin Şalgamcıoğlu for their contributions and valuable comments.

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TABLE OF CONTENTS

ABSTRACT	ii
ÖZET	v
ACKNOWLEDGMENTS.....	vii
LIST OF TABLES.....	xi
LIST OF MAPS	xii
LIST OF FIGURES.....	xiii
I INTRODUCTION.....	1
1.1 Aims and Objectives	5
1.2 Scope	6
1.3 Structure	8
1.4 Method	10
1.5 Chapter Assessment	12
II THEORETICAL DISCUSSIONS	14
2.1 Space and Society	14
2.1.1 What is Space?	15
2.1.2 “Space” in Relation with Society	19
2.2 Formation of Dwelling.....	23
2.2.1 The Meanings of Dwelling.....	25
2.2.2 Dwelling and Social Structure in City.....	27
2.3 A Theory, A Method: Space Syntax	32
2.3.1 Space Syntax in Architectural Design.....	33
2.3.2 Application of Space Syntax Method in Projects with Different Scales and Functions	34
2.3.3 Space Syntax and Dwelling.....	39
2.4 Chapter Assessment	42

III	URBAN DEVELOPMENT AND APARTMENTISATION PROCESS OF İSTANBUL.....	46
3.1	First Attempts in Urban Planning of İstanbul: Modernisation in the Late Ottoman Period, 19 th Century.....	46
3.1.1	The Impact of Fires on the Zoning of İstanbul	48
3.1.2	İstanbul's Apartment Buildings in the Late Ottoman Period	51
3.2	The Modern City of the Republic: İstanbul	54
3.2.1	Prost's Plans for İstanbul.....	56
3.2.2	İstanbul Apartment Buildings in the Early Republican Period .	59
3.2.3	Modern Domestic Life	62
3.3	Architectural Development and Apartmentisation in the Industrialised City: İstanbul	64
3.3.1	Standardisation in Construction Materials	66
3.3.2	Housing Representation and Profiles	68
3.4	Development of Kadıköy	73
3.4.1	The Feneryolu Neighbourhood	77
3.5	Chapter Assessment	84
IV	METHODOLOGY	87
4.1	Strategy of the Study	87
4.2	Approach of the Study	89
4.3	Sample Selection.....	92
4.4	Data Collection	95
4.5	Data Analysis	96
4.6	Synthesis of the Analysis	101
4.7	Chapter Assessment	101
V	CASE STUDY: FENERYOLU NEIGHBOURHOOD, KADIKÖY, İSTANBUL	104
5.1	Analyses of the First Group of Apartment Type Dwelling in the Feneryolu Neighbourhood (1950-1965).....	105
5.1.1	External Factors that Affected the Apartment Type Dwellings in the First Group (1950-1965).....	105
5.1.2	Excluded and Included Spaces in the Apartment Type Dwellings	

in the First Group (1950-1965)	106
5.1.3. Space Syntax Analyses Results of the Apartment Type Dwellings in the First Group (1950-1965)	107
5.2 Analyses of the Second Group of Apartment Type Dwelling in the Feneryolu Neighbourhood (1965 - 1980)	115
5.2.1 External Factors that Affected the Apartment Type Dwellings in the Second Group (1965 - 1980)	115
5.2.2 Excluded and Included Spaces in the Apartment Type Dwellings in the First Group (1965 - 1980)	116
5.2.3 Space Syntax Analyses Results of the Apartment Type Dwellings in the Second Group (1965 - 1980)	117
5.3 Analyses of the Third Group of Apartment Type Dwelling in the Feneryolu Neighbourhood (1980 - 2000)	126
5.3.1 External Factors that Affected the Apartment Type Dwellings in the Third Group (1980 - 2000)	126
5.3.2. Excluded and Included Spaces in the Apartment Type Dwellings in the Third Group (1965 - 1980)	128
5.3.3 Space Syntax Analyses Results of the Apartment Type Dwellings in the Third Group (1980 - 2000)	129
5.4 Analyses of the Fourth Group of Apartment Type Dwelling in the Feneryolu Neighbourhood (2000 - 2020)	138
5.4.1 External Factors that Affected the Apartment Type Dwellings in the Fourth Group (2000 - 2020)	138
5.4.2 Excluded and Included Spaces in the Apartment Type Dwellings in the Fourth Group (2000 - 2020)	139
5.4.3 Space Syntax Analyses Results of the Apartment Type Dwellings in the Fourth Group (2000 - 2020)	140
5.5 Synthesis	151
5.6 Chapter Assessment	172
VI CONCLUSION	174
BIBLIOGRAPHY	182
VITA	193
ENDNOTES	194

LIST OF TABLES

1	Table 2.1: Syntactic values of the YCBA, MoMA, and HMA.	38
2	Table 5.1: The units of “The 1956 Apartment (1956), Özmutlu Apartment (1958), Yunus Emre Apartment (1962), Eren Apartment (1963)”	106
3	Table 5.2: The units of “Nilüfer Apartment (1967), Özen Apartment (1969), The 1970 Apartment (1970), Uğur Apartment (1973), Galip Bey Apartment (1977)”	116
4	Table 5.3: The units of “Mehmet Ayvacı Apartment (1983), Tellioglu Apartment (1984), Alpan Apartment (1987), Güzide Apartment (1993), Dr Sami Aksu Apartment (1999)”	128
5	Table 5.4: The units of “Uyum Apartment (2000), Sevgili Korupark Compound (2009), Şafak Apartment (2010), Ekşioğlu Apartment (2014), Çamlık Apartment (2019)”	139
6	Table 5.5: The Units of the Apartment Type Dwellings in Feneryolu	152
7	Table 5.6: The Functional Areas with the Highest and Lowest Mean Isovist Area	154
8	Table 5.7: The Functional Areas with the Highest and Lowest Perimeter value	157
9	Table 5.8: The Functional Areas with the Highest and Lowest Compactness value	159
10	Table 5.9: The Functional Areas with the Highest and Lowest Circularity value	161
11	Table 5.10: The Functional Areas with the Highest and Lowest Radial Mean value	164
12	Table 5.11: The Functional Areas with the Highest and Lowest Standard Deviation value	166
13	Table 5.12: The Functional Areas with the Highest and Lowest Mean Depth value.....	168
14	Table 5.13: The Functional Areas with the Highest and Lowest Integration value.....	171

LIST OF MAPS

1	Map 3.1: Von Moltke's map of Istanbul, 1837	47
2	Map 3.2: Great Fire in Pera. Drawn by Mandouce, 1870	48
3	Map 3.3: Goad map of Istanbul	50
4	Map 3.4: Pervititch map of Istanbul	50
5	Map 3.5: Nirven map of Istanbul	50
6	Map 3.6: Sadyk Pacha Apartments, Goad Maps 1905	52
7	Map 3.7: Kauffer's Map of Istanbul, 1786	73
8	Map 3.8: Stolpe's Map of Istanbul, 1882	74
9	Map 3.9: Goad's Map of Kadıköy, 1906	75
10	Map 3.10: The Feneryolu Neighbourhood	77
11	Map 3.11: Feneryolu, 1938	79
12	Map 3.12: Land Subdivision and Densification Process of the Feneryolu Neighbourhood	80

LIST OF FIGURES

1	Figure 1.1: Timeline of the Development of the Feneryolu Neighbourhood.....	7
2	Figure 2.1: The Therme Vals.....	18
3	Figure 2.2: Tallensi Compound.....	21
4	Figure 2.3: Tallensi Landscape.....	22
5	Figure 2.4: Ndembu Village	23
6	Figure 2.5: Alternative Theories of House Form.	24
7	Figure 2.6: Factors Affecting the Formation of Dwelling.....	25
8	Figure 2.7: Rondanson's Cartoon.....	26
9	Figure 2.8: Benthall Green Social Blocks	29
10	Figure 2.9: House For Families	30
11	Figure 2.10: Three Lifestyles of Bell	31
12	Figure 2.11: Four Lifestyles and Environmental Preferences of Moore	32
13	Figure 2.12: Trafalgar Square.....	35
14	Figure 2.13: Tate Britain	36
15	Figure 2.14: YCBA, MoMA, and HMA's Layouts and Pictures of the Atriums... ..	38
16	Figure 2.15: Axial Map of Curado's Blocks Before and After	42
17	Figure 3.1: View of the Ruins after the Great Fire of Pera	49
18	Figure 3.2: Kadıköy, Yeldeğirmeni Neighbourhood [Photograph].....	51
19	Figure 3.3: Decugis House [Photograph]	53
20	Figure 3.4: Botter Han/Apartment [Photograph].....	53
21	Figure 3.5: Harikzedegan (Teyyare) Apartments	54
22	Figure 3.6: Project for Eminönü Square.....	58
23	Figure 3.7: An Example of the Modern Guest Room, Drawn by Architect Aptullah Ziya.....	59
24	Figure 3.8: Hüsnü B. Apartment Building, Nişantaşı, 1932	60
25	Figure 3.9: A rental house in Taksim, 1939	61
26	Figure 3.10: Göksun Rental House, 1940	61
27	Figure 3.11: Examples of Periodicals in the Republic Period.....	63
28	Figure 3.12: Furniture Examples in Early Republic Period Dwellings, Yedigün Magazine.....	63
29	Figure 3.13: Timeline of the Factors that Caused Socio-Spatial Changes in Turkey after the Proclamation of the Republic	65
30	Figure 3.14: Lassa Factory [Photograph]	67
31	Figure 3.15: Arçelik Factory, Gebze [Photograph]	67
32	Figure 3.16: An Example of an Apartment Building with the Build-and- Sell Construction Technique,1970 [Photograph]	68
33	Figure 3.17: Lottery House Posters of the Banks.....	69
34	Figure 3.18: Emlak Kredi Bank's Brochure, The Layout Plan of Ataköy Blocks.	70
35	Figure 3.19: Harb Akademileri Subay Yapı Cooperative, 1975	71
36	Figure 3.20: Ağaoğlu MyCity Umraniye, 2000 [Photograph]	72

37	Figure 3.21: Ataşehir Meridyen, Bahçeşehir 5th Region, TOKİ [Photograph]	72
38	Figure 3.22: Ağaoğlu Maslak1453	73
39	Figure 3.23: Moda, 1900 [Photograph]	75
40	Figure 3.24: Moda, after 1928 [Photograph].....	75
41	Figure 3.25: Suadiye Beach [Photograph].....	76
42	Figure 3.26: Kadıköy, 1950 [Photograph].....	76
43	Figure 3.27: Kilercibaşı Mansion [Photograph]	81
44	Figure 3.28: A House Project, 1932	81
45	Figure 3.29: Nedim Karakurt's House, 1956	81
46	Figure 3.30: An Apartment Building with Added Floors, 1958.....	82
47	Figure 3.31: Mustafa Nihat Apartment Building, 1972	82
48	Figure 3.32: An Apartment Building, 1987.....	83
49	Figure 3.33: Farukbey Apartment Building, 2009	83
50	Figure 3.34: An Apartment Building, 2019.....	84
51	Figure 4.1: Diagram of the Strategy of the Study	88
52	Figure 4.2: Diagram of the Layout of the Methodology	88
53	Figure 4.3: The Breaking Points of the Apartmentisation Period	90
54	Figure 4.4: The Diagram of the Approach of the Study	91
55	Figure 4.5: Functional Areas to be Studied	91
56	Figure 4.6: The Locations of the Samples.....	94
57	Figure 4.7: The List of Samples	94
58	Figure 4.8: The Cover of Sample Project.....	97
59	Figure 4.9: The Typical Floor Plan of the Sample	97
60	Figure 4.10: The Typical Floor Plan of the Sample	97
61	Figure 4.11: General Options	98
62	Figure 4.12: Steps of the Grid Isovist Analysis of the Sample	99
63	Figure 4.13: Steps of the Grid Isovist Analysis of the Sample	99
64	Figure 4.14: Steps of the Grid Isovist Analysis of the Sample	99
65	Figure 4.15: Syntactic Values of the Sample	99
66	Figure 4.16: Syntactic Values of the Sample	99
67	Figure 4.17: Syntactic Values and Diagram Sample.....	100
68	Figure 4.18: Syntactic Values and Diagram Sample.....	100
69	Figure 5.1: Functional Areas of The 1956 Apartment (1956), Özmutlu Apartment (1958), Yunus Emre Apartment. (1962), Eren Apartment (1963)	107
70	Figure 5.2: Mean Isovist Area, 1 st Period.....	107
71	Figure 5.3: Perimeter, 1 st Period.....	108
72	Figure 5.4: Compactness, 1 st Period	109
73	Figure 5.5: Circularity, 1 st Period.....	110
74	Figure 5.6: Radial Mean, 1 st Period.....	111
75	Figure 5.7: Standard Deviation of the Radial Rays, 1 st Period.....	112
76	Figure 5.8: Mean Depth, 1 st Period	113
77	Figure 5.9: Integration, 1 st Period.....	114

78	Figure 5.10: Functional Areas of Nilüfer Apartment (1967), Özen Apartment (1969), the 1970 Apartment (1970), Uğur Apartment (1973), Galip Bey Apartment (1977)	117
79	Figure 5.11: Mean Isovist Area, 2 nd Period.....	118
80	Figure 5.12: Perimeter, 2 nd Period.....	119
81	Figure 5.13: Compactness, 2 nd Period	120
82	Figure 5.14: Circularity, 2 nd Period	121
83	Figure 5.15: Radial Mean, 2 nd Period.....	122
84	Figure 5.16: Standard Deviation, 2 nd Period	123
85	Figure 5.17: Mean Depth, 2 nd Period.....	124
86	Figure 5.18: Integration, 2 nd Period.....	125
87	Figure 5.19: Functional Areas of Mehmet Ayvacı Apartment (1983), Tellioğlu Apartment (1984), Alpan Apartment (1987), Güzide Apartment (1993), Dr Sami Aksu Apartment (1999).....	129
88	Figure 5.20: Mean Isovist Area, 3 rd Period.....	129
89	Figure 5.21: Perimeter, 3 rd Period	131
90	Figure 5.22: Compactness, 3 rd Period.....	132
91	Figure 5.23: Circularity, 3 rd Period.....	133
92	Figure 5.24: Radial Mean, 3 rd Period	134
93	Figure 5.25: Standard Deviation of the Radial Rays, 3 rd Period	135
94	Figure 5.26: Mean Depth, 3 rd Period.....	136
95	Figure 5.27: Integration, 3 rd Period	137
96	Figure 5.28: Functional Areas of Uyum Apartment (2000), Sevgili Korupark Compound (2008), Şafak Apartment (2010), Ekşioğlu Apartment (2014), Çamlık Apartment (2019).....	140
97	Figure 5.29: Mean Isovist Area, 4 th Period	141
98	Figure 5.30: Perimeter, 4 th Period	142
99	Figure 5.31: Compactness, 4 th Period.....	143
100	Figure 5.32: Circularity, 4 th Period.....	144
101	Figure 5.33: Radial Mean, 4 th Period	145
102	Figure 5.34: Standard Deviation of the Radial Rays, 4 th Period	146
103	Figure 5.35: Mean Depth, 4 th Period	148
104	Figure 5.36: Integration, 4 th Period	149
105	Figure 5.37: Direct and Indirect Factors that Affected the Apartment Type Dwellings.....	151
106	Figure 5.38: Mean Isovist Area of the Functional Areas in Four Periods.....	154
107	Figure 5.39: Trend Graph of the Mean Isovist Area	155
108	Figure 5.40: Perimeter value of the Functional Areas in Four Periods	156
109	Figure 5.41: Trend Graph of the Perimeter	157
110	Figure 5.42: Compactness value of the Functional Areas in Four Periods	158
111	Figure 5.43: Trend Graph of the Compactness	159
112	Figure 5.44: Circularity value of the Functional Areas in Four Periods	161

113	Figure 5.45: Trend Graph of the Circularity	162
114	Figure 5.46: Radial Mean value of the Functional Areas in Four Periods	163
115	Figure 5.47: Trend Graph of the Radial Mean	164
116	Figure 5.48: Standard Deviation value of the Functional Areas in Four Periods	165
117	Figure 5.49: Trend Graph of the Standard Deviation	166
118	Figure 5.50: Mean Depth value of the Functional Areas in Four Periods	168
119	Figure 5.51: Trend Graph of the Mean Depth	169
120	Figure 5.52: Integration value of the Functional Areas in Four Periods	170
121	Figure 5.53: Trend Graph of the Integration	171



CHAPTER I

INTRODUCTION

After the proclamation of the Republic of Turkey, for the sake of "constructing a new country", steps towards modernisation have been taken through the production of architectural and urban planning. After the construction of the republican city of Ankara, the action was taken to reconstruct a modern city in Istanbul, which handed over its capital status to Ankara in 1923. French urbanist-architect Henri Prost was invited to Istanbul for the re-planning of the city (Bilsel, 2011). Prost prepared a ten-year plan in which residential, workplace and recreation areas were to be organised on the European and Anatolian side, and include new arteries and conservation plans (Prost, 1936-1938; Bilsel, 2010). With the transition to the multi-party system in the 1950 elections and the DPⁱ winning the elections, Henri Prost's Istanbul Planning task was terminated. Although the consequence of the projects that Henri Prost prepared a separate matter of discussion, they have greatly contributed to Istanbul's current cityscape (İstanbul Dergisi, 1996).

The physical transformation of the city of Istanbul is not only of the urban scale, but also in residential typologies and interior spatial configurations due to technological developments, the economic crisis that emerged with the post-war period, movements in domestic politics, migration, and corresponding changes in society and family structure. With modernisation practices, the experimental structuring process has started as "our way of development" in the urban texture (Bozdoğan and Akcan, 2012). In addition to

public spaces, housing designs have also changed. Due to the inconsistency of housing policies, the development of technology, natural disasters, immigration, and sociological changes related to them, there is an undeniable physical transformation in apartment type houses.

The process of increasing the diversity in housing typologies in Istanbul, after the proclamation of the republic, and the stimulation of apartmentisation, as well as urban growth, is briefly summarised as follows:

‘İkramiye evleri’ (bonus/lottery houses) distributed through a lottery by state banks with the aim of encouraging the public to save money in the Early Republic Period in the 1930s, when the economic statism model was adopted have given support to the housing problem in Turkey and played a significant role in the development and diversification of housing culture. The industrialisation and population growth that followed one another in the 1950s brought about the housing problem in Istanbul. The effects of the post-war global economic crises were felt in the country and therefore production in architecture slowed down. In the 1960s, a more intense need for housing emerged and gecekondulaşma (slums) were not prevented (Keleş, 1983). With the Property Ownership Law in 1965, apartmentisation was flogged. The build-and-sell technique became widespread in the 1970s and apartments were built to suit every budget (Tanyeli, 2004). With the property ownership law and the spread of the build-and-sell technique, Istanbul met with the Black Sea origin contractorsⁱⁱ. This means that contractors, who take the place of the architect in planning and practice and often put the cost before design, bargain with the householders to build apartments with a low budget. The mansions, where large families lived, have been transformed into nuclear-family apartments. With the Construction Zoning Law in 1980, the establishment of

mass housing fund and mass housing administration in 1983, new construction zoning law, so-called Urban Transformation Law, in 2000 apartmentisation in Istanbul began to grow rapidly.

The diversity in the plan typologies of the apartment type houses can be attributed to the zoning plans, the transition from detached houses to the individual apartment buildings, and the reflection of the heating system technologies in the spatial arrangement within the residence. Also, dependent variables such as gross cross-sectional area of the column or shear wall, the body width of the beam, and the useful height of the beam and the column, which were reported in the earthquake regulation in 2007 in the Official Gazette (URL - 1). These legislative changes lead to a physical change in geometric form and spatial sequence in the house plan. By the 2020s, it was possible to find numerous dwelling typologies experimented in Istanbul. Throughout the years, factors including: the political situation in the country, the economy, the work of non-architectsⁱⁱⁱ (Tanyeli, 2004), technological developments, and new laws are the most questionable factors and breaking points in the change of dwelling and proliferated dwelling identities. In the seventy-year mentioned above, housing production in the city undoubtedly continued and as a result, apartmentisation gained momentum in direct proportion to the growth of the city. The planning schemes of the apartment type houses have also undergone a geometric change over time for the same reasons.

The changes in the geometric form that occur in the plan schemes depending on the zoning laws and regulations directly affect the spatial arrangement in the house, such as how permeable the units are or how circular or compact the plan scheme is. For example, the general trend in the plan schemes where the radial values are examined in

this study, radial length^{iv} is seen dominantly in the living spaces in the first period of buildings. However, the last period of buildings, the radial length is seen highly in the unit “corridors”, which do not exist in the first period of buildings and are new units. Likewise, the spatial arrangements of the units have changed over time. Plan schemes where the living area is in a central position and other units are arranged around it are not valid for recent buildings. In other words, while there was a social environment in the whole of the plan scheme in the first periods of apartment buildings, nowadays bedrooms and living areas are separated from each other and the phenomenon of individualisation and privacy in the house has become more acute.

With the development of technology in the house, spatial arrangement and spatial behaviour changed. One of the most important factors that change the central hall scheme type of the residences is the heating system. For example, the secondary units such as bedrooms and kitchen were located around a central hall and were heated by the heat source located in this central unit. The arrival of natural gas to Istanbul in 1992 (URL – 2) eliminated the central hall designed for efficient heating of the dwelling with heating stoves.

With the introduction of the internet in 2001, a new focal point was created in living spaces. Although it is thought that desktop computers do not affect the spatial arrangement, they have had an effect on the spatial behaviour in the dwelling. With the importance of data transfer and broadband internet usage with smartphones, Turkey made the transition to 3G by the end of 2009 (URL – 3). This is also one of the factors that led to changing spatial behaviour such as spending time in bedrooms during the day. As a current example of social changes, Covid-19, which emerged in late 2019 and affected the whole world, has been one of the factors affecting spatial behaviour in interior spaces. Due to the ongoing restrictions, the interior of the residence is redefined,

and the space is altered abstractly. Although the physical impact of Covid-19 in public spaces is felt directly, it has not yet had an impact on the design of the residential interior. Although the semantic values are not measured in this thesis due to restrictions, the change of apartment-type dwellings is presented concretely in the light of the change in the syntactic values of the space.

In this study, the geometric transformations in the apartment-type house plan schemes and social transformations because of it, are endeavoured to be examined. While discussing the social reasons of this change, its mathematical results are obtained through the Space Syntax technique. Thus, it contributes to understanding the organisation of modern apartment-type residential interiors in the Feneryolu neighbourhood through Space Syntax analysis.

1.1 Aims and Objectives

The purpose of this study is to examine the changes in the spatial configuration of the apartment-type residential buildings in the Istanbul-Feneryolu neighbourhood, and to grasp the relationships with the historical breaking points from the 1950s to 2020. This study contributes to the understanding of the spatial organisation of the apartment buildings through the Space Syntax Theory.

In order to understand the syntactic transformations and diversity in spatial organisations of dwellings based on urban growth and apartmentisation, this research seeks to answer the questions given below:

- What are the reasons that triggered apartmentisation in İstanbul?

- Has the acceleration of apartmentisation caused syntactic changes in the interior of the residence? If it has, in what direction did the syntactic changes occur between living space, service area, bedroom area and the service areas related to bedrooms?
- What changes have occurred in spatial configuration due to apartmentisation?
- What is the relationship between syntactic changes and external changes?
- How did spatial behaviours change in the spatial configurations that occurred with apartmentisation?

This study, which examines the geometric transformations of interior spaces, is supported by social theories. In this context, how physical transformations affect social life in the interior of the residence is discussed through these theories. As a result of this study, the acceleration of housing practices and apartment type housing diversity in Istanbul in parallel with urban growth are examined through the Space Syntax analysis method.

1.2 Scope

As a result of the developing commercial life and housing density in the old city and its surroundings, the city centre of Istanbul was evolved on the European side. Therefore, the first apartmentisation process started in Nişantaşı, Teşvikiye and Şişli neighbourhoods on the European side of Istanbul (Tekeli, 2013). However, especially in the 1970s, when new construction techniques developed, mass production began to accelerate; new laws came into force as apartment-type dwellings became dominant in the Anatolian side. Especially around the Marmaray^v train line, the housing

was sprawled. This period marks the starting point of the thesis when modern apartments began to be mass-produced with contemporary materials.

According to the data obtained from the field trips and research, the history range of the research starts in the 1950s, since the oldest apartment-type houses in the region are rental houses and the first examples were seen in the 1950s. Rental houses, which were produced in the 1950s and seen in the case area, were built, and used as detached houses. Then, extra floors were added to rent them out which turned the single-family houses into the first examples of apartment type dwellings in the Feneryolu neighbourhood. The sample selection process for analysis is explained in detail in the methodology section of the thesis. As the diversity of apartment-type dwellings is the concern of this thesis, it is essential that the samples were produced in different years between the 1950s – 2020.

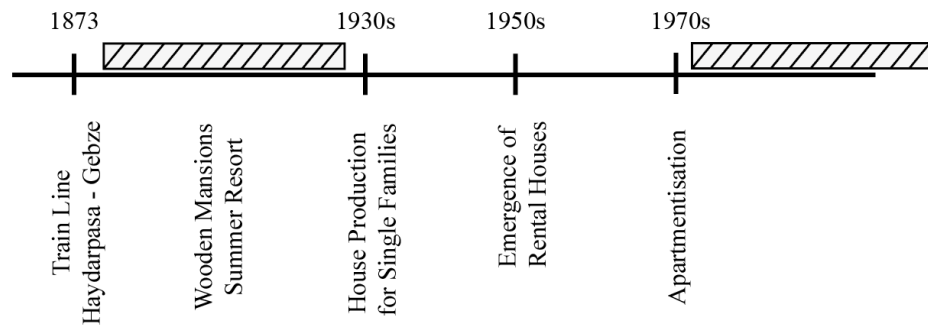


Figure 1.1: Timeline of the Development of the Feneryolu Neighbourhood

Since the main idea is based on apartment diversity and syntactic analysis of apartment plan organisations, the analyses are carried out in Feneryolu apartment buildings to comprehend the research questions. The reason for choosing this region is that it is important to observe the diversity in such close neighbourhoods to understand

the transformation more clearly while interpreting the analyses within the scope of the study and to ensure comprehensive knowledge of the field is ensured.

In addition to the building changing throughout the period, the units that are excluded such as *salle-à-manger*, central hall, storage room, guest room, maid's room or included such as, corridors, en-suite bathroom, emergency escape corridors in the plan schemes were considered. In order to calculate the mathematical transformation in domestic spaces, the decision was made to examine the Istanbul - Feneryolu apartments by using the Space Syntax method.

1.3 Structure

This thesis, which examines the urban growth and apartmentisation in the metropolitan city of Istanbul and analyses the syntactic values of the spatial configurations of apartment plan typologies, consists of six chapters.

After a brief introduction which mentions the reconstruction and developing process in Istanbul, and the variety of apartment-type housing with the reasons, the questions that determine the starting point of the thesis and how to measure these questions in the aims and objectives section are addressed. In the Scope section, the historical period that is the concern of this study within the general apartmentisation trend in Istanbul and which types of dwellings in which region is examined within the scope of this thesis are mentioned. After drawing the frame of the thesis in the structure section, a summary of the path followed from the beginning to the end of the thesis is given in the method section.

In the second chapter, research was made into obtaining data by examining the basic topics in the thesis and about apartment-type dwellings, interior spatial changes, and Space Syntax method. The theoretical discussion was conducted through the findings while the following chapter voices the history of the case area. In this chapter, a historical process that sheds light on the physical development and transformations in the Feneryolu neighbourhood of Kadıköy district in Istanbul is addressed. A detailed literature review is carried out about Istanbul, the city where the case study is conducted, and the city's local and architectural magazines, newspapers, and development plan reports are examined.

In the fourth chapter, to specify the methodology and the materials within the scope of the study aimed at examining the spatial change in apartment type houses; the residences, the spaces produced specifically for the actions carried out in it, and the relations between these spaces are handled as a whole, and Space Syntax method is used to understand and objectively demonstrate these relations. University of Michigan licensed Syntax 2D software was used to present the conceptual determinations of the method with mathematical data and diagrams.

In the fifth chapter, which includes the analysis and synthesis phase of the determined samples; apartment-type residences built in various years in between 1950 – 2020 in the Feneryolu neighbourhood in Istanbul are selected and tables and descriptions of all examples are prepared by applying mean isovist, graph and mean radial analysis, which are the parameters in the Space Syntax method.

In the last chapter of the thesis, analysis and synthesis, the data obtained as a result of the analysis are compared with each other by taking into account the plan schemes and use and interpreted in the context of the selected criteria. Within the scope of the study, the aim is to investigate the effects of the zoning plans and apartment type housing production in Istanbul as well as the plan typologies of the apartment-type houses that emerged during the apartmentisation process and are exposed to change in the Feneryolu neighbourhood.

Thus, the design criteria of the interiors of the apartment-type houses built in the Feneryolu neighbourhood, and the external factors affecting the space syntax throughout time are expressed in written and visual form.

1.4 Method

First of all, the definition of the problem is put forward with a hypothesis. In this context, the hypothesis that is determined has two main variables. These variables are defined as dependent and independent. Within the scope of the thesis, the dependent variable is the syntactic transformations of apartment type dwellings over time while the independent variable, on the other hand, is listed as zoning laws, house production techniques, the introduction of technology into the house, and the change of lifestyle. Studies conducted in line with the purpose determined within the scope of the thesis consist of four stages: source research, which is the literature review, followed by determination of the material and method, analysis and synthesis of the determined samples, and conclusion.

Theoretical discussions such as space, society, formation of dwelling, meanings of dwelling, and Space Syntax as a theory and a method were conducted with the literature review. Considering theoretical discussions, sources regarding the apartmentisation process and urban sprawl in Istanbul are investigated. The case area is selected, the construction in the selected neighbourhood is observed and the history of the physical development and transformation of the region is examined.

After the method and materials to be used are determined, samples are selected. The data which are the plan schemes, is obtained from the competent authorities. The obtained data is analysed through Space Syntax method. Syntax 2D software is an efficient analysis tool to obtain fast and consistent results.

The space sequences in the plan schemes are examined and owing to these arrangements and designs, the isovist, graph, and radial values of the domestic space of the apartments are analysed. With the isovist variables, it is visualised how spiky or rounded the isovist polygon obtained in the space is. In addition, with the "Circularity" parameter in the isovist variables, not only the circularity of the shape of a space but also the "centrality of the viewpoint within that space" is measured (Dalton and Dalton, 2001). Thus, how linear the space is compared to the plan scheme is determined. In other words, through the analyses, it is found out that whether the units split from the whole of the plan scheme and specialised. With the radial mean data, which supports the isovist data, the convex or concave of the obtained isovist polygon is radially measured and analysed. Thus, how permeable the space is, how wide, narrow, and long it is, can be interpreted by considering the function of the space. Graph analyses help to

understand how visually connected all spaces are and how many ‘steps’ it takes to cover the entire area, where the ‘steps’ are measured by how far one can see.

The thesis is completed by examining the mathematical results in the context of independent variables. The values obtained are grouped by considering the dates determined as the breaking points. The grouping technique is explained in detail in the methodology section. These groups are as follows;

1- 1950 to 1965

2- 1965 to 1980

3- 1980 to 2000

4- 2000 to 2020

Charts are created from each analysed data divided into categories and the trends of the syntactic change within the dwellings are observed and their relations with independent variables are examined.

1.5 Chapter Assessment

In this chapter, the apartmentisation process in Turkey is briefly mentioned and the factors affecting the residential interior design are investigated. The aim of the thesis was explained as to understand the relationship between the external factors and the spatial developments and Space Syntax values in the apartment type dwellings. While defining the transformation of the space with mathematical data, it is aimed to consider the conditions in the process of physical transformation and to interpret the change in syntactic values of the interior based on social theories.

While determining the scope of the thesis, the construction process in the Feneryolu neighbourhood, which is the case area, was examined. The date range of the thesis was identified through the determination of the emergence of the apartment type houses in the Feneryolu neighbourhood.

Each chapter was briefly summarised in the structure of the thesis. The thesis starts with the investigation of the causes of syntactic transformations of interior spaces in apartment type dwellings. In the second chapter, socio-spatial theories and Space Syntax theory are discussed. The third chapter provides comprehensive information about the production of apartment type dwelling in İstanbul and the case area. In the fourth chapter, the method used in the study is mentioned and the analysis process is demonstrated with an example. The fifth chapter is the section where the synthesis of the obtained analyses results is made. The sixth chapter contains the results of the thesis.

In the method of the thesis, the construction of the hypothesis, the determination of the method, the selection of the material, the sample selection, the approach to the study and the analysis-synthesis process are briefly mentioned. In other words; the general method of the thesis is described. In the fourth chapter, the whole methodology is explained in more detail.

The next chapter will voice the theoretical discussions on space, society, socio-spatial changes in dwellings, the relationship between the Space Syntax theory/method and domestic spaces.

CHAPTER II

THEORETICAL DISCUSSIONS

In this thesis, in which apartment-type housing forms and space organisations and their syntactic transformations are examined, on the one hand, the social transformation of space is discussed, on the other hand, discussions and studies about how space and specifically housing are analysed with the space syntax technique are the concern of this section. Understanding the meanings of space, the linkage between space and society, and how spatial sequences are shaped will help to understand the social basis in the syntactic changes of houses.

2.1 Space and Society

The effect of syntactic transformations in domestic space on spatial practices, or the situation where newly generated space practices shape the domestic space is an endless cycle that occurs between the space and the user. In this cycle, rather than discussing the house in particular, firstly examining the concept of space and putting forward the arguments about the creation of the space is an important key in understanding the space in this thesis.

On the other hand, the differentiation and reproduction of the space practices by the subjects with their own experiences is also a reflection of the societal culture to

which the individual belongs. In this context, the phenomenon of society and space is one of the important arguments in this thesis.

2.1.1 What is Space?

Space has been defined in different ways by various disciplines throughout human history. Space has no common definition or boundaries. Disciplines that place 'space' at the centre of their work have perceived and defined space according to their own working purposes. For this reason, it can be said that conceptual differences make space a rich 'thing'. However, although the definitions made according to the way the space is perceived and handled, sometimes support each other, they can also contain opposite meanings. Therefore, it is seen that the space is defined by evaluating it from different perspectives, and instead of talking about similar definitions of space, the differences in the definition of space should be seen for their diversity and richness (Usta, 2020).

Democritus, one of the ancient Greek philosophers, accepted space while working on the existence. According to him, existing things are comprised of infinite and small particles. These atoms, which are infinite and indivisible, differ in size and shape and are subject to a necessary motion. In this case, Democritus admits an empty space to explain the movement. Plato, on the other hand, considers space as a container that contains everything that exists. According to his ideas, space has neither form nor limit. The place does not change completely. There are objects in space; small and large objects congregate to form the universe. In other words, according to Plato, there is no such thing as a void in the universe.

Similarly, Aristotle argues that objects constitute space. What limits the space is the movement of an object and the object itself. In this case, Aristotle rejects the emptiness of space and theorises the concept of a finite space. Therefore, he does not have an absolute understanding of space that encompasses the universe (Kahveci, 2007).

When the most important definitions of space by 20th-century scientists are examined, both various and opposite concepts emerge. According to Newton, space and time are absolute. Space is infinite and does not change depending on anything; it remains the same and does not move. The movement of the objects in the space does not cause a change between the objects. On the other hand, Leibniz opposed Newton's view. Leibniz defines space not as an entity, but as a set of topological relations between objects and incidents. Of this he defines space as existing at the same time in the arrangement of objects that coexist and in their relation to each other (Harvey, 2006) and space is not just any state or position of objects, but a set of states, an order of possibilities for their coexistence (Leibniz, 1961). Einstein, on the other hand, argues that with his "theory of relativity" the perception of space and time is relative, unlike Newton's absolute space.

'Space' has been the subject of research and discussion from ancient philosophers to 20th-century scientists, and until today. Philosophy and science conceptualised space with abstract and concrete definitions. In architecture, the other side of the coin, space is the most basic and essential element since it contains humans. The relationship between space and architecture began ten thousand years ago in Mesopotamia. Architecturally, Zevi does not consider only the spatial form, but rather the spatial effect of the whole (Zevi, 2015). This effect is determined by the

organisation of the surfaces that limit the space, lighting, and even symbolic motifs (Usta, 2020).

According to Lefebvre, absolute space means an empty space defined by geometrical meanings (Lefebvre, 2001). He defines space with expressions such as euclidean, isotropic and infinite, and evaluated the space in a mathematical framework. Another definition of absolute space was made by Harvey in his book "Social Justice and the City". According to him, absolute space is a concept that can only be defined by its own existence, without the need for the existence of the objects around it. He thinks that acknowledging space as an "absolute concept" makes space a "thing-in-itself" independent of matter (Harvey, 2006).

Space and subject are two inseparable elements in architecture. The subject, that is, the human being, is surrounded by the space with abstract or concrete boundaries while experiencing the space. According to Usta, all spatial creations in the real sense are first of all formed by the enclosing of a subject (Usta, 2020). Spatial structure is formed by the enclosing of the middle axis, which is formed by the human being physically or abstractly. The spatial organisation as an outcome of this situation creates the space, which is the main element in the evolution of architecture. For this reason, architecture as an art is fundamentally different from all disciplines in the applied arts and presents a situation that surrounds the human being (Schmarsow and Fiedler, 2017). Usta underlined that the perception of the spatial structure as an external body with its own organisation and spatial structure should not be confused with geometric space. She put forward the definition of space with "the feeling of space" by the human, who is the subject of the space (Usta, 2020).

Usta, supported her definition of space with the following words of Goethe "... we must feel the enthusiasm of a beautiful place, even if they took us there blindfolded". The perception/feeling of space by the subject, hence the existence of space, is reminiscent of Peter Zumthor's Therme Vals, a hotel/spa complex located in the town of Vals in the Swiss canton of Graubünden.

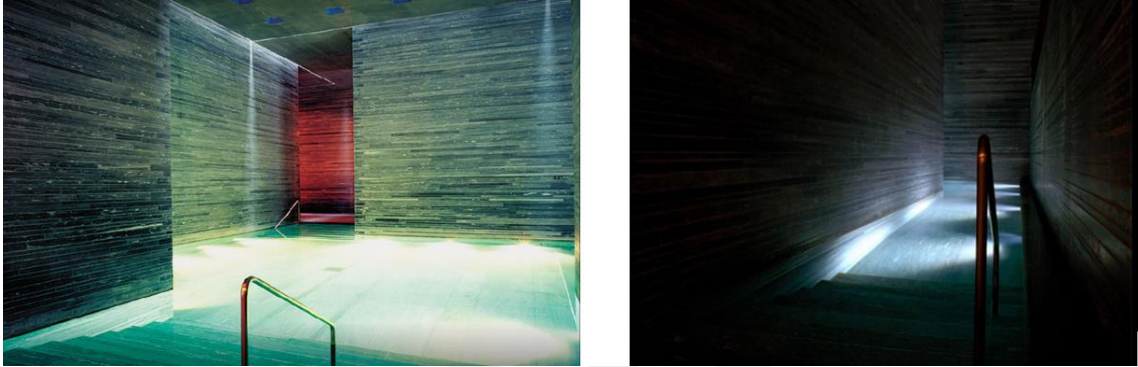


Figure 2.1: The Therme Vals. (URL – 4)

İhsan Bilgin examines Zumthor's Therme Vals project in his book titled "Mimarın Soluğu - The Architect's Breath" and mentions that Peter Zumthor's thermal building allows us to feel the space, it separates time and space from each other and enables us to experience space not only with our sense of sight but also with our other senses (Bilgin, 2016).

In this case, the sensation of space manifests itself in a direct sense of the body and means feeling it with all the senses rather than just being perceived visually

2.1.2 “Space” in Relation with Society

Humans create society and their own culture naturally with the place they occupy in the world, their consumption behaviours, and information exchange. In addition to being in a place, society provides the possibility of communication with each other while arranging people in the place. Hillier and Hanson, in their book *The Social Logic of Space*, state that while society groups people into various categories, it also physically organises the space (Hillier and Hanson, 1984). This physical order defines space for society with buildings, boundaries, and zones.

Spatial order is shaped according to cultural differences. Since people create their own social existence and environment, there are cultural and spatial differences between societies. The fact that cultural differences between societies cause spatial differences has led to the definition of spatial order as a part of the culture. In addition to the aforementioned definitions, space is defined as mass-produced, artificial, active, and most importantly, variable when it is considered with society (Uluoğlu, 2004). In the holistic approach, the relationship between subject (human) and object (space) is dialectical. Space no longer defines a void as Lefebvre and Harvey advocate, but a phenomenon that is grasped, produced, and inhabited by the body. Therefore, a human's relationship with space evolves as an open-ended circular relationship that is constantly fed from daily life. In this environment, the space reproduces itself actively and interminably.

According to Aydınlı, this situation makes it possible to perceive the complex and multi-layered structure of the concept of space and to experience it spatially. The spatial experience takes place as a result of perceiving the subject and space as a whole that affects and constantly changes each other instead of perceiving them as separate phenomena. The potential of possibility inherent in spatial experience allows the

experience to be reconstructed repeatedly (Aydınlı, 2008). This explains how the possibilities of spatial experience multiply when it is considered together with the principle that re-established small relationships will greatly change the outcome (Çetin, 2008).

In the article, *The Problem of Space*, Hillier and Hanson think that it is not correct to limit the connection between society and space only to culture and lifestyles (Hillier and Hanson, 1984a). The radical changes of the spatial form, the relationship between the spatial environment and society are the factors that cause the evolution of society to a large extent. "...these shifts appear to be not so much a by-product of the social changes, but an intrinsic part of them and even to some extent causative of them. The agricultural revolution, the formation of fixed settlements, urbanisation, the early development of the state, industrialisation, and even the growth of the modern interventionist society in which social and spatial changes appear almost as necessary dimensions of each other." (Hillier and Hanson, 1984).

Moreover, there are cases when society forms a spatial system. Hillier and Hanson compared the spatial forms of Forter and Turner's cases, Tallensi compound and Ndembu village (Hillier and Hanson 1984b). The reason for this is to grasp two completely different societies, their space logics, and social systems in space syntax.

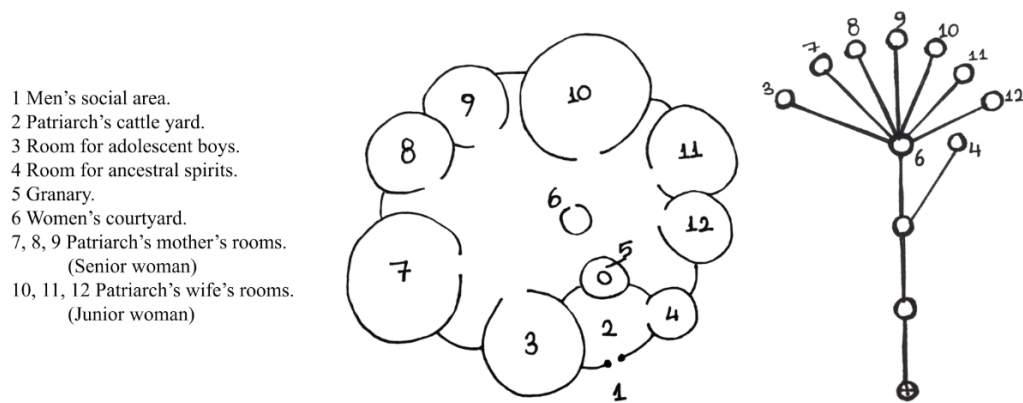


Figure 2.2: Tallensi Compound (Hillier and Hanson, 1984)

Tallensi is a dispersed village. However, although the compounds have a complex appearance, they are designed in a certain order. The Tallensi house is the embodiment of the Tallensi philosophy of life. It is shaped by the social life of the Tallensi society; therefore, space is a social product in the Tallensi compound.

The interconnected spaces create intimacy. The space numbered 1 is the men's social area. Number 2 is the cattle yard inside the entrance area. Number 4 is room for ancestral spirits. The spaces numbered 1 and 2 are identified with male members of the compound. While the area defined with men is the most dominant area where the internal-external relationship of the compound is managed, the units for the senior women are the second most powerful areas to control the interior relations. The courtyard numbered 6 is reserved for women.

There is a hierarchical order between the units, thus the space syntax must comply with this hierarchy. In addition to hierarchical social practices, there are segregated social experiences in space. For example, cooking and eating occur among separate nuclear groups. The focal point where women and men come together is the

granary. The hierarchical order and the daily life routines of the Tallensi people created non-interchangeability in space syntax.

When Tallensi young men start their own families, they first add a new section to the parental compound with their own entrance, then they become completely independent, albeit in the same vicinity. They follow exactly the same spatial pattern for their own compounds. Not all compounds are exactly alike, but they are designed with a particular principle. Contrary to the principle developed for indoors, the compounds are randomly distributed over the area. Concordance at the micro-scale does not exist at the macro-scale. There are sub-groups of compounds formed in a region, and these units together form a settlement, and no one interferes with anyone's domain.

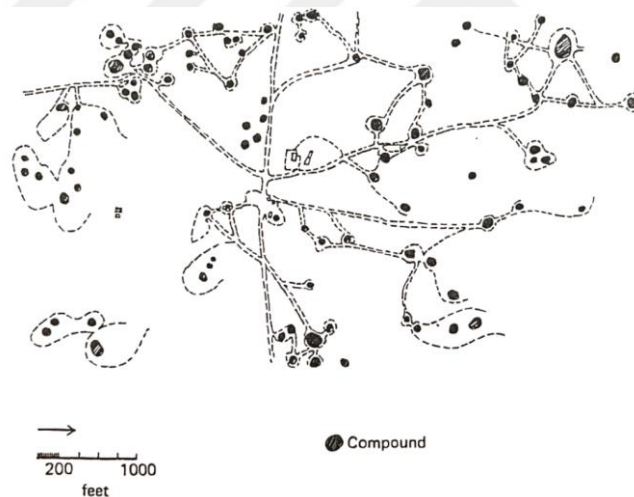


Figure 2.3: Tallensi Landscape (Hillier and Hanson, 1984)

Unlike the Tallensi compound, the Ndembu village consists of independent and randomly scattered huts. “These circles of huts are traditionally known as nyikala (sing, mukala) and This term may be translated as * village” (Turner,1996).

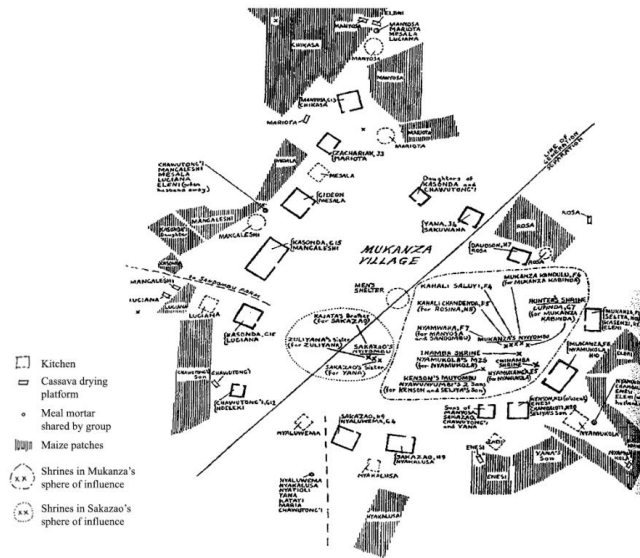


Figure 2.4: Ndembu Village (Turner, 1996)

According to Hiller and Hanson “superficially the Ndembu village appears to be a case where the idea of correspondence between social and spatial structure is achieved” (Hiller and Hanson, 1984). In fact, Ndembu villagers and the spatial appearance of the village is defined as highly unstable. Although Ndembu village seems disconnected in terms of the settlement, the generality of the village is linked to the headman with the ties of kinship.

The most crucial situation that differentiates Ndembu village from the Tallensi compound is that the Ndembu society is known as matrilineal. This situation creates instability. Because Ndembu women have the right to divorce, and when they get divorced, they can take their children and settle in with their brothers. The fact that the child's bond with the mother is stronger than anything else makes the bond of the child with his father and his village weak. This undermines continuity and stability in Ndembu village.

2.2 Formation of Dwelling

It can be said that housing is a cultural product and a disciplinary concept based on the examples produced in the relationship of space and society. Therefore, culture, behaviour and space form an interaction system. For example, Rapoport described a building as the product of the interaction between humans and the physical environment. In other words, the elements that represent the human being; biological structure, social organisation, worldview, lifestyle, and social, psychological, and physical needs, whereas the elements that represent the physical environment are climate, settlement, material, and technology (Rapoport, 1969). With the interaction of these two basic elements, the physical environment in which social behaviours are exhibited occurs.

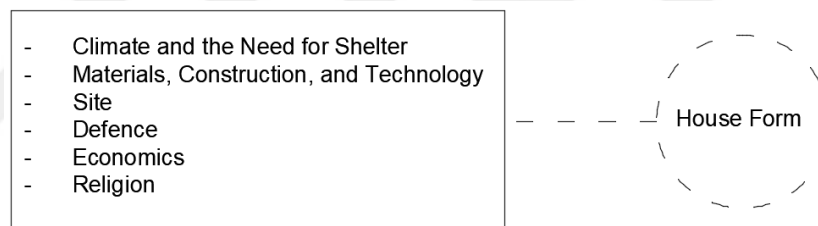


Figure 2.5: Alternative Theories of House Form, (Rapoport, 1969)

Rapoport, in his book 'House, Form and Culture', in which he discusses the reasons for the diversity of house forms/types and produces alternative theories, states that cultural factors, as well as climatic, economic, technology, material, defence and belief factors, cause the form and type of house to be determined (Rapoport, 1969).

Turgut (Turgut, 1990), on the other hand, categorised these factors in her own study and examined the place of the factors affecting the housing formation in the design process. According to Turgut (Turgut, 1990), when the environment is considered at micro and meso scales, it is seen that there is a circular relationship

between environmental, socio-economic factors, cultural components and building form in the formation process of a house.

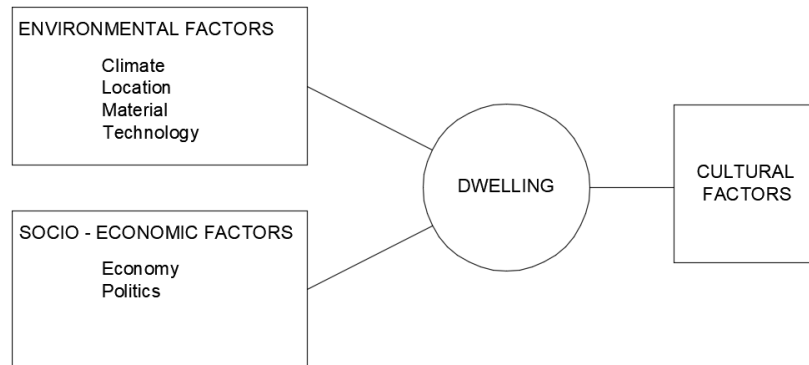


Figure 2.6: Factors Affecting the Formation of Dwelling, (Turgut, 1990)

The effects of these factors on the formation and design of the house occur at different stages and rates over time. Similar to the design principles of space production in Tallensi compound and Ndembu village, there are irresistible factors that affect the design as well as certain elements in housing production. These factors are called secondary or leading factors (Altman and Chemers, 1980).

The leading factors are also the determining factor of the housing type as well as the spatial configuration being arranged in different ways. An important foot of the methodology of this thesis is based on this table.

2.2.1 The Meanings of Dwelling

In essence, a dwelling is a social unit in which each individual and family's own culture, history and traditions are transferred to the next generations. It is the scene of different social behaviors. It brings individuals to society. Dener defines dwelling as

“the foundation of stone of the society” (Dener, 2005). One of the meanings of the dwelling is that it is a means of expression.

Uğur Tanyeli, in his book “Konutu ve Modernleşmeyi Metropolden Okumak - Reading Dwelling and Modernisation from the Metropolis” (Tanyeli, 2004), talks about the struggle of dwelling with modernity. He tells through Ronwlandson's cartoon that the people of the modern age are not at peace with their dwellings and that there is a never-ending tension between the two.



Figure 2.7: Rondlandson’s cartoon^{vi}

Taste became a "demonstrable" action in modern people. The purpose of this action is to design one's own micro-environment according to his or her taste, to show his or her status in society and to become individualised.

Tanyeli defines the traditional house as the inevitable, unthinkable space of the non-individualised human being as a necessary result of the 'vernacular epistemology'. Consequently, a modern human being can exist with spaces and objects, therefore, by "possession". In 19th century European residences, this situation occurs as "horror vacui"(Tanyeli, 2004). According to them, having a voice and becoming individualised by filling the interior and exterior spaces with all kinds of goods is a basic function that makes people human.

The visualisation of individualisation has also led to experimentation in the dwelling. Sharing this view, Aytanga Dener states that; “dwelling is an agent that plays an important role in articulation of social and cultural identity” (Dener, 2005). Additionally, Mougenot argues that dwelling determines the position of people in the social sphere (Mougenot, 1988).

Furthermore, the dwelling is the first environment in which social relations are learned how to be established. In this context, individuals develop their social behaviors in the dwelling and are prepared to communicate with other individuals in the society. Housing regulations, according to Mougenot, are used to develop morals in the middle classes. Housing benefits the entire society, but especially the lower classes, in terms of morals and social peace (Mougenot, 1988).

Dener, also states that the house is “the place where the inhabitants are cured physically and psychologically” (Dener, 2005). This gives the dwelling the definition of being a rehabilitation place. There are cases where the dwelling is not only a place of healing but also a place of punishment in cases such as forbidding children to leave the house, or house arrest for offenders.

2.2.2 Dwelling and Social Structure in City

Transformations occurred in dwelling types due to modernity and environmental, socio-economic, and cultural factors shown in Figure 2.6. These changes also affected the social structure. Likewise, the influence of the social structure also had an effect on the dwelling typologies. Aytanga Dener says that housing types differ in every social period. According to her, this situation is proof of the change of the social structure. In this context, the relationship between changing dwelling typologies and social formation can create a diachronic study (Dener, 2005).

The most critical breaking point in dwelling forms and social structure occurred with the industrial revolution, which started in England in the second half of the 18th century and affected all the world. Agriculture lost its primary importance as a source of livelihood, and the masses have begun to supply their labour in industrialising cities in the face of the increasing demand for industrial production. Cities are settlement forms where non-agricultural production is carried out and, more importantly, the control functions of the distribution of both agricultural and non-agricultural production are gathered, and have reached the levels of size, heterogeneity, and integration according to certain technological development levels (Kıray, 1998). Although the increasing importance of cities with the Industrial Revolution and the increasing labour demand in cities are met by migration from rural to urban, the cities were insufficient against the rapidly developing population movements and housing problems began to occur in many industrial cities. Due to the world wars that took place in the years following the industrial revolution, the housing problem in the cities grew and became inextricable. The fact that the rapid increase in urban poverty, need for housing became a luxury for a significant part of the citizens. The fact that urban poverty and the social problems associated with it increasingly pose serious threats to the whole society led to the necessity of public intervention. These problems were tried to be solved with the social housing policies that started to be implemented in Europe at the end of the 19th century and in other countries from the first half of the 20th century (Kunduracı, 2013).

The first known major application in the field of social housing was made in London's "Bethnal Green" area. Bethnal Green social housing was built on the site of shelters where approximately 6,000 people lived in poor conditions (Greenhalgh and Moss, 2009). With this urban clearance project, not only the areas of the poor were improved, but also a part of the city that was seen as diseased was healed.



Figure 2.8: Benthall Green Social Blocks

They are designed as Home for Families by architects who are members of The Society for Improving the Condition of the Laboring Classes SICLC. Positioning the stairs outside of the houses was to provide air circulation for health, ignoring the winter cold, and to provide education for living together with the society thanks to the street-house connection. At this point, as Mougnot stated in the previous section where the meanings of the dwelling were discussed, dwelling becomes a tool for creating social peace that can be manipulated by the authority and has a regulatory effect on lower classes (Mougnot, 1988).

The Model House for Families of Artisans, exhibited at the World's Fair in 1851, was designed by architect Henry Roberts, also a member of SICLC (URL – 5). Consisting of 2-5 floors and 4-20 flats, each of these residences, which envisages meeting all needs indoors, had a master bedroom and 2 small rooms, an anteroom and a kitchen-like space. When it was necessary to build housing for more families, floors could be built on top of each other or side by side with the same space organisation.

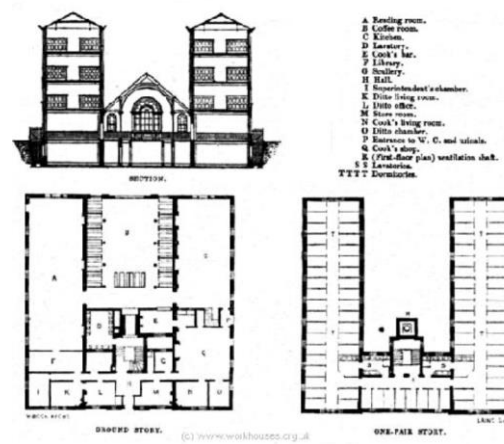


Figure 2.9: House for Families

As it is seen in social housing, for example, the housing preference mechanism gives clues about the social structure and family structure of the individuals. Housing preferences work in parallel with income level and therefore lifestyles. Lifestyles are in constant change depending on various external factors and this state of change contributes to the solution of spatial problems by emphasizing the various needs of the society (Michelson, 1987). In the example of Bethnal Green Social Blocks, the authority tried to ensure that low-class people who were suffering from unemployment and poverty would follow the urban order thus reduce the crime rate in the city by placing them in the Social Blocks. However, it is a matter of debate whether the example of Bethnal Green urban clearance is a practice that fully fits with Michelson's theory of solving the spatial problem. The reason for this is that people living in monotonously designed blocks that are designed only based on income levels. Even if they have the same ethnic origin, every society has a diverse cultural background. The cultural structure that differentiates the society also shapes the environment through interventions (for a detailed explanation see: Curado's Blocks, Amorim and Loureiro, 2001). As a result, the fact that Bethnal green blocks are only produced with the same plan scheme ignores one of the most important factors determining the lifestyle such as

"culture". In this context, while solving the spatial problem, the decisions taken by the authority resulted in inappropriate and inefficient projects.

Altman and Chemers state that housing preferences are a reflection of the family and a societal structure (Altman and Chemers, 1980). Family and social structure can be interpreted from the plan typologies and space syntax of the preferred houses. In the spatial arrangement of the houses, it can be clearly seen that if the house is for the extended family or nuclear family, the roles of the parents, the parent-child relationship (Edgü, 2003). This means that social structure is a factor that shapes the house. The lifestyles of dwellers are divided into three categories according to Bell (Bell, 1965).

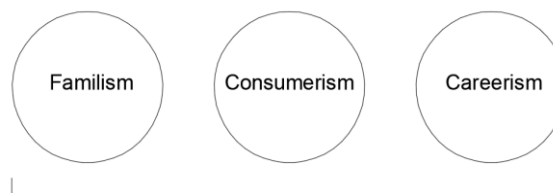


Figure 2.10: Three main lifestyles of Bell (Bell, 1965)

In familism, the way of life is determined by raising children. People who have adopted the consumerism lifestyle always have a strong urge for 'possession'. In the Careerism lifestyle, the focus is on the profession and everything else is secondary. Moore designed a new grouping by further elaborating Bell's (Edgü,2003). According to Moore, there are four different lifestyles that drive environmental preferences (Moore, 1972). Each of these lifestyles has different priorities.

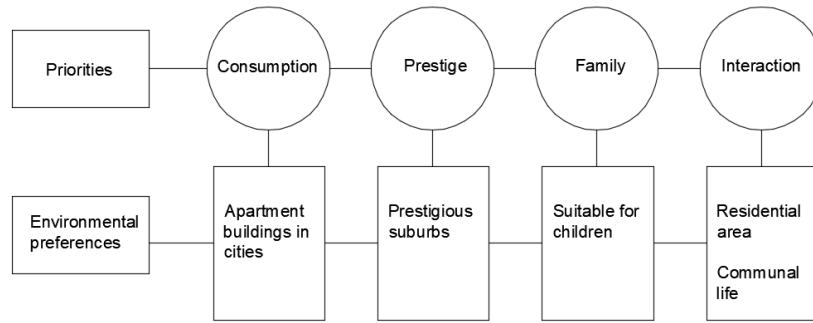


Figure 2.11: Four lifestyles and environmental preferences of Moore (Moore, 1972)

While the group that belongs to the consumerist lifestyle prefers the apartments in the city centres, the group that attaches importance to social prestige prefers the suburbs. The most important preference criterion in family-oriented housing and environment selection is that the environment is suitable for children. Another group is the group whose priority is social interaction. The most important criterion in the housing and environmental selection of this group is that it is a residential area.

2.3 A Theory, A Method: Space Syntax

“To grasp space, to know how to see it, is the key to understanding of building” (Zevi, 1957).

The term space syntax is simply but fundamentally defined as “the set of rules necessary to produce different spatial organisations” (Hillier and Leaman, 1974). This method was first developed by Hillier and Hanson. It is defined as a set of techniques or methods used to explain and classify spatial formation in residential areas or buildings (Hillier, B., Burdett, R., Peponis, J., Penn, A., 1987; Edgü, 2003, Şalgamcıoğlu, 2013). It obtains important data as an analysis method and defines the built environment as theory (Şalgamcıoğlu, 20013). With this method, it is found that interior and exterior

formations are the result of various cultural approaches and affect social relations in one way or another (Edgü,2003). Space syntax attempts to define how spatial configurations reveals social or cultural meanings and how the built environment provides social interaction (Dursun, 2007).

Syntactic measurements of the built environment are easily made with the Syntax 2D software developed by James Turner at the University of Michigan. These measurements are made with vision fields called 'isovist'. Benedikt argued the definition of environment before the definition of isovist. According to him, the environment consists of visible real surfaces in a space. Isovist, on the other hand, is the whole of the points seen from a vantage point in a place that is surrounded by visible real surfaces (Benedikt, 1979). To obtain the Isovist field, a distinction must be made between the object and the environment. Benedict briefly made this distinction as 'movable objects' and 'immovable environment'.

In this context, in order to determine the isovist field, all objects that exist in the space and cannot move, viewed from the vantage point are considered as walls (Benedikt, 1979; Turner and Penn, 1999; Batty; 2001; Turner et al., 2001; Dalton, 2001, Ünlü et al., 2009; Şalgamcıoğlu, 2013).

2.3.1 Space Syntax in Architectural Design

The space syntax method can be used not only for the built environment but also in the architectural design process as a prediction tool. In this way, it is possible to research various design alternatives, analyse and evaluate designs, and develop new design solutions if necessary. The space syntax method is a method applied not only in residential buildings but also in open and closed public spaces such as squares, train stations, airports and even in the urban design process. Since it is an analytical,

quantitative and descriptive analysis tool, it is used to analyse spatial constructions in different forms such as cities, landscapes, interior spaces and buildings (Hillier and Hanson, 1984; Hillier, 1996, Dursun, 2007).

An individual in an environment moves his or her body, head and eyes to perceive the environment in order to gain more detailed information about it. When the person moves from one point to another, the field of view and the size, depth and form of the surfaces he or she perceives change. The space syntax method and the assistive software provide this experience in a digital environment, explaining the syntactic relationship between person and space or between space and space with various parameters. Grasping spatial configurations, understanding the formative processes of spatial configurations and the social meanings of spaces form the basis of space syntax research (Bafna, 2003).

2.3.2 Application of Space Syntax Method in Projects with Different Scales and Functions

As mentioned before, the space syntax theory and method are used both in the design phase, in the analysis of the built environment and in the improvement projects, to grasp the potential of the use of space. While giving clues about the character of the built environment, it tells how efficient the projects in the design phase are with various parameters.

One of the areas where the space syntax technique is used is the improvement works of Trafalgar Square in London. The government wanted to rehabilitate this area as the public area between Trafalgar Square and Parliament Square in London is dominated by traffic and therefore is an unsafe and unpreferable area for the citizens.

During the design phase of the project, the Space Syntax Laboratory collaborated with the design office by making an observation and a collection of data on existing space-use and movement patterns. First of all, pedestrian movements were observed in more than 300 different locations and at different times, on different days and in different seasons. As a result of the case study, it was revealed that the citizens only used the edges of the square as a transition area due to the stairs surrounding the square.

When the syntactic values are calculated with the space syntax software, the most striking points of the pedestrian movements fully corresponded with the computer model. In fact, more detailed results were obtained from the model. The most accessible regions in the axial analyses are indicated by red lines (Dursun, 2007).

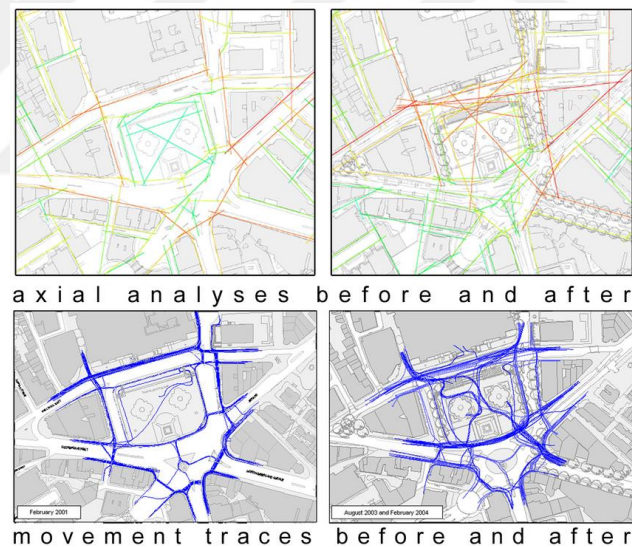


Figure 2.12: Trafalgar Square (Space Syntax), (Dursun, 2007)

As a result of the syntactic data obtained, design solutions were produced. One of the design solutions is to design a new staircase and the other is to connect it to Parliament Square with a larger area (Space Syntax, 2004; Dursun, 2007).

The space syntax method is an auxiliary tool that provides data in the decision phase and analysis of interior spaces as well as contributing to the design process at the urban scale. For instance, the space syntax method was used in the design process of the wing project of the Tate Britain building. Space Syntax Laboratory collaborated with Tate Britain architects on the project of new exhibition space in the Tate Britain building. During the process of designing an additional unit for the building, case studies were carried out and there was an attempt to comprehend the social use of the existing plan scheme. In this context, pedestrian movements were observed from 300 different locations. Field research took place at different times of the day, on different days of the week, and at different seasons of the year (Dursun, 2007).

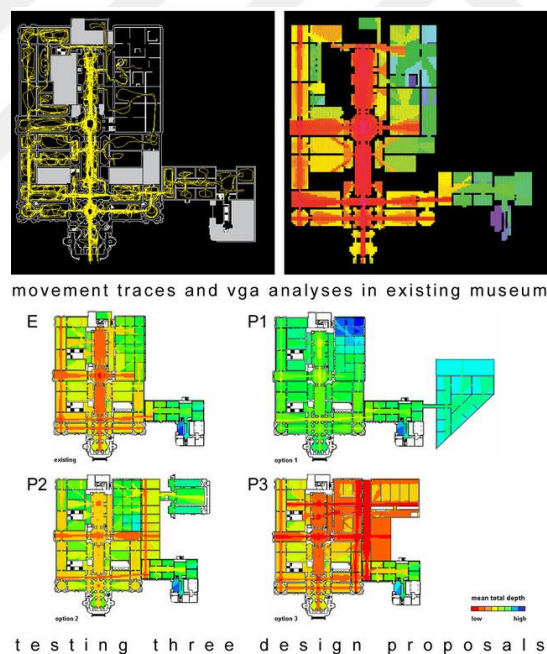


Figure 2.13: Tate Britain, (Space Syntax, 2002; Dursun, 2007)

Three proposals prepared by the architects were examined with both survey and space syntax analysis and the results were synthesised. In the figure 2.13, E indicates

the existing layout of the building, P1, P2, and P3 are the three proposals tested through space syntax software.

In the results obtained, Proposal 1 and Proposal 2 projects are with high spatial depth. According to the pedestrian movement trace made on the existing layout, the density is seen in the middle axis, which forms the spine of the building. While Proposal 1 and proposal 2 affected the existing layout negatively, the spatial configuration of proposal 3 positively affected the plan scheme with the highly accessible new units.

The space syntax method has been one of the most important tools in the decision phase of the Tate Britain additional unit project. Testing the proposals with space syntax software saved both time and money, and the efficiency of use of the interior space is increased with a rational spatial arrangement.

Using the space syntax method, Rohloff, Psarra, and Wineman examined the spatial configurations of three different museums and investigated the effects of museum morphologies on the use of space. While doing this, they focused on the atria section of the museums, emphasised the visibility parameter and discussed the relationship between visibility and space use patterns. Three museums were examined in this study: the Yale Center for British Art, New Haven (YCBA), the Museum of Modern Art-New Expansion, N.Y. (MoMA), and the High Museum of Art, Atlanta (HMA).

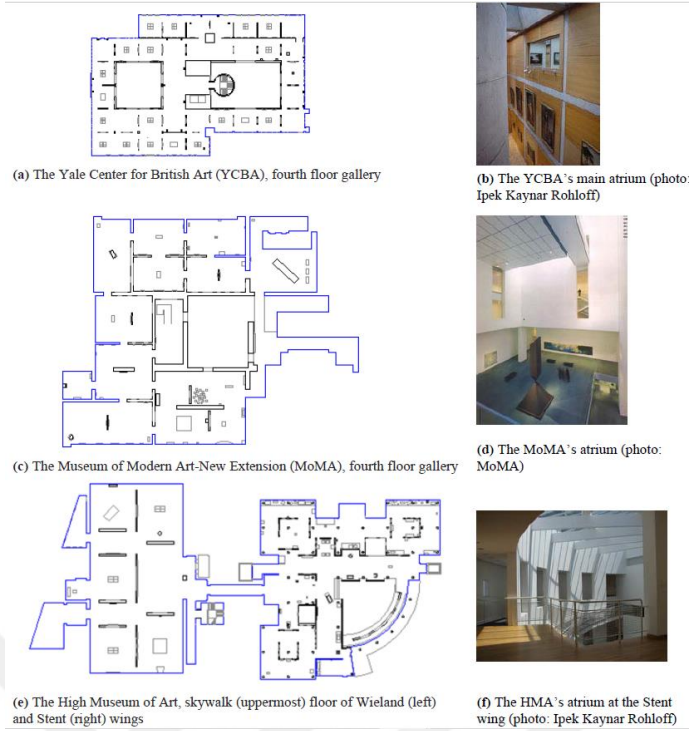


Figure 2.14: YCBA, MoMA, and HMA's layouts and pictures of the atriums

They determined three groups of space-use patterns for data collection; “visitor's movement paths, stopping to view displays, and stopping to survey exhibitions and/or space” (Rohloff, Psarra, Wineman, 2009). For the observation, visitors are tracked in the range of 25-34 people in each museum. Movement path, data on the behaviour of viewing displays, and data on the behaviour of scanning spaces data were collected in various observation and record methods. In order to measure the effect of Visibility on the use of space, the collected data is used in the correlation phase.

	YCBA	MoMA	HMA
<i>r</i> value	0.82	0.75	0.77
<i>R</i> ² value	0.67	0.56	0.59
Mean V. Connectivity	782.58	916.46	1018.46
Mean V. Integration	8.24	6.08	7.07
Number of grid cells	6466.00	11033.00	11423.00

Table 2.1: Syntactic values of the YCBA, MoMA, and HMA

When the Visual intelligibility, mean connectivity and mean integration analyses of all three galleries are performed and compared, the YCBA's connectivity value is higher than the others, due to some doorway connections. Similarly, YCBA's visual intelligibility value is the highest. Which means the visitors of the YCBA will easily grasp the layout of the gallery through perception of local visual information. As a result of the correlations of the mathematical values with the data obtained by the survey, some significant results were found. As a result, it has been proven that user behaviours are related to space morphology.

Rohloff et al.'s work used the Space syntax technique in existing environments and measured the effects of morphology on space use. In this study, which is about the importance of visibility value in large and complicated spaces such as galleries, it is concluded that morphology is a factor that should be taken into account in the architectural design decision stage (Rohloff, Psarra, Wineman, 2009).

2.3.3 Space Syntax and Dwelling

Although the space syntax theory and technique is generally used in large-scale projects, there are examples where it is used in dwellings as well. Spatial configuration, depth, permeability, and interrelationships of spaces in the house are some of the parameters examined. There are studies that analyse the interior spaces of houses, especially in traditional houses since they contain vernacular spaces and spatial arrangements.

Alper Ünlü, in his study on the circulation area of traditional Turkish houses, which are also similar to Syrian and Iraqi houses (Ünlü, 1998), examined the "sofa"(Ünlü, 1999). By researching 120 traditional Turkish houses, he focused on the spatial configuration with the neighbouring spaces, integration, and depth value

parameters of the “sofa”, which is the core of the traditional Turkish house. He analysed the housing typologies in 3 main categories. These are outer sofa houses, central sofa houses and inner sofa houses. However, the outer sofa was examined under 5 headings. These are “outer sofa houses with two rooms, outer sofa houses with multi rooms, outer sofa houses with lywans, outer sofa houses with kiosks, outer sofa houses with kiosks and lywans” (Ünlü, 1999).

When he compared the values, he obtained through only the syntactic measurements, he found that the integration, depth and compactness values were higher in houses with inner sofas. In the study, Ünlü stated that depth value is a parameter that concerns the relationship between units and has a large share in the changes in housing typology (Ünlü, 1999).

As a similar study, the permeability and visibility analyses of 20th-century Turkish houses were made by Yasemin İnce Güney (Güney, 2005; Güney, 2007). Visibility analyses were carried out on 108 apartments built between 1920 and 1990. As a result of the analysis, she carried out by dividing the houses into 3 groups, the visually integrated spaces in the first and second group buildings are the central halls called "sofas". However, there is a difference in the depth value of the sofas in the first and second group houses. Sofas in the first group dwellings are directly welcoming the users, however, in the second group of dwellings, sofas are reached through entrance halls. In the last group, while the integration values of the guests welcoming units increased, the bedrooms areas were more segregated.

Another study into domestic space using the space syntax method was made by Şalgamcıoğlu and Ünlü. (Şalgamcıoğlu, M., E., and Ünlü, A., 2013). In their study on the change in the social structure of the society and housing regulations, they made syntactic analyses of the interiors of apartment-type dwellings built between 1930 and

1980. They divided the houses into 3 functional zones and examined them. The apartments examined were divided into two categories as phase 1 and phase 2. The average values of the analysis results made with the selected parameters for the phase 1 and phase 2 apartments were compared. All correlation results between syntactic values and phases were tested with the SPSS program.

A study in which the Space Syntax method was used in mezo scale research was made by Amorim and Loureiro. Amorim and Loureiro, in their study of the transformations of mass housing in Brazil, draws attention to the intervention of inhabitants in buildings and public spaces (Amorim and Loureiro, 2001). The interventions in buildings and public spaces happens instinctively by the user.

Brazil has been a country influenced by modernist ideas in social housing production until the end of the 80s. With this trend, apartments with urban spaces on the back and front were built. The Curado housing complex, built in the 1970s, is a typical example of these buildings (Amorim and Loureiro, 2000). Although the project was designed with a modernist approach and rationally organised interior spaces, it was interfered with by inhabitants. This is because the design principles of the project conflict with the cultures and social relations of the inhabitants. The fact that the spaces between buildings belong to "nobody" does not match the privacy, control and identity factors that inhabitants need (Amorim and Loureiro, 2001). Inhabitants wanted to have a control mechanism by securing building entrances with semi-closed spaces. For this reason, walls, iron railings and doors were added to the project with user intervention. This situation caused changes in the axial map. The purpose of the users is to have control over accessibility and visibility.

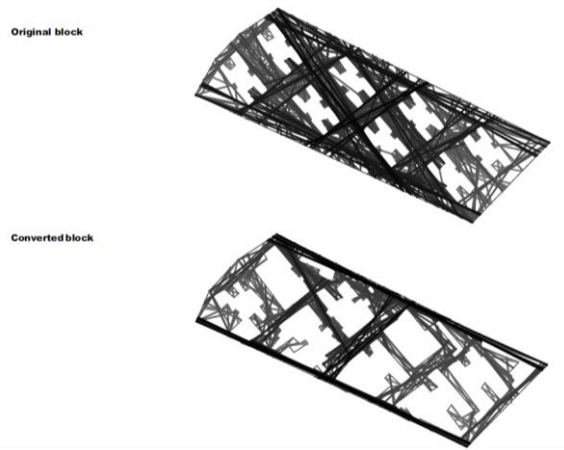


Figure 2.15: Axial map of Curado's blocks before and after

The analyses made on Curado's blocks are also a reference work for the other similar projects in Brazil, as most places in Brazil have changed in the same way. The most important result of this study is that these spatial changes reveal the difference in knowledge of domestic activities, social structure and demands between the designer and the user.

2.4 Chapter Assessment

In this chapter, where the theoretical discussion is carried out, first of all, the definitions and discussions made by philosophers and scholars from various disciplines are examined in order to understand the concept of space. After this, the relationship between architecture and space was emphasised. In architecture, space was defined as an active and variable phenomenon that surrounds people, perceived not only by the sense of sight but also by all other senses.

Then, the relationship between space and society was examined. This relationship is discussed over Tallensi compound and Ndembu village, whose social structures are completely different from each other. The effect of social structures and culture on space has been understood through these two cases. Studies on the factors

affecting the housing form were examined. It has been determined that the continuous interaction of culture, behaviour and space is one of the most important factors that shape dwelling. These factors have been categorised by the experts and examined under separate headings.

Since housing is shaped by culture and social structure, housing cannot have a single meaning like space. In this case, when the definitions of the meanings of the house are examined; housing is a means of expression, a place of cultural transfer, a place of education, a place of healing, and a tool of providing social peace, which is sometimes manipulated by the authorities and imposed on the lower classes.

Housing, social structure and housing preferences in the city are examined after the definitions of housing. Renovation of the diseased neighbourhoods in the city centre with urban clearance due to the threat of social structure to all society is examined. Then, discussions on environmental preferences were examined. Bell and Moore (Bell, 1965; Moore, 1972) grouped people according to their lifestyle and environmental preferences. Each group examined has priorities and environment preferences according to their own reasons. The reason for examining the subjects of city-social structure-environmental preferences is that these arguments are one of the explanations for the diversity of housing typology in the case area of this thesis.

After the social theories and discussions, research was conducted on the Space syntax, which is the quantitative part of this study. First of all, it is explained with the definitions of various experts that space syntax is both a theory and a method. Then, the place of space syntax in architecture was discussed. It is mentioned here that space syntax can be used as a method both in the design phase and in reading and analysing the built environment.

In the next section, the use of the space syntax technique in projects with different scales and different functions is examined in order to show the usage areas of space syntax. The Trafalgar Square improvement work has been an exemplary project of analysis and interpretation in the built environment. Design solutions were developed according to the analysis results. The other project examined is the additional exhibition area project of the Tate Britain building. The most rational spatial organisation was chosen to be implemented according to the analysis results of the 3 tested proposals. In this case, both time and money were saved, tested, approved, and rationally planned spatial organisation was obtained. Another project that was carried out on the built environment was the atriums of 3 museums. As a result of this study, the importance of the visibility value in the atrium was emphasised.

Projects in which the space syntax method is also applied in housing studies were searched for. In the first of these projects, the 'sofa' unit, which is the circulation area of traditional Turkish houses, was examined. In this paper integration, depth and compactness parameters were emphasised, and it was underlined that the change in compactness parameter would cause a change in the housing form. In the next study, permeability and visibility analyses of 20th-century Turkish houses were emphasised. Similar to the first project, houses with 'sofa' were analysed. In another study on space syntax and housing, apartment type houses were examined. In this study, the apartments were divided into three functional areas and syntactic analyses were carried out separately for each area. With this study, the transformation of the interior spaces of apartment type residences was shown. The last project reviewed concerns urban spaces as part of the design around apartment buildings in Brazil. The intervention of the user in the dwelling both shows the importance of the social structure discussed in the

previous sections and presents the diversity in the usage of this method since such a study is undergone with space syntax.

The following chapter voices the apartment building process in Istanbul. The socio-spatial changes and concerning events from the late Ottoman period of the 19th century to the present are examined.



CHAPTER III

URBAN DEVELOPMENT AND APARTMENTISATION PROCESS OF ISTANBUL

As with every developing city, housing production is in a constant state of change depending on period, adopted lifestyles, expectations, consumption habits, and economic and social standards. In this context, although the scope of the thesis is determined between 1950 and 2020, the modernisation process in the late Ottoman period should be included in the historical readings of the thesis.

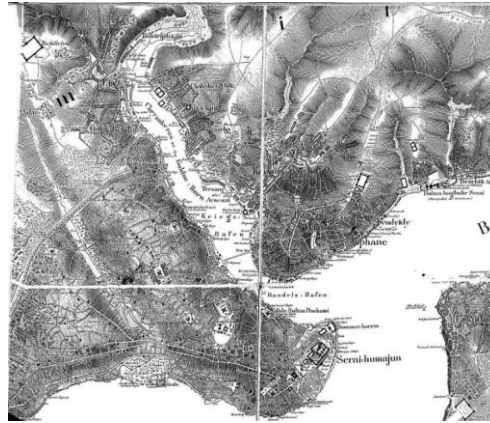
The purpose of this is to understand modernisation in the city, as well as to gain a clear comprehension of the changes in housing. With regards to the examples of the first apartments in Istanbul, the years that were the beginning of "collective life" correspond to the 1800s. For this reason, the 19th century is a substantial period for understanding the transition process to the apartment building in Istanbul.

3.1 First Attempts in Urban Planning of İstanbul: Modernisation in the Late Ottoman Period, 19th Century

The concept of modernity represents the changes that the West has acquired with its own experiences in social, cultural, economic, and political analogues which are the changes tried to make by emulating West in non-Western societies. Modernity, which

formed its philosophical background in the Enlightenment era, is a stark contrast to tradition. Although modernity was born in Europe, it also had a huge influence and effect on the whole world with the industrial revolution. The reflection of modernity in Turkey corresponds to the late Ottoman period. Besides the popularity of modernity in Europe, it began to affect the economy and institutional structure of the Ottoman Empire in the early 1800s.

Pay-ı Taht^{vii} has always been the prior and privileged city of the Sultans. Istanbul, the centre of politics, economy, and cultural wealth, where the empire was ruled, became the first city that was influenced by the Westernisation and Modernisation process. However, “when the empire was struggling with problems of integration with rapidly industrialising and modernising West in the mid-19th century, town planning had become an issue, not for the sake of rebuilding a modern capital at first” (Meriç and Saner, 2021).



Map 3.1: Von Moltke’s map of Istanbul, 1837 (URL – 6).

In the early 1800s, due to the weakness of the municipality, unplanned housing and densification in Istanbul progressed rapidly and, as a result, it turned into a complex and unfit city. The Ottoman Empire began the planning process of Istanbul by having the zoning maps drawn. However, in the modernisation process, there were more

practical problems to overcome, such as responding to the needs of changing commerce, finance, and bureaucracy, or preventing highly destructive fires in the settled areas by implementing simple building codes and regulations.

3.1.1 The Impact of Fires on the Zoning of İstanbul

The regular occurrence of neighbourhood fires presented one of the biggest challenges that the dwellers in Istanbul had to withstand. Among all the natural disasters in Istanbul, fires were the most destructive, and the effect of them on the reconstruction of the urban fabric is undeniable. According to Zeynep Çalışkan (2017), every fireground has been a scene where the official forms to be given to the city are tested. With the fire of Aksaray in 1956, Hocaapaşa in 1865 and the great fire in Pera in 1870, Istanbul lost a large part of the building stock consisting of wooden houses. In consequence of these fires, large gaps were opened in the city, and the city became ruined.



Map 3.2: Great Fire in Pera. Drawn by Mandouze, 1870 (URL – 7).

In the plan of the Pera region drawn by Mandouze, the area destroyed by the great fire is indicated in red. The sheer magnitude of the fire in Pera has also been covered in foreign media, an example of this was an illustration of the ruins of Pera which was published in London News.



Figure 3.1: View of the Ruins after the Great Fire of Pera (URL – 8).

One of the most important steps taken in the modernisation process of the city was the transition to modern westernised municipalism. The Sixth Region Municipality^{viii} (Altıncı Daire-i Belediye) is one of the institutions that was established by modelling Western examples in the 19th-century modernisation process. It was founded in 1857 and kept its privileged status until the promulgation of the Municipal Law in 1876 (Oncel, 2010). The municipality's boundaries include Galata, Pera and Tophane, and later, its borders were expanded. The Sixth Region Municipality, which is the first municipal institution in the western sense, was put into service in the Beyoğlu region. Thus, in the second half of the 19th century, the reorganisation of the city was undertaken due to destructions caused by fires, and the neighbourhoods were re-formed by giving building permits in addition to the street arrangement.

In this context, the fire maps have an important place among the documents that determine the urban fabric and the location of the new neighbourhoods and are among the sources that shed light on the history of Istanbul. Later, Goad (1904-1905), Pervititch (1922-1945) and Nirven (1951) maps, which were prepared for fire insurances, are also important sources and tools for observing the rapid urbanisation of the city. These studies, which include maps of the European and Anatolian sides, complement each other. They contain comprehensive information about the functions of buildings, street names and building blocks as well as the owners of the buildings.



Map 3.3,3.4,3.5: Goad (URL – 9), Pervititch (URL – 10), Nirven (URL – 11) maps of Istanbul

Within the scope of the measures to be taken against fires, the first zoning arrangements of Istanbul were made on the gradual road system, geometric road network, the transition from wooden building to masonry building, removal of cul-de-sacs, construction of sidewalks (...) (Tekeli, 2013).

3.1.2 Istanbul's Apartment Buildings in the Late Ottoman Period

The emergence of terraced houses and apartment buildings in the 1800s is an example of the innovation that affected the building types in Istanbul. “In the 1880s, with the emergence of the middle class for the first time, terraced houses and apartment buildings started to be built. The middle class are workers in western-dependent business organisations and medium-sized traders. This group of people are predominantly non-Muslims. Therefore, examples of buildings such as apartment buildings and terraced houses have emerged in non-Muslim neighbourhoods. Sötlüce, Kasımpaşa, Tatavla, Elmadağ, Fener, Balat, Kumkapı, Yenikapı on the European side and Kuzguncuk, Üsküdar, Yeldeğirmeni and Mühürdar on the Anatolian side are the region where terraced houses were seen.” (Kıray, 1978).



Figure 3.2: Kadıköy, Yeldeğirmeni Neighbourhood [Photograph], (Tekeli, 2013)

On the European side, family-rental houses as apartment type housing examples before apartmentisation have been one of Öncel's studies. She expresses the emergence of the first apartment buildings in her “Apartman: Galata’da Yeni Bir Konut Tipi”^{ix} book as follows: Buildings designed for the first collective life in Galata are defined as “Maison” or “Inn”, in the next series of cadastral maps prepared by Goad in 1905, the definitions of these buildings were changed to “Apartments” (Öncel, 2010).



Map 3.6: Sadyk Pacha Apartments, Goad Maps 1905 (URL -12)

There are examples of apartments that were built as dwellings in the late Ottoman period but later changed in function. Some of the apartment buildings have been demolished, some have been preserved, but some of them have lost their originality to some extent. These apartment buildings provide information about the transformations in the social and economic structure and physical environment of the city during the modernisation process in the 19th century.

Tülin Görgülü mentions the Decugis House (Gorgulu, 2016) in her study in which she examines the apartments. The building was designed by Vallauray in 1895 (Photo 3.2). The building was built as a residence, later turned into a workplace due to its central location. In 1987 it was reorganised and turned into a hotel.



Figure 3.3: Decugis House [Photograph], (Gorgulu, 2016)

Another remarkable building, one of the first apartment buildings, is the Botter house (Photo 3.3), designed in Art Nouveau style, on İstiklal Street. The Botter Apartment is one of the unique residential examples, designed by the Italian architect d'Aranco in 1900 exclusively for the palace tailor Botter and his family. The apartment is now empty and waiting to be restored.



Figure 3.4: Botter Han/Apartment [Photograph], (URL – 13)

The "Harikzedegan Apartments" (Photo 3.4), designed by Architect Kemalettin for families who lost their homes in the fire, as a "social residence" in Istanbul, were completed in 1922.



Figure 3.5: Harikzedegan (Teyyare) Apartments (URL – 14)

Harikzedegan Apartments were built with the reinforced concrete structure system, which was first used in France at the end of the 19th century. The use of this technique is an indication of the importance given to apartment-type housing production and construction technologies in the late Ottoman period during the modernisation process. This new plan and structure system, which produces the spatiality of a new social practice with the reinforced concrete stairs and galleries in the middle courtyard, pioneers the buildings built after the republic. The current function of the building is the hotel building.

3.2 The Modern City of the Republic: Istanbul

With the collapse of the Ottoman Empire and the establishment of the Turkish Republic in 1923, the aim was to create a modern environment and society in Turkey in the Republic period. "A series of reforms carried out by a group of dedicated

nationalists headed by Mustafa Kemal Atatürk to build a nation-state on the ruins of the Ottoman Empire” (Yavuz, Ozkan, 2005). However, creating a modern country by simply designing a new capital city in Ankara was not a complete solution. The change had to take place in government institutions, schools, and even families. In this context, some of the reforms brought in the modernisation process are as follows: changes in education (secularisation), abolishment of the caliphate, prohibition of turbans, fezzes, and veils by adopting the western-style clothing, and the changing of the alphabet, with the usage of Latin script instead of Arabic script.

Attempts to rebuild Turkey as "modern Turkey" are started in Ankara and the second significant initiative took place in Istanbul. Similar modernisation plans for Istanbul were on the agenda of politics during the Republic period, which adopted a much more radical reform program than the Ottoman Empire. The regime, which enthusiastically implemented the program of changing the Ottoman legacy with modern Western values, envisioned a series of changes in the redefinition and reshaping of public space according to the norms of Western civilization and the re-planning of cities, as well as radical changes in other areas.

At the beginning of the 20th century, the cities planned in accordance with the requirements of the industrial age, public health, and new transportation technologies in the West, which fits the ‘modern city’ profile planned to be created in Istanbul. In addition, it is aimed to improve the physical conditions that do not suit a modern country, such as improper housing, narrow streets, ratty neighbourhoods, with the arrangements in Istanbul. The image of the ideal modern family was frequently published in the magazines, thereby the new and modern lifestyle introduced to the public.

3.1.2 Prost's Plans for Istanbul

The municipality of Istanbul invited the French urbanist-architect Henri Prost to Istanbul in 1933 for a closed competition, which was held for the planning of Istanbul. Prost then received a further invitation in 1935 to directly carry out the planning of the city. Giving the planning work of Istanbul to Henri Prost has been criticised by local architects and urbanists over time. However, while planning the spatial transformation of such an old city from a western perspective, it was also important to choose a professional who knew Istanbul well in terms of its historical value and culture. Prost was the most suitable candidate for the Planning of Istanbul due to his work on the Master Plan of Paris and his studies in Istanbul (Aydemir, 2008).

Prost took a dual approach in planning Istanbul, as he did in Paris. With this approach, he aimed to control the rapid urban growth in the urban fringes and propose a developed highway infrastructure around the city. In this way, while providing the technological infrastructure required for a modern metropolis, efforts to protect the city's historical and natural sites would also have been provided.

The French urbanist-architect worked on the planning of Istanbul until 1950. His works in this process are as follows; European side master plan (1937), Anatolian side master plan (1939), the Bosphorus coast plans (1939-1940) and the implementation plans, and the Ten-Year Plan Program covering the period 1943-1953. In addition, Prost made detailed urban arrangements, parks, squares, and waterfront designs, and he implemented some of them.

Prost believed that the modernisation of Istanbul was a very delicate surgery. His purpose was to orient such an old capital city, where a social transformation was taking place, towards a future where the living condition would change. With regards to this

context, Henri Prost had three main principles in planning İstanbul. These are "environmental health" (l'hygiène), "transportation" (la circulation) and "aesthetics" (l'esthétique). While establishing the modern city, it was essential to modernise not only the city, but also the lifestyle by adopting the westernised way of life for men and women. For this, while opening new arteries that strengthen transportation in the city, Prost aimed to clean the derelict neighbourhoods and large gaps left by the fire in the city, and design large squares. He imagined a republican city where men and women were together in the squares.

Prost's modern city imagination also included an uninterrupted highway system. Electricity in the city had been an innovation that started to be used with the commissioning of the Silahtarğa Power Plant in 1914 and would be the source of the greatest changes. The most important contribution of electricity to the city was the use of electric trams in transportation. With the reconstruction of the Galata bridge, which was made of steel and wood, in 1914, electric trams were provided with an uninterrupted transportation line. Prost desired to provide this convenience for cars as well. He designed highways that now flow around the Greco-Roman and Ottoman buildings that would reveal the beauty of İstanbul. In addition to both rail and highway systems, he wanted to increase the ferry services between the European and Anatolian sides and to strengthen the relationship between the two continents by building the Üsküdar pier on the Anatolian side.

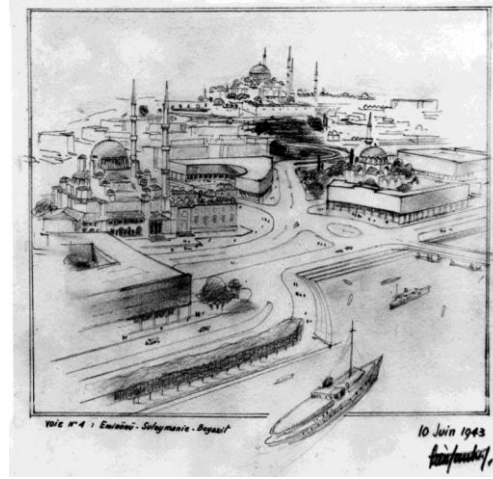


Figure 3.6: Project for Eminönü Square. (Bilsel, 2011)

Prost worked not only on modern infrastructure but also on new residential areas. Prost adopted the merging of very small and irregularly divided parcels in the historical peninsula and the re-planning and rationalisation of the street texture, the creation of green areas by expropriation where necessary, and the creation of a new settlement order. He proposed that transforming the existing fabric of the Marmara coast, along the coast and the railway, into a new settlement consisting of high standard housing blocks. He also proposed a new residential area consisting of "workers' neighbourhoods" and "cheap houses" between Yedikule and Silivrikapı, in the south of Yenibahçe. Although Prost's housing proposals created class divisions, he set up modern apartment plans around the city.

Prost was able to partially implement his projects despite all the economic problems brought about by the Second World War. However, with the victory of the opposition party in the 1950 general elections, Prost's planning process in Istanbul were terminated. Despite the ideological difference with Prost, Prime Minister Menderes followed his plans even after having him dismissed.

3.2.2 Istanbul Apartment Buildings in the Early Republican Period

As a result of the developing commercial life and housing density in the old city and its surroundings, the city centre of Istanbul was advanced on the European side. Therefore, the first apartmentisation process started in Nişantaşı, Teşvikiye and Şişli neighbourhoods on the European side of Istanbul (Tekeli, 2013). The appearance of Harbiye, Pangaltı, Kurtuluş, Osmanbey, Nişantaşı, Teşvikiye and Şişli changed after the 1920s. The houses and mansions in the gardens in these districts gradually began to be replaced by apartment buildings constructed with reinforced concrete. The widespread use of apartment buildings has caused the old transportation routes to become wide and distinct streets. In the 1920s and 1930s, Şişli and the surrounding of Şişli became the region where the upper-income group resided.

Living in an apartment became a privilege. The inadequate infrastructure of the mansions was not suitable for the conditions of the modern-day. With the domination of the Cubist architectural trend in modernism, residential architecture has been simplified.



Figure 3.7: An Example of the Modern Guest Room, Drawn by Architect Aptullah Ziya, 1931 (URL -15)

Aptullah Ziya proposed an apartment with special electrical connections, lighting fixtures, ergonomic and modern indoor furniture, corner-positioned piano, large windows that allow light in, and a wide, spacious indoor area that fits the modern age with all its features. Ziya said for the architects who could not keep up with the modern architectural trend, "World architects, who were only busy with decorating the buildings by using their skills in their hands and eyes, were unemployed". And he added "Apartment life is the life of the twentieth century. The era of mansions and konaks where brides, grooms, fathers, and mothers lived together is over. It is inexpensive to build, provides an easiness to contact with neighbours" (Ziya, 1931). By saying so, he touched on the importance of apartment production in modernisation.

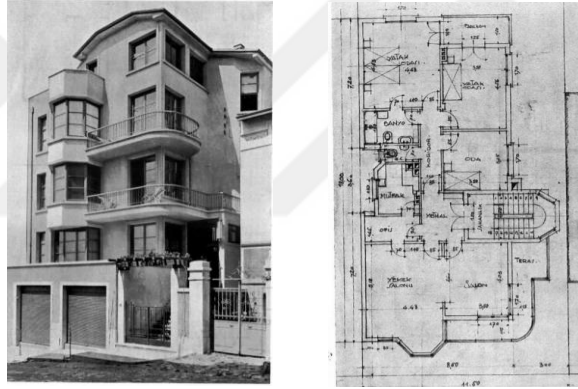


Figure 3.8: Hüsni B. Apartment Building, Nişantaşı, 1932 (URL-16)

- In Güzel Bahçe Street in Nişantaşı, Hüsni B. Apartment Building (Figure 3.4) has a wide view over Beşiktaş, including the sea and Üsküdar. The building is entered through an open entrance to the left. The main staircase leading to the apartments is outside the building. Thus, the flats on each floor are the same size. There are balconies on each floor on the facade. There is a large terrace in front of the ground floor. There are two living areas on the facade. The dining room, office and kitchen have been successfully arranged together. The bedrooms are placed on the back facade.

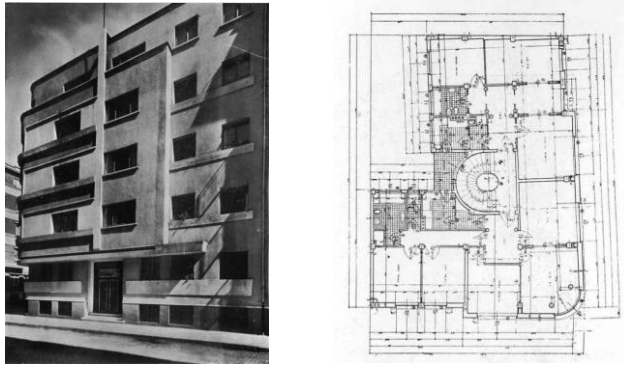


Figure 3.9: A rental house in Taksim, 1939 (URL – 17)

- The rental house (Figure 3.4), which was built on one of the corner plots on the Taksim Square in Talimhane, design by Architect Seyfi Arkan, is a successful work with the planning technique. The building, which is designed as double flats on each floor, is entered through a large entrance hall. The entrance hall is completely covered with marble. From the entrance hall, a wide staircase leads to the flats on the upper floor. Corner flats are designed as five rooms, others with four rooms. Apart from the rooms, the apartments have a kitchen, office, a bathroom, and a toilet.

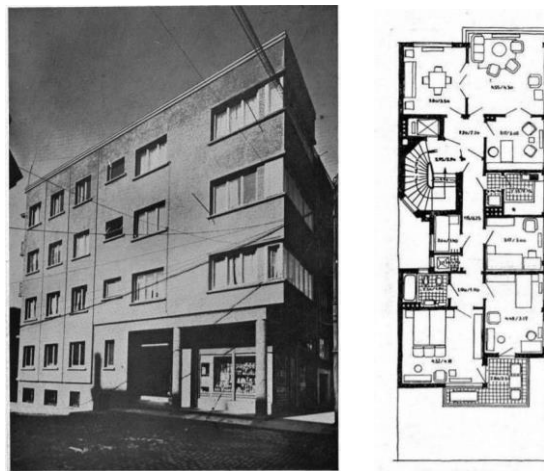


Figure 3.10: Göksun Rental House, 1940 (URL – 18)

- The Göksun Rental House (Figure 3.6), built on the corner of Maçka Street, was designed as four floors. Two shops were designed on the ground floor of the building, facing the street, and the entrance of the apartment building is in the

side street. Each flat consists of three living areas, one entrance hall, one service corridor, and bedrooms. In the back, there are three bedrooms, a bathroom, a small maid's room, and a kitchen. There is a large terrace in front of the bedrooms. There is hot water and a central heating system in the building.

3.2.3 Modern Domestic Life

The most important transformation in modern nation-building took place within the family. Replacing the extended family phenomenon with the nuclear family phenomenon was also the basis of modernisation within the dwelling. The ideal modern family depiction is demonstrated in hygienic and smartly designed modern homes where young, healthy, and patriotic families live.

It was one of the highest priorities of the republican regime for women to increase their visibility in public areas, to have equal rights, to become free individuals and to be educated individuals at the same time. “It gave modern Turkey one of the most pragmatic institutions of republican history: the girls’ institutes (kız enstitüleri) established by the Ministry of Education in 1928 – 1929 and mostly housed in buildings with a modernist aesthetic” (Bozdoğan, 2001). In the girls' institutes "In parallel with the rights brought, with the arts and vocational schools opened in the first years of the Republic, it was aimed to make women stand on their feet economically" (Ariğ, 2011). “Properly arranged” kitchens which can be considered as an important factor of change in the interior of the residence were demonstrated to students at the institutions. The middle-class women were taught rational methods of child-rearing, as well as domestic work.

Modern interior magazines inspired by the west, as well as the modern methods taught in girls' institutes, was significant. Modern interiors were illustrated in these

magazines and included examples of “modern concepts of domestic space, household efficiency and hygiene, modern lifestyles and modern house design” (Bozdoğan, 2001).



Figure 3.11: Examples of Periodicals in the Republic Period

Cover photos of some of the interior space and women's magazines, which were another driving force of modernisation in the family and interior space in the early Republican period, were given (Figure 3.7). A modern woman, next to a modern mother image is illustrated on the cover of Muhit magazine.

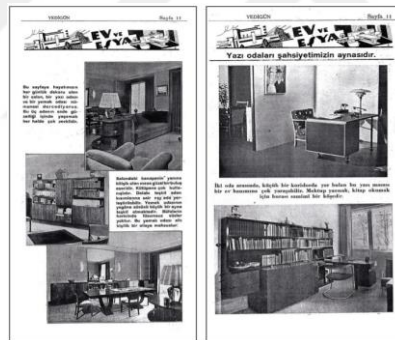


Figure 3.12: Furniture Examples in Early Republic Period Dwellings, Yedigün Magazine, (Bozdoğan, 2001)

In Yedigün magazine, a rationally designed kitchen was illustrated, and a column was written about the importance of the kitchen in dwellings. Aside the kitchen image published in Yedigün magazine, it was stated that women readers should see their kitchens as a living room, and the duties of housewives who spend their hours in this area, as in European and American examples, in-home service and kitchen work, and the furniture arrangement of these kitchens were mentioned.

3.3 Architectural Development and Apartmentisation in the Industrialised City: İstanbul

After the transition to the multi-party regime in Turkey, the Democratic Party achieved victory in the general elections in 1950. During the time DP in power between 1950 and 1960 “Prost’s Master Plan seems to have inspired the large-scale urban operations that were undertaken by Prime Minister Adnan Menderes in 1957” (Bilsel,2011) and this period is marked by architecture and urbanism as a form of ‘visible politics’ (Bozdoğan, 2016).

Turkey continued to experience the construction difficulties caused by the Second World War when the liberal economy was adopted in the 1950s. Since the 1950s, the rapid population growth which eventuated with migration from rural to urban has brought new dimensions to the housing problem. The insufficient infrastructure brought about by rapid urbanisation, difficulties in importing construction materials, the fact that the construction sector is not institutionalised and the lack of building lands in the city led to the development of new housing production forms (Tekeli, 2012). With the increase in the population of the city, while slum areas grew rapidly, land subdivision works in the city also accelerated. Solutions for the housing problem in the

city in these years are either construction of single plot-based cooperatives in urban parcels or collective (mass) housing located on the periphery of the city (Tekeli, 2012).

However, in this period, housing production was inadequate for low-income people and the population migrating from rural to urban areas. Contrary to the architectural discourses of the period about the affordable housing issue, the group benefiting from the increase in housing production and apartmentisation is middle and upper-income group families (Bozdoğan, Akcan, 2012).

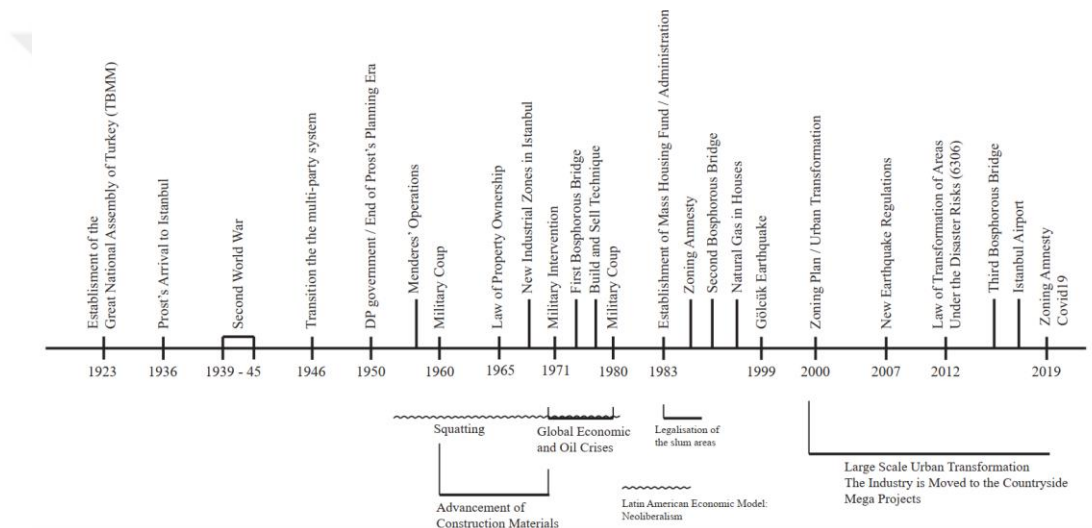


Figure 3.13: Timeline of the Factors that Caused Socio-Spatial Changes in Turkey after the Proclamation of the Republic

The development in industry, which started in the second half of the 1960s, is one of the most important breaking points affecting housing production. Therefore, there has been a physical transformation in housing typologies and spatial configurations due to technological developments, the economic crisis that arose with the post-war period, movements in domestic politics, migration, and the changes in society and family structure (Meriç and Sezginalp, 2020).

Two standard housing typologies have emerged in modern housing. One of them is a house or villa designed for a single-family, and the other is an apartment building in the city. However, apartment type dwellings “had a very different meaning in the early republican period from what it came to signify after the ‘flat ownership,’ or condominium, legislation of 1965 (kat mülkiyeti kanunu), which marked the real boom in a speculative apartment building in Turkey” (Bozdoğan, 2001). Therefore, the twenty-year period covering the 1960s and 1970s, along with the Law of Property Ownership, the creation of new industrial areas in the city, advancement of construction materials, the first Bosphorus bridge and the connection of two continents, was a period in which uncontrolled urban growth in Istanbul occurred and apartmentisation accelerated. “Factories designed by the partners and built in the late 1960s for İstanbul’s new industrial zones, which acted as magnets for city’s informal growth, included Neyir Textile Factory in Levent (1966), Northern Electrics Telephone Factory in Ümraniye, the United German Medicine Factories and the General Electric Factory (both in Topkapı), and Corrugated Cardboard Factory in Gebze” (Bozdoğan, Akcan, 2012). The villagers, who were the cheap labour force of the city, migrated from Anatolia to Istanbul and built slum settlement, especially around the factories.

3.3.1 Standardisation in Construction Materials

“1960s and ‘70s were the two decades that exposed reinforced concrete, large-span iron and steel construction, and prefabricated materials were first tried out in buildings.” (Bozdoğan and Akcan, 2012). Rather than being imported, construction materials started to be produced in the country with the industrialisation of Turkey. Among the factories that were established during this period were Koç, Sabancı and Alarko. Shortly after the establishment of the factories, affordable and standardised

construction systems were produced. Building production has hastened and became economical with the standardised construction products.

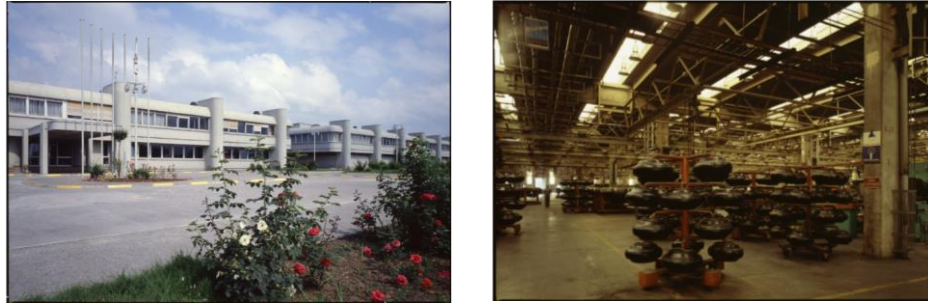


Figure 3.14: Lassa Factory [Photograph], (URL – 19)

Lassa Factory project, one of the industrial architectural works of this period, was designed in 1975 and implemented between 1976-1977 by Tekeli and Sisa. The factory building, designed entirely with prefabricated beams, columns, and facade panels, demonstrated the influence of industrial production on architecture in Turkey.

Another factory produced with high-tech similar to the Lassa Factory is Arçelik Washing Machine Factory designed in Gebze.



Figure 3.15: Arçelik Factory, Gebze [Photograph], (URL – 20)

Standardised construction materials have not only been used in the construction of factory buildings or other official institution buildings. While one of the biggest driving factors of the acceleration of apartment type housing production in Istanbul was

mass production and standardisation in construction materials, the other factor was the property ownership law mentioned earlier.

3.3.2 Housing Representation and Profiles

In modernised Turkey, the development of foreign relations and consequentially the adoption of American-like consumption, are important criterions in determining the housing style (Görgülü, 2003). The apartment lifestyle was an indicator of status and wealth in the early Republican period. However, with the development in the production of materials, mass production and standardisation in construction materials, affordable construction techniques, and most importantly, the property ownership law, apartmentisation became an opportunity to become a homeowner for the middle classes who could not afford to build houses on a single plot. “The biggest effect of the transition to property ownership law is that small capitalist housing producers, defined as "property developers (yapsatçı)", acquire an important share in housing production” (Türkün, 2014). With this process, apartment-type houses were produced in the central neighbourhoods of the city, mostly for middle and upper-income groups. Middle-class housing settlements in Istanbul took place in this way, creating the most important housing supply of the city on both the European and Anatolian sides.

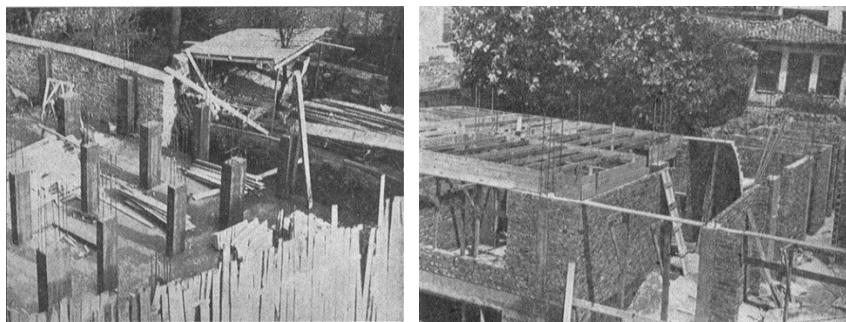


Figure 3.16: An Example of an Apartment Building with the Build-and-Sell Construction Technique, 1970 [Photograph], (URL – 21)

However, in the same period, lottery houses/apartments, from the end of the 1940s to the end of the 1970s, together with the cooperative organisations, appear as an important product in the formation and development of the modern housing/apartment building culture in Turkey. The lottery houses are related to "modern housing" policies, which were mostly managed and formed by the central authority in the Early Republican Period. However, later, the lottery houses had a very strong connection with the rapid change in Turkish political and economic life after the Second World War and the democratisation/liberalisation process that started with the Democrat Party rule in the 1950s.



Figure 3.17: Lottery House Posters of the Banks, (Şumnu, 2014)

As an important institutional development in this period, with the establishment of the General Directorate of Land Office in 1969, it was aimed to prevent excessive

price inflation of lands by regulating buying and selling processes, to provide the land and plots needed for housing, industry, education, health, tourism investments and public facilities.

In addition to the production of build-and-sell housing, Emlak Kredi Bank's most important mass housing initiatives are the Ataköy mass housing project, of which building began in 1957 and completion in 1964, and 12,000 housing units were involved.

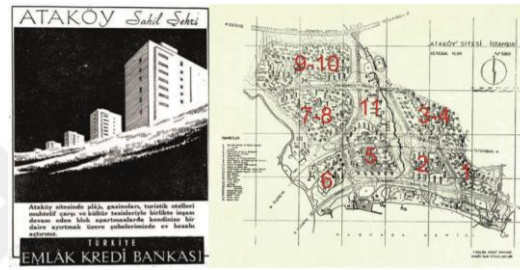


Figure 3.18: Emlak Kredi Bank's Brochure (Gürel,2012), The Layout Plan of Ataköy Blocks (Giray, Baytop,1995)

In 1970s' politics, considering the house and its environment, accordingly, there had been a tendency to form plots with infrastructure outside the city centre and to develop them in relation to urban areas (Türkün, 2014). In this context, mass housing construction has been adopted as a method for solving inadequate infrastructural issues as a result of slum housing, urban housing, or high-rise buildings. With the Mass Housing Law enacted in the early 1980s, cooperatives, with priority, and private housing entrepreneurs started to implement such large-scale housing projects.

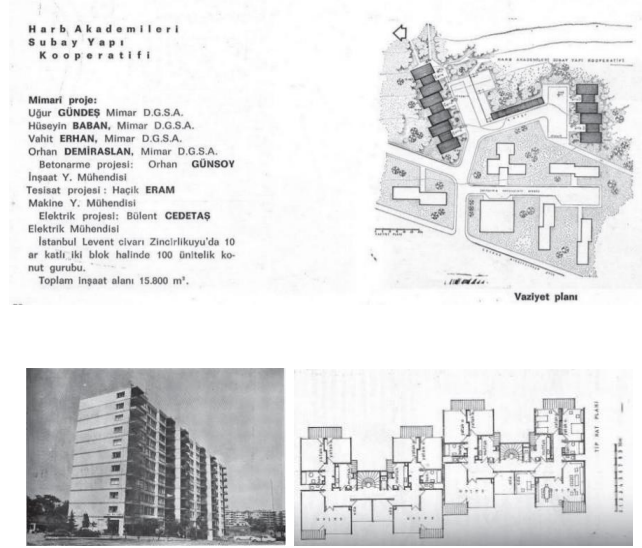


Figure 3.19: Harb Akademileri Subay Yapı Cooperative, 1975, (URL – 22)

With the 1985 Mass Housing Law, cooperatives were on the agenda again, but housing production was mostly private sector oriented. Some of the companies with large capital also undertook the production of construction materials and implemented large housing projects in the mass housing areas on the periphery of the city. With the adoption of the mass housing law in the 1980s, there was a big boom in the housing sector. Service-oriented "concept" projects went beyond existing as a simple building and were designed as "businesses" (Görgülü, Koca, 2007). While creating “new cities” with concept projects, housing production targeting low-income groups has been gradually abandoned. The cooperative houses, whose main purpose was produced as social housing, has become a solution for the middle class as a result of the difficulties in the payments of the low-income families. After the 2000s, the cooperative model has almost completely disappeared.



Figure 3.20: Ağaoğlu MyCity Umraniye, 2000 [Photograph], (URL – 23)

With the establishment of TOKİ^x in 1984, Turkey came across a new form of housing presentation. TOKİ implements its own projects on its lands, usually through the method of revenue sharing. It is seen that a large part of the land transferred to TOKİ by the state was reserved for TOKİ's projects, and the share of the land allocated to cooperatives decreased to 1.6% in 2004 (Geray, 2011). The fact that housing gained different identities in the city, where the global capital flow is accumulated, and the decrease of empty urban land in the city and its resultant increase in value (Edgu, 2003) caused *housing* to eventually become an *investment factor* over time.

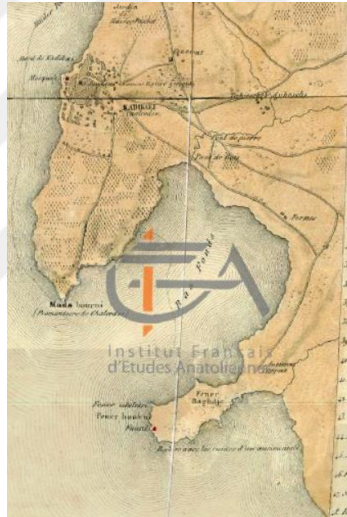


Figure 3.21: Ataşehir Meridyen, Bahçeşehir 5th Region, TOKİ [Photograph], (URL – 24)



Figure 3.22: Ağaoğlu Maslak1453, (URL – 25)

3.4 Development of Kadıköy

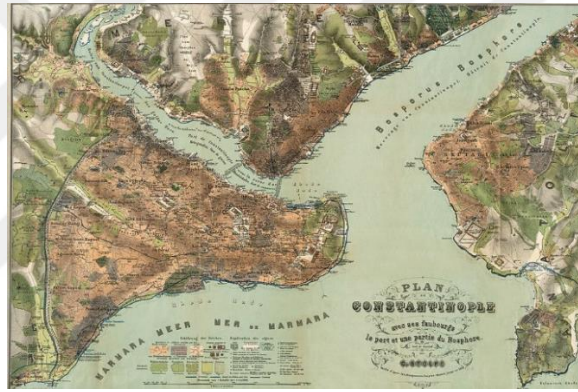


Map 3.7: Kauffer's Map of Istanbul, 1786, (URL – 26)

From the second half of the 19th century, upper income groups began to prefer other parts of the city and one of these areas was Kadıköy. On the Anatolian side, with the start of ferry services in 1843 and the completion of the Haydarpaşa-İzmit railway in 1870, suburbs were formed on the coast and around the stations (Orhan, 2020), Summer settlements, which consist of mostly wooden mansions located in large gardens, have started to develop in these areas. These settlements would begin to become permanent

residences after a while. “These are Yeşilköy and Bakırköy in the west, Kızıltoprak, Göztepe, Erenköy and Bostancı in the east” (Tekeli, 2013).

In the Ottoman period, the Kadıköy area is a favourite summer resort and promenade, as it was in the Roman and Byzantine periods. Besides, it was an important agricultural production area. Haydarpaşa, Kuşdili Creek (Kurbağalidere), Acıbadem and Koşuyolu and Fenerbahçe were the leading meadows and picnic areas. Within the wide field extending from Kadıköy to Bostancı, there were mansions belonging to the sultan and senior managers, waterfront residences (Sahilsaray) and gardens, while villages were located in the hinterlands.



Map 3.8: Stolpe’s Map of Istanbul, 1882, (URL – 27)

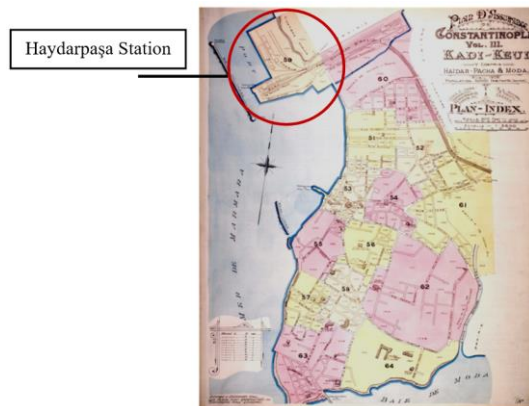
The great fire that Kadıköy endured during the modernisation process of the 19th century Ottoman Empire was the trigger of a transformation as in the European side (Türker, 2008). Due to the fire in 1893, 1901 and 1911 (URL – 28), Kadıköy lost a large part of its building stock^{xi}. In the reconstruction process of Kadıköy “In the reconstruction process, Kadıköy started to grow and become prosperous after the construction of the Haydarpaşa-İzmit Railway in 1874. Kadıköy has become a residential area for both winter and summer” (Alus, S.M., 1939).

On the other hand, the Balkan immigrants who escaped from the Ottoman-Russian war in 1877-1878 had to take shelter in Kadıköy. This was an important breaking point that affected the socio-demographic history of Kadıköy, which was the "rural" area of Istanbul. Towards the end of the 19th century, on one hand, Kadıköy was a European city decorated with mansions of Levantine families, and on the other hand, it was a popular summer resort.



Figure 3.23, 3.24: Moda, 1900 [Photograph] (URL – 29), Moda, after 1928 [Photograph] (URL – 30)

At the beginning of the 20th century, Haydarpaşa Station building was built in Kadıköy since it was the first station of the Istanbul-Konya railway. With this station building, Kadıköy gained even more importance.



Map 3.9: Goad's Map of Kadıköy, 1906, (URL – 31)

Beaches were built in the coastal settlements such as Moda, Fenerbahçe, Caddebostan and Suadiye in Kadıköy that was declared as a district on 23 March 1930 and preserved the character of the summer resort that started to form in the early 20th century.



Figure 3.25: Suadiye Beach [Photograph], (URL – 32)

During Prost's planning period of Istanbul between 1938-1949, a bridge connecting the Kadıköy-Üsküdar road and Haydarpaşa station was built, and the Bağdat Avenue was paved with asphalt. With the reinforced concrete system, which was a new construction technique in the modernisation process, the wooden mansions were demolished in the 1940s, and modern and single-family houses with reinforced concrete began to be built. In the 1950s, a transformation started to take place in Kadıköy and apartmentisation started with rapid urbanisation.

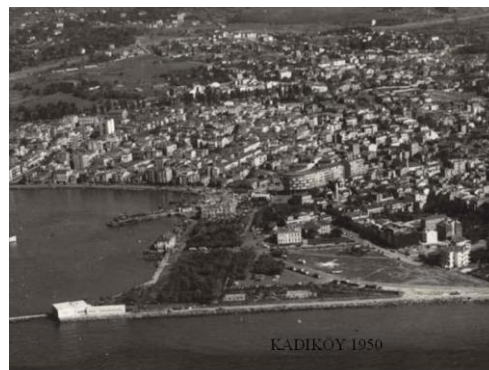
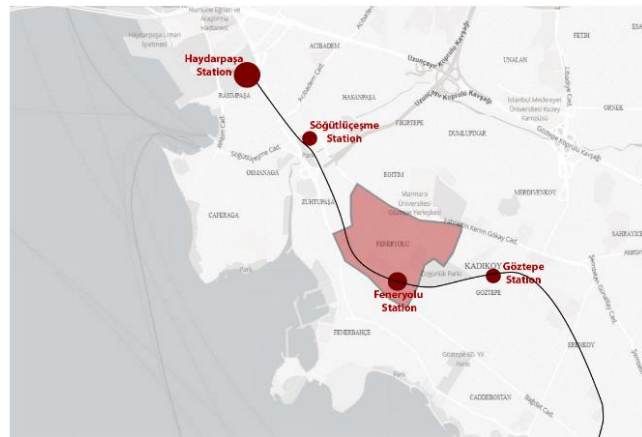


Figure 3.26: Kadıköy, 1950 [Photograph], (URL – 33)

The years that will accelerate the apartment building process are the years following the 1965 Property Ownership Law. With the Property Ownership Law in 1965, the process in which the low-density settlement fabric will be replaced by the multi-storey apartment buildings has started (Tekeli, 1994). With the opening of the first Bosphorus Bridge in 1973, transportation between the European and Anatolian continents has become easier, thus, Kadıköy has become an even more attractive location for a residential area. After the 1970s, it started to turn into a dense residential area consisting of 7 to 8 storey apartment buildings and gaining its current appearance.

3.4.1 The Feneryolu Neighbourhood

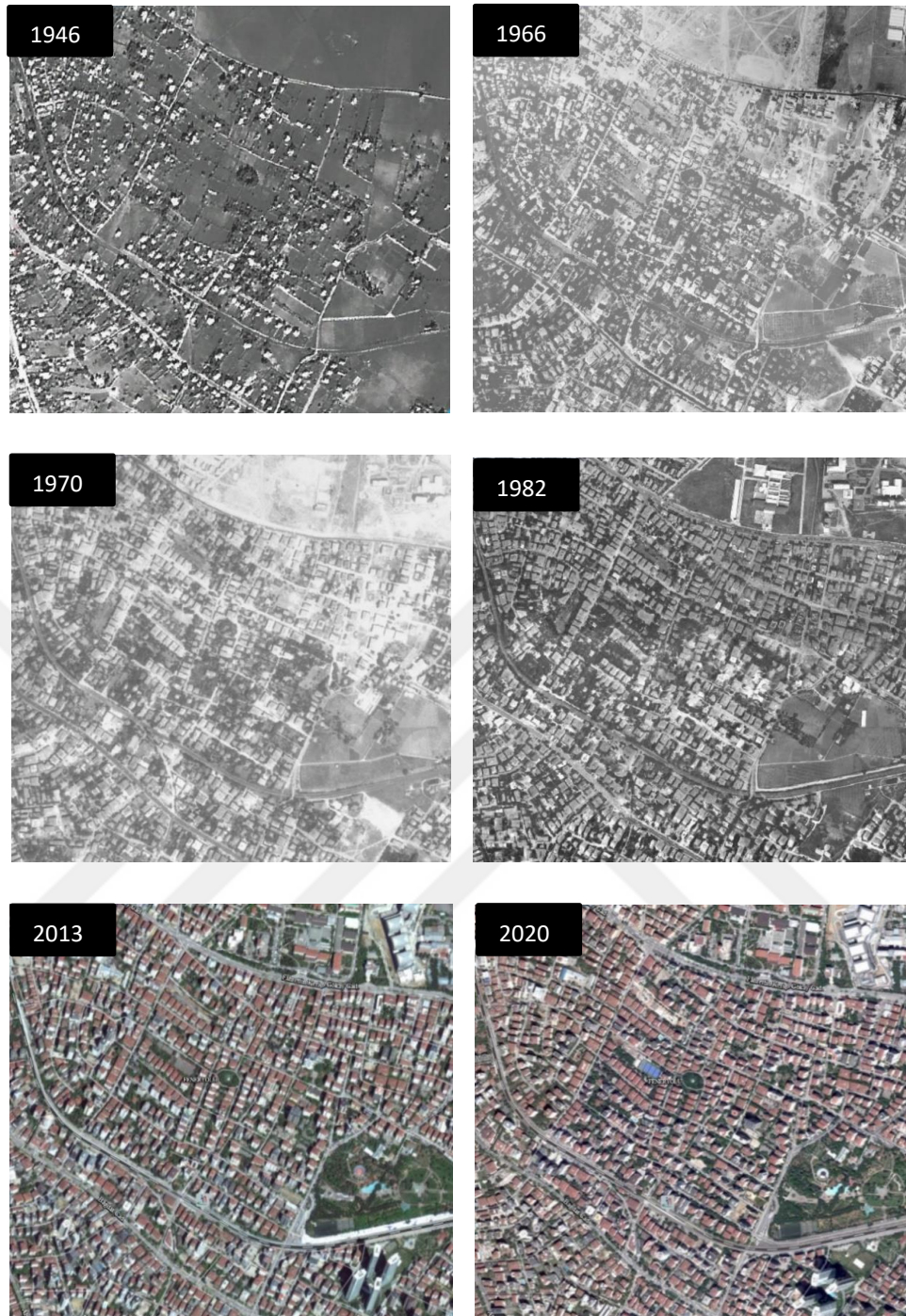
The Feneryolu Neighbourhood is in the Kadıköy district of Istanbul. The borders of the Feneryolu Neighbourhood are Bağdat Street in the north and Fahrettin Kerim Gökay Street in the south. It is between Göztepe and Söğütöçme stations in the east and west. Feneryolu and the surrounding neighbourhoods developed around the railway route. The neighbourhood is accessed by the Marmaray train line, minibuses, and buses.



Map 3.10: The Feneryolu Neighbourhood, (URL – 34)

The structure of this region began in the late Ottoman period. It was particularly affected by the 1965 Property Ownership Law, and the densification accelerated in the early 1970s and became a region dominated by apartment type dwellings. For this reason, the region consists of the late Ottoman's wooden mansions, the early Republic's cubist single-family houses, and modern apartment-type residences. In addition, due to the apartmentisation popularity came with the Law of Property Ownership and the urban transformation in the region, also contemporary apartment examples exist in the neighbourhood. The wooden mansions alongside large parcels of the late Ottoman period, and the cubist residences of the early Republic period contributed to the unique profile of the region. Unfortunately, most of the original architectural examples are only found in archives nowadays. The fact that the region consists of these layers determined the starting point of this thesis.

While on the European side, the mansions of the Ottoman bureaucrats were concentrated in Nişantaşı, on the Anatolian side the newly developed Kızıltoprak, Göztepe, Erenköy, Bostancı were the areas where the upper classes settled in the 20th century. In this context, the first residential texture in the region was formed in the late Ottoman period when the upper-income bracket bought large parcels of land on the city periphery via the law of Embye^{xii} and built wooden mansions. Hence, the construction has shifted from the centre of Kadıköy and formed the neighbouring districts of Fenerbahçe, Kızıltoprak, Bostancı, Erenköy and Göztepe.



Map 3.12: Land Subdivision and Densification Process of the Feneryolu Neighbourhood, (URL – 35)



Figure 3.27: Kilercibaşı Mansion [Photograph], (URL – 36)

With the land subdivision works, detached single-family houses began to replace the wooden mansions in the region. During this period, the Feneryolu neighbourhood preserved its character as a summer resort.

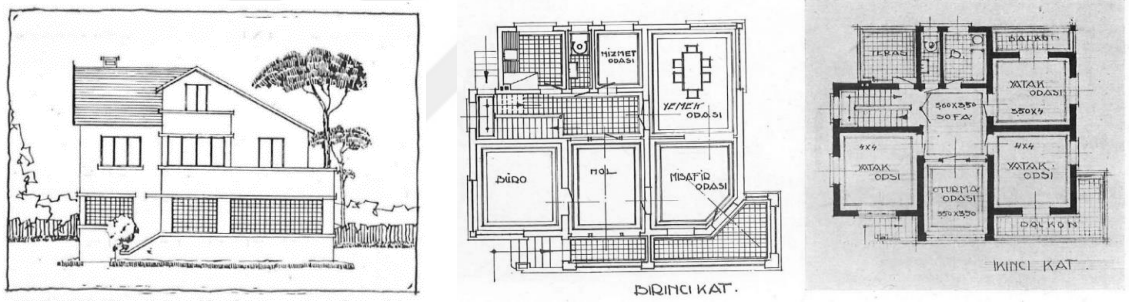


Figure 3.28: A House Project, 1932, (URL – 37)

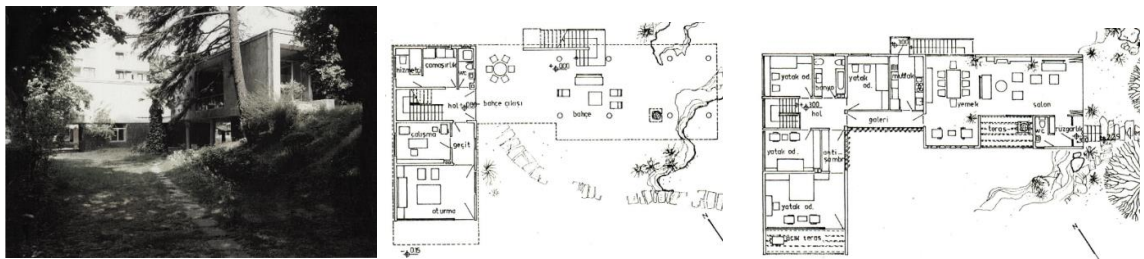


Figure 3.29: Nedim Karakurt's House, 1956, (URL – 38)

The first transition to apartment-type dwellings started in the 1950s and the 3 to 4-storey apartment-type dwellings were found in the region.



Figure 3.30: An Apartment Building with Added Floors, 1958, Kadıköy Municipality Archive

Following the 1965 property ownership law, the release of the restrictions on storey height via the regulations in 1973, triggered the build-and-sell housing trend in the region. For this reason, production of the apartment type dwelling in the region accelerated and the texture of the neighbourhood started to consist of 7-8-storey apartment buildings in small parcels.



Figure 3.31: Mustafa Nihat Apartment Building, 1972, Kadıköy Municipality Archive

Mansions and houses of the early Republican period continued to exist in the Feneryolu neighbourhood, but later most of the houses were replaced by high-rise apartment buildings with the effect of the build-and-sell period.

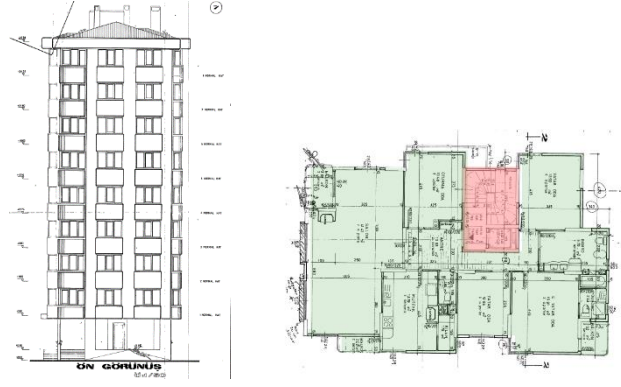


Figure 3.32: An Apartment Building, 1987, Kadıköy Municipality Archive

In the 2000s, since it would be financially inefficient to build apartment-type dwellings on parcels that excessively shrank, merging the divided parcels was acknowledged as a solution. During the entire process, residences belonging to different periods and produced with different techniques existed in the Feneryolu neighbourhood.

In addition, due to the 1999 Gölcük earthquake, new spatial configurations have occurred in the buildings built according to the earthquake regulations reported in 2007. Fire escapes, fire halls, the gross cross-sectional area of the column or shear wall, the body width of the beam, and the useful height of the beam and the column are the determining factors in the spatial organisations.

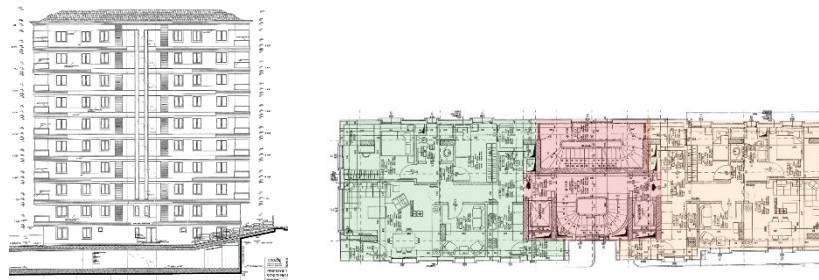


Figure 3.33: Farukbey Apartment Building, 2009, Kadıköy Municipality Archive

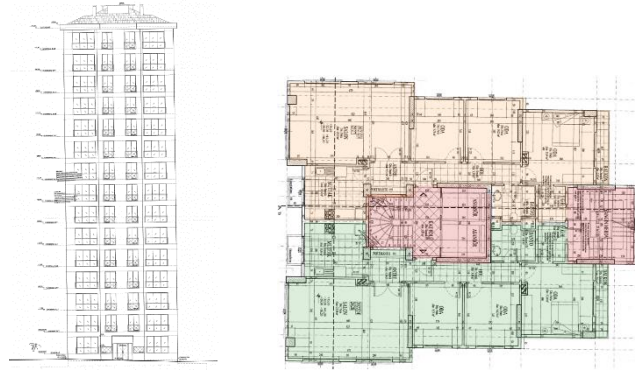


Figure 3.34: An Apartment Building, 2019, Kadıköy Municipality Archive

3.5 Chapter Assessment

In this chapter, the factors that affected housing production in Istanbul and triggered housing production in the city are examined. One of the biggest changes that were required for the sake of modernisation was the change of environment in the city. In this context, with the modernisation process that started in the late Ottoman period, the planning of Istanbul was the primary objective. Neighbourhood fires have been one of the contributing factors affecting housing policies in Istanbul. The insurance maps drawn due to the fires have been helpful tools for understanding unplanned urbanisation and post-fire casualties. Because of these fires, large gaps were opened in the city.

In the late Ottoman period, apartment buildings primarily consisted of terraced houses where middle-class workers lived. Then, as examples of collective life, a number of inns appeared in the 1905 Goad's map. There are also apartment-type residences produced during this period. In particular, the Harikzedegan apartment designed by Architect Kemalettin is the first social housing project and one of the first modernist approaches to the apartment type dwelling.

In the early Republican Period, the way to create a modern environment and society was through reforms. Atatürk endeavoured to create the modern environment with Henri Prost's Plans and modern society with the education of women. In addition to girls' institutes, Western interior magazines and women's magazines came to the fore. The magazines portrayed ideal modern family and modern interiors. In the early Republican years, the other significant step towards modernisation in society was the nuclear family life. Apart from the single-family houses, apartment type dwellings were produced. As an indicator of modernity, the apartments were designed with a reinforced concrete system, hot water, central heating system, electricity, large and spacious interiors.

After the Second World War, the slowdown in the construction sector was followed by the Industrialisation Period. Industrialisation and the transition to mass production in construction materials made construction easier and cheaper. However, the property ownership law, the first Bosphorus bridge, and urban transformation laws and regulations caused a boom in the housing sector, and a rapid densification and urban sprawl occurred in Istanbul. Housing production, on the other hand, passed under the management of the private sector rather than cooperatives.

In the case study area of the thesis, Kadıköy, Feneryolu, housing production started when the upper-class group of the late Ottoman bought large parcels of land, which was a summer resort in those years, and built wooden mansions via the Embiye Law. Land subdivision works and single-family houses emerged in the Feneryolu neighbourhood in the early Republican Period. After the property ownership law and the construction of the first Bosphorus bridge, the process of apartmentisation and urban densification began in Feneryolu and the surrounding neighbourhoods. With the release of the storey height limit with the regulations in 1973, the production of high-rise

apartments commenced. During this period, the land subdivision process continued, apartments were built in smaller parcels. In the 2000s, the texture of the neighbourhood continued to change with the merging of excessively shrank building plots. The neighbourhood, which continued to densify with high rise apartment buildings via the urban transformation laws, became a dense residential area.

In the next chapter, the syntactic analysis of the interior spaces of the apartment-type dwellings in the Feneryolu neighbourhood, and the external factors of the syntactic transformations are examined.



CHAPTER IV

METHODOLOGY

It is true that geometric transformations in interiors of any kind of dwellings are a subject within the scope of Space Syntax Theory. However, this thesis is not only a study in which syntactic values are measured and the obtained values are compared. The main purpose of this study is to comprehend the connection between the syntactic values obtained as a result of the analysis, and the external factors which are zoning laws, social and technological changes, as well as the change of family and lifestyles. In this context, the decision was made to examine the mathematical transformation of domestic spaces in Istanbul apartment- type houses whilst the aforementioned external factors were considered.

4.1 Strategy of the Study

The strategy of this study is to present the connection between external factors and spatial transformations with diagrams. In this context, by listing what is meant by spatial transformations and elements to be considered as external factors, a basis is prepared for the research, data collection and data analysis phases. A connection is established between the transformations in the interior spaces of the apartment type dwellings that analysed with the Space Syntax parameters, and the factors that directly or indirectly affect the housing policy, modern domestic space production and living style in Istanbul.

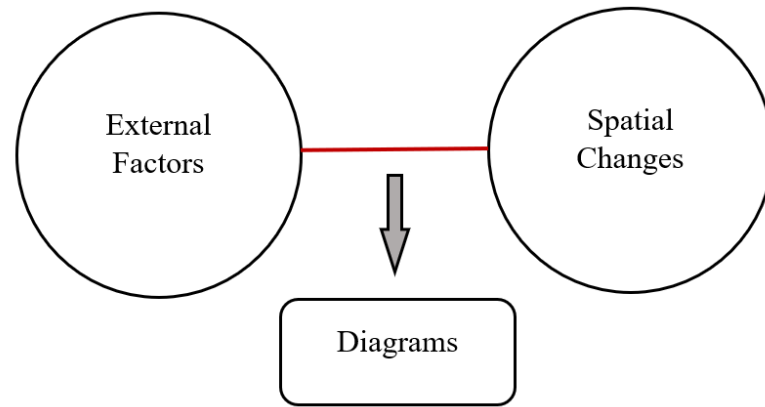


Figure 4.1: Diagram of the Strategy of the Study

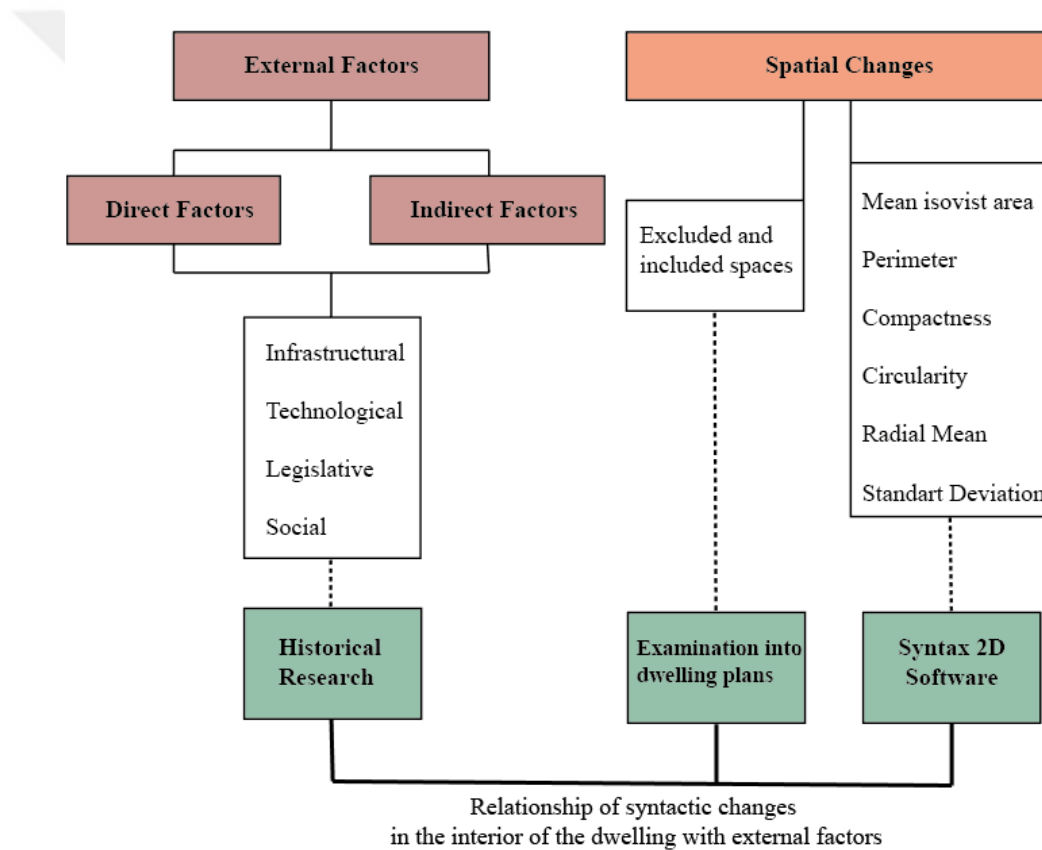


Figure 4.2: Diagram of the Layout of the Methodology

While examining the syntactic changes in the residential interior as well as the change of spatial organisations, external factors which affect the interior directly or indirectly such as the advancement of construction materials, the Law of Property Ownership, spread of the build-sell technique, zoning plans and regulations, magazines

about modern interior and modern life, natural gas in the houses, and access of the internet are also examined.

This study is conducted with a combined strategy. While historical research is carried out on one hand, apartment-type housing plans obtained from the municipal archive are examined and analysed on the other. The data obtained as a result are compared and analysed with diagrams.

4.2 Approach of the Study

As a preliminary stage of the case study, historical development in Turkey is examined in order to understand the atmosphere of the era when the dwelling started to change in shape. From the Empire reign to the Republican period, Turkey entered a new era by not only changing the regime but also lifestyle, consumption habits, and eventually dwelling forms. Shaped by the trio of political, socio-cultural, and technological developments, the dwelling has gained new identities over time.

In order to form the method of the study, especially the zoning laws in Istanbul, all the factors that trigger the existence and formal diversification of the apartment-type dwelling in the selected case area are listed. As a result of the research, the periods in which the apartment type houses proliferated and diversified through transformation are determined. The points where aforementioned radical changes occur are called "breaking points" in this study.

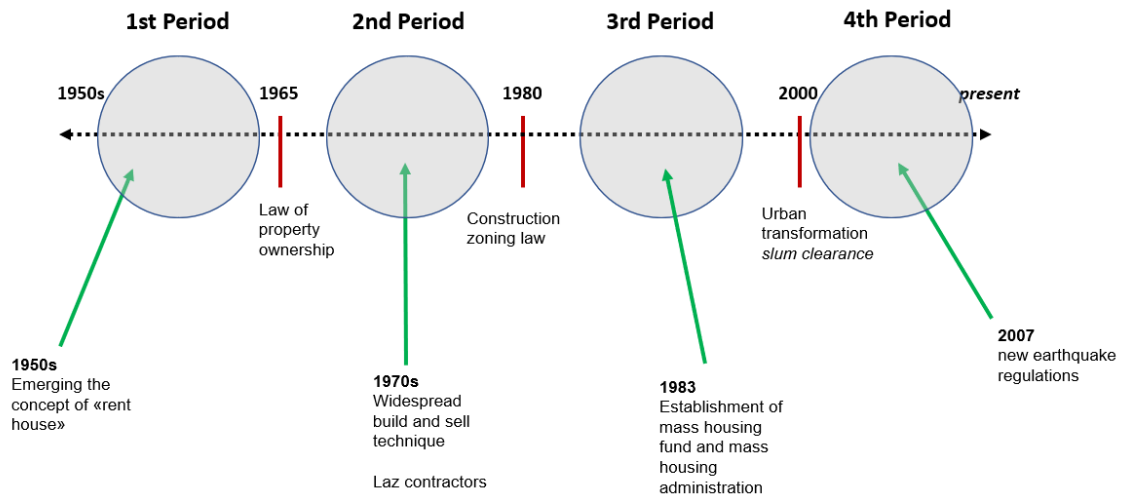


Figure 4.3: The Breaking Points of the Apartmentisation Period

The first apartment types encountered in the neighbourhood within the scope of the study were built as "rental houses" in the 1950s by adding extra floors on the existing detached house. For this reason, it is rational to determine the starting point of the study as the early 1950s. The years to be examined from the early 1950s to 2020 are divided by the historical breaking points and are listed as follows.

Law of Property Ownership in 1965 (URL – 39), Construction zoning law in 1980, Urban Transformation law in 2000 (Yenice, 2014). Hence, the seventy-year period is divided into four periods with the three breaking points determined (Fig 4.3). The periods are listed as follows,

- 1- 1950 to 1965
- 2- 1965 to 1980
- 3- 1980 to 2000
- 4- 2000 to 2020

Secondary factors, which are in between the main factors that determine the breaking points should be considered as they directly affect the interior design. Periods determined with breaking points are also valid for grouping the apartment-type plans to

be examined. In other words, apartment houses are divided into four categories according to their construction date to analyse.

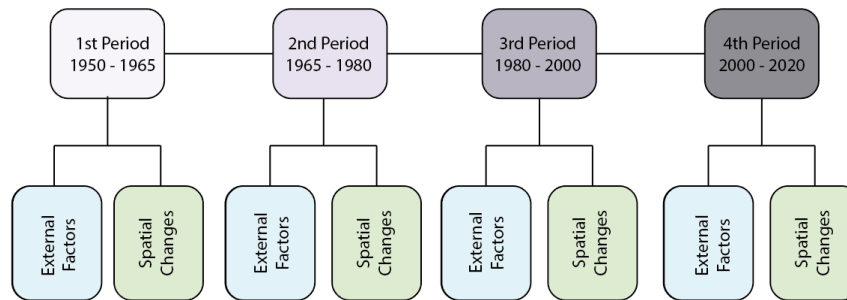


Figure 4.4: The Diagram of the Approach of the Study

Although the analysis is applied to the whole plan in the process of achieving the numerical results of the syntax parameters, plan schemes are handled in three separate sections which are the living area, service area and bedroom area. The dwellings are compared over the three sections. The sections to be examined in this context are as follows:

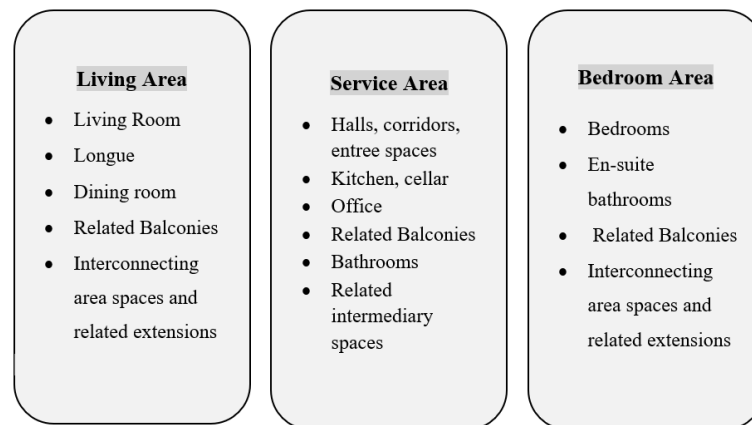


Figure 4.5: Functional Areas to be Studied

Each sample is analysed into three regions as Living area, Service area and Bedroom area. Syntax measurements are made by measuring isovist, graph and radial values. While the isovist area, isovist perimeter, circularity and compactness parameters are measured within the isovist values, the radial mean and standard deviation

parameters are considered within the radial values. With the graph measurement, the analysis is applied by mean depth, and integration parameters. In this thesis, isovist, graph and radial data are measured to comprehend the changes in the interior spaces of apartment-type houses.

The definitions of these parameters are made in detail in Chapter 2 where the theoretical discussion is held. However, the reason for choosing these parameters is that they help in understanding the geometric changes in the domestic space of the apartment type dwellings caused by historical breaking points. The parameters mentioned above are calculated separately for each unit and the average values are considered. Since the analyses are made one by one for each unit, dozens of numbers are obtained as a result. Visualisation is made with diagrams so that the numbers can be presented in a concrete, controllable and easily interpretable manner.

4.3 Sample Selection

In order to examine the buildings covering a seventy-year period that is divided into four periods by breaking points, a region where these aforementioned buildings are situated is selected. The coexistence of different types of buildings in the boundary of the region takes the thesis to another level. Within the scope, the streets where apartment-type houses built in various years are located and were selected during an excursion in the Feneryolu neighbourhood in the Kadıköy district of Istanbul; an area where the urban transformation continues rapidly today.

The streets are chosen among the closest ones to the Feneryolu train station and near the vicinity of Feneryolu Street. The reason for this is that apartment house production in the region started around the train line and the Feneryolu street and densified all over the neighbourhood. In the third chapter, where the urban development

and transformation of the Feneryolu neighbourhood is investigated, the development is observed in the maps showing the urbanisation speed and boundaries of the region. Thus, the streets with a wide range of apartment type buildings ranging from the recently built buildings to the earliest 1950s apartment buildings are selected.

Before the sampling process, the apartment type dwellings acquired are categorised historically, taking into account the breakpoints mentioned earlier. The apartment buildings that differentiate in form such as the apartments on the corner of the building block are eliminated. This is because the plan layout of the apartment-type houses built in the narrow corner of the triangular city blocks is designed in a triangular form to get maximum efficiency from the building plot.

Since the plan sizes are a parameter where the transformation in the interior can be read, they are also a comparison element in the synthesis phase. Therefore, selecting plan schemes with the same area value is not a priority. In addition, although there are duplex apartments in the selected samples, the plan type considered and analysed is “typical floor plan”.

Apartment-type housing projects, which are categorised according to the breaking points and eliminated according to the mentioned criteria, are selected by random sampling. Although the sample selections are made randomly, the most important criterion is that the selected samples were built in different years, in order to better grasp the understanding of the housing concept of the periods. Five samples of apartment type dwelling for each period are determined randomly from the remaining apartment buildings in order to analyse. Regardless of which street they are on, the selected apartment type residences according to the years of construction are as follows;

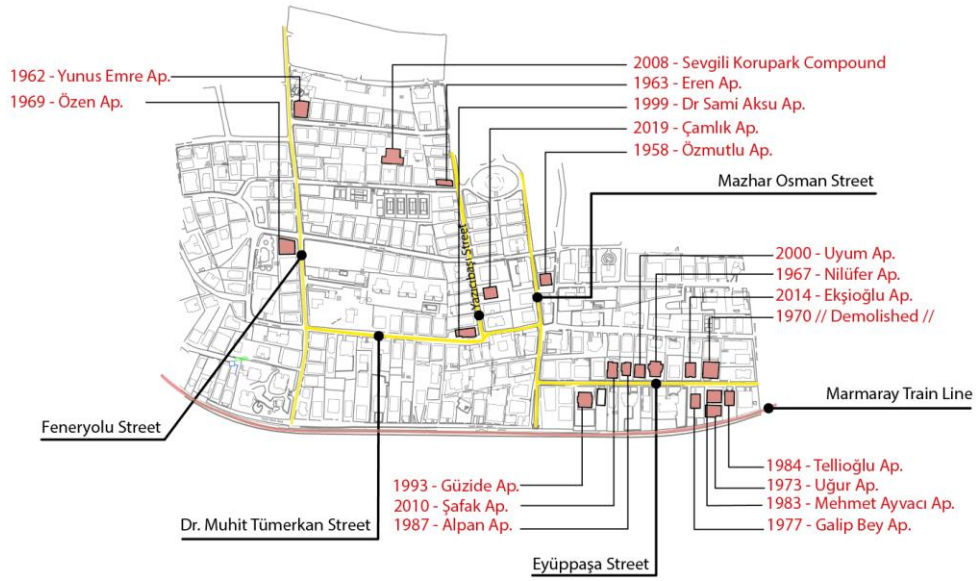


Figure 4.6: The Locations of the Samples

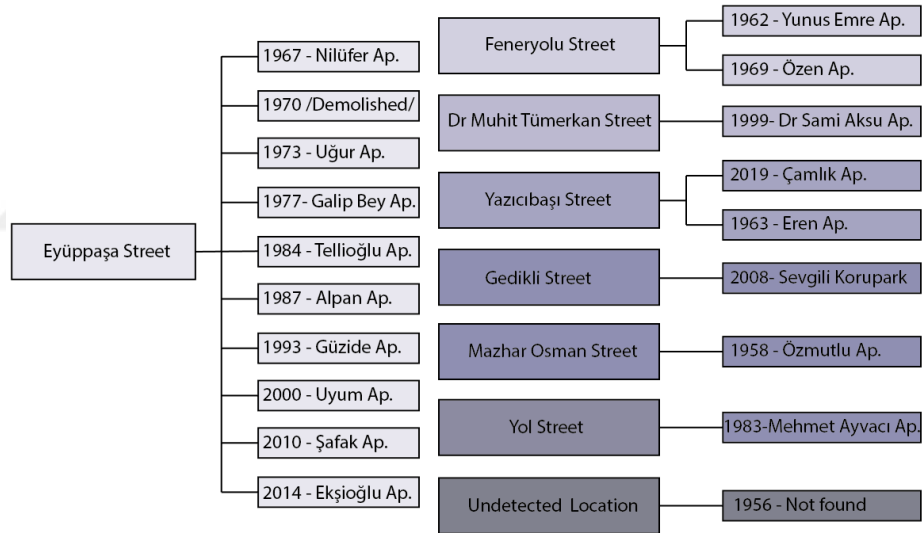


Figure 4.7: The List of the Samples

As a result of the subdivision works in the area, large plots in which wooden mansions were located were divided into smaller parcels, and new building blocks occurred, thus, the morphology of the neighbourhood was altered. For this reason, although the location of the 1956 sample, which is the earliest example, as specified in the project established by the municipality, no such street, lot, nor block number were found in the current plan of the neighbourhood.

4.4 Data Collection

In this study, in which both social factors and spatial changes are investigated, the data collection is carried out in two separate phases.

- 1- Examination of the syntactic transformations of the spaces; apartment type housing plans are required. The municipality of Kadıköy is contacted to obtain the housing plans.

With a petition provided from Ozyegin University, an Excel file containing the block and parcel numbers of the apartment buildings to be analysed is prepared and sent to the municipality of Kadıköy. The archive manager prepares the related projects in a digital environment by grouping them according to the block numbers and thus the plans are obtained.

The examination of social factors is also categorised within itself.

- 1- In order to understand the laws that came into force and to grasp their effects on the domestic space of the housing, each law is examined in detail from the Official Gazette of the Turkish Republic's archive where the laws are published, and it is verified whether they have effects on the physical transformation.
- 2- Other factors that arise within each period, that is, between two breaking points, have an impact on the housing are also examined. For example, the emergence of the build-and-sell technique and its introduction to Istanbul by the Black Sea originated contractors. In this context, articles published in architecture journals are examined. For example, Mimar and Arkitekt journals contain many articles on construction technologies and techniques.

3- In the context of reinterpretation of interior design by the user, women's and home magazines that could be considered as the most effective influencer of interior modernisation are examined. These magazines contain articles, drawings and photos of modern interiors, furniture choices and modern lifestyles in Europe. In Turkey, especially from the late Ottoman period until the 1970s, there was a trend in which magazines were actively published. Modern domestic life is presented not only with a modern architectural design but with a depiction of the nuclear family. The journal examples examined are Hayat, Yedigün and Muhit.

4- Other features of the selected apartment type buildings are monitored which include number of floors, number of flats per floor, elevator, skylight, and average square meters. These features are the elements that provide information about the quality of the house, the lifestyles, and standards of the users as well as the housing production technique of the period.

Although this thesis centres on the interior of the house, the house production technique, material, and the new solutions introduced in every period are factors affecting the interior of the residence and should not be ignored.

4.5 Data Analysis

Before analysing the plan schemes of the apartment type houses by the syntax 2D software, it is decided which floor plans are analysed. In this thesis, ground floor plans, loft plans, and duplex housing plans are ignored, and regular floor plans are focused on instead. Projects obtained from the archive of Kadıköy municipality are

scanned digitally and stored with the ".tif" extension. Each tif file contains all the relevant plans, sections, façades, roof plans, basement plans, and static calculations of a house. Since the projects are very old, the construction dates of some of them have become unreadable.

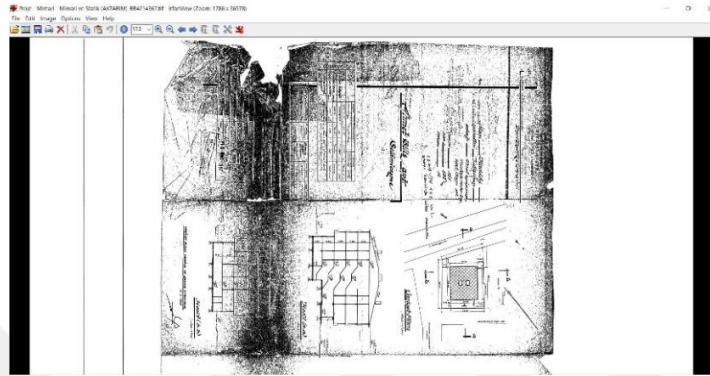


Figure 4.8: The Cover of the Sample Project

In this chapter of the thesis, it is useful to explain the methodology over a sample to better understand the analysis process. In this context, the selected project is the apartment built in 1967, block number 592 - parcel number 14 (Fig 4.8). The typical floor plan of the apartment (Fig4.9) is re-drawn in the AutoCAD programme in the one-to-one scale.

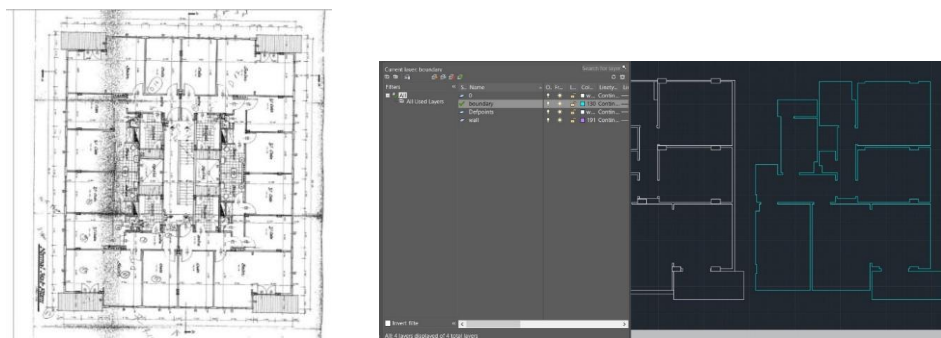


Figure 4.9, 4.10: The Typical Floor Plan of the Sample

While redrawing the housing plan, the interior furnishings are ignored, only boundary and walls are drawn with the polyline tool and saved in '.dxf' format. At this

point, even the recesses and protrusions caused by the columns are drawn carefully to the finest detail.

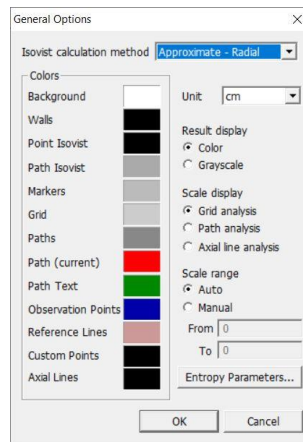


Figure 4.11: General Options

The drawing is transferred to the Syntax 2D software. Isovist calculation method is selected as Approximate-Radial. With this calculation method, isovist, graph, and radial values are calculated at the same time. Since the house plans are drawn in cm scale, cm length unit is selected from the unit tab.

Grid analysis is selected in scale display options since the floor plans are divided into grids, and analysis is made by taking the value of each grid. Subsequently, grid settings are made from the 'grid' tab. From the Grid Setup / Options option, the Span Size setting is entered as 25 (Fig4.13). Thus, the plan scheme is divided every 25 units. The Span Size number is kept constants for all the projects, hereby, consistent rates are expected. 'Span count X', 'Span count Y' and 'Total cells' numbers are dependent on span size and automatically change. Thus, the average values found in projects with different scales are consistent with each other. In order to calculate the graph measures, the box below must be checked. After determining the Span size value, the 'Initialise Grid' option is selected from the grid tab. At this stage, the plan is ready to be analysed.

As the last step, ‘Create Grid Isovist’ is selected from the Grid tab and the result comes out in coloured format (Fig4.14).

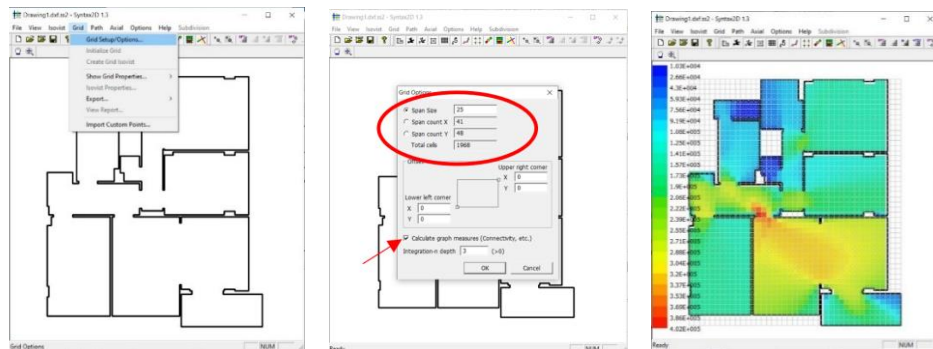


Figure 4.12, 4.13, 4.14: Steps of the Grid Isovist Analysis of the Sample

In the process of calculating numerical data, the values taken from the midpoint of each unit are summed up and the average value is found by dividing by the sum of the number of units. An example of this, with regards the method in this study: to find the average isovist, graph, and radial values of the living space, the midpoints of the relevant units, which are the living room and balcony in this project, are selected and the ‘isovist properties’ option is selected from the grid tab from the toolbar (Fig4.15).

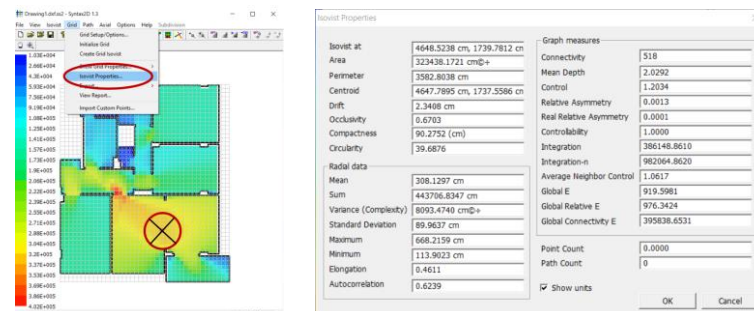


Figure 4. 15, 4.16: Syntactic Values of the Sample

The left part of the table (Fig4.16) demonstrates the numerical values of the selected coordinate (Fig4.15) is isovist and radial data values. The isovist and radial parameters, all of which are average values, are as follows. Isovist area, perimeter, compactness, circularity, radial mean, standard deviation and are the subject of

discussion in this thesis. The syntactic values are easily calculated in Syntax 2D software. The average values of the units categorized according to the method of this thesis are calculated manually. Values are transferred to the Excel file to understand and interpret the relationship between values.

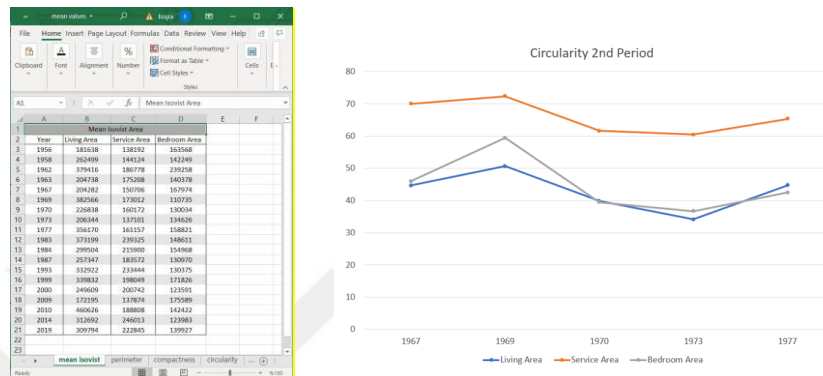


Figure 4.17, 4.18: Syntactic Values and Diagram Sample

Line graphs demonstrating the values of living area, service area, bedroom area for each apartment type housing plan is obtained from Excel (Fig17). The analysed data is compared one by one and the physical transformation in the apartment-type housing plans is synthesised.

Examination into Dwelling Plans

In addition to the Space Syntax analysis, either the excluded or included units in the interior of the residence are observed, and the interior spaces of the apartment-type dwellings in each period determined with their breaking points are listed. Separate tables are made for each period.

External Factors

External factors are the factors that affect the transformation of apartment type dwellings. These factors are examined under two subtitles as direct and indirect external

factors. These factors include all the reasons that affect the interior space in the case area, from the building construction technique to the reasons for the acceleration of the settlement in the neighbourhood. Such as social, infrastructural, technological, and legislative factors in each period determined with breaking points are investigated and listed. Thus, the extent to which syntactic and spatial changes are related to external factors are compared in the synthesis section.

4.6 Synthesis of the Analysis

The comparison of all the data obtained and the establishment of the relationship between syntactic changes and external factors takes place in this section. In this context, the average syntactic trends of each period are considered. While making the comparisons, the syntax parameters and the studied functional areas are listed. The increase and decrease in the mathematical data of syntactic parameters are examined. Parameters are matched with the functional areas where they tend to increase or decrease. Thus, the trend in average syntactic values in apartment-type dwellings is visualised with diagrams. Considering the external factors in the construction period of the buildings, the decrease or increase in the syntactic values is evaluated.

As a result, the relationship matrix, which reveals the changes in the space syntax and spatial organisation of the apartment-type dwellings, is examined individually with general trends emerging over the years.

4.7 Chapter Assessment

In this chapter, the approach of the study was decided, and then applied according to how interior spaces of apartment type dwelling can be examined, analysed,

and evaluated. As the strategy of the study, the historical research of exterior factors affecting the transformations of the apartment type dwellings is conducted, on the other hand, the syntactic transformations in the residential interior were measured through the Space Syntax software.

To determine the framework of the study, the history of the emergence of the apartment type dwellings in Feneryolu, which is the case study area, was investigated. Apartment-type dwellings in the region were first encountered as rental houses in the 1950s. Because of this, the chosen starting point of the study was the 1950s. Since the external factors cause radical changes in housing, the study is divided into periods according to the years determined with the external factors.

Apartment type housing layouts are divided into three functional areas, which are: Living area, Service area, and Bedroom area. Each respective area is to be analysed. The parameters: Mean Isovist area, Perimeter, Compactness, Circularity, Radial mean, Standard deviation, Mean depth, and Integration in the Syntax2D software are selected as the analysis tool.

Sample selection was made as random sampling, and the location of the selected samples were indicated with a map. Data collection took place in two phases. While housing plans are obtained from Kadıköy municipality archive, the external factors affecting the interior of the house are acquired from:

- The laws in the Official Gazette of the Turkish Republic,
- The articles in the journals such as Mimarlık, and Arkitekt,
- Modern interior examples in the magazines such as Hayat, Yedigün, and Muhit.

The data analysis process is explained in detail over an example. The obtained isovist, graph, and radial data values are listed in Excel and prepared for the evaluation process.

In the next chapter, the analysis results of the syntactic transformation in the respective interiors of the apartment type dwellings and the external factors will be categorised according to the breaking points. Diagrams will be created with the results of the analysis. The changes in the diagrams will be compared with the external factors and interpreted.



CHAPTER V

CASE STUDY: FENERYOLU NEIGHBOURHOOD, KADIKÖY, İSTANBUL

Due to urban sprawl and densification in Istanbul, apartment-type dwellings have become the dominant building type in Istanbul over time. The physical transformation occurred in the interior of the dwelling dependent on external factors, and as a result, apartment-type dwellings started to diversify. External factors sometimes arise from laws, developments in housing production technology, and social changes in the daily life of the user. All kinds of external factors have caused the interior of the dwelling to change over time.

The seventy years following the beginning of apartment type dwelling production in the Feneryolu neighbourhood from the 1950s to 2020 are examined in four periodic groups. The syntactic changes of the dwellings in each group are discussed over three functional areas. These areas are the Living Area, Service Area, and Bedroom Area.

Moreover, a table of included and excluded units is made so that the change in the interior can be observed and the quality of action inside the dwelling can be discussed. By investigating the reasons for all these transformations mentioned above, external factors that affect the interior space are examined. As a result, the relationship between the analysis results of interior space transformations and the external factors is

interpreted and evaluated. Thus, in this chapter, the syntactic changes of the interior space, spatial changes, and external factors that affect the interior are examined.

5.1 Analyses of the First Group of Apartment Type Dwelling in the Feneryolu Neighbourhood (1950-1965)

The general dwelling typologies of the first period consist of apartment buildings that were converted from detached, single-family houses to three-storey apartments. These dwellings were redesigned as 3 - 4 storeys on average.

5.1.1 External Factors that Affected the Apartment Type Dwellings in the First Group (1950-1965)

The date range for examining the external factors of the first group was determined as 1950-1965. In this context, infrastructural, technological, legislative, and sociological factors in the fifteen-year period are the focal point. These issues consist of factors that affect the production of apartment-type dwellings directly and indirectly in Istanbul generally, but specifically in the Feneryolu neighbourhood. These are listed as direct factors and indirect factors. The factors that directly affect the production of apartment-type dwellings in the Feneryolu neighbourhood between the years 1950 - 1965 are as follows;

- The introduction of new production techniques.
- Production of rental houses in the Feneryolu neighbourhood.
- The transition from large-family houses to single-family houses.
- Housing production in smaller parcels as a result of land subdivisions.

The factors that indirectly affect the production of apartment-type dwellings in the Feneryolu neighbourhood between the years 1950 - 1965 are as follows;

- Economic effects of World War 2.
- Menderes' Operations.
- Strengthening the sea transportation of the Anatolian and European sides.
- Migration.

5.1.2 Excluded and Included Spaces in the Apartment Type Dwellings in the First Group (1950-1965)

Name - Year	Floor	Area m ²	Central Hall	Corridor	Interconne- cting hall	Living Room	Sitting Room	Salle-à- manger	Kitchen	Cellar	Storage Room	Office	Guest's Room	Wc	Bathroom	En-Suite Bathroom
The 1956 Ap.(1956)	3	105														
Özmutlu Ap. (1958)	3	100														
Y. Emre Ap. (1962)	B+5	110														
Eren Ap. (1963)	3	100														

Table 5.1: The units of “The 1956 Apartment (1956), Özmutlu Apartment (1958), Yunus Emre Apartment (1962), Eren Apartment (1963)”.

Interior spaces of the first group of apartment type dwellings;

- They consist of an average 103 square meters of spatial arrangement.
- The spaces relate to the central hall and interconnection hall.
- Living room, sitting room, and salle-à-manger^{xiii} constitute the Living Area.
- There is always a separate unit for the kitchen.
- Cellars and offices only exist in The 1956 Apartment (1956), while the guest's room only exists in Yunus Emre Apartment (1962).

- All dwellings have shared bathrooms.
- Except for Eren Apartment (1963), all the apartments have separate WCs apart from the bathroom.

5.1.3. Space Syntax Analyses Results of the Apartment Type Dwellings in the First Group (1950-1965)

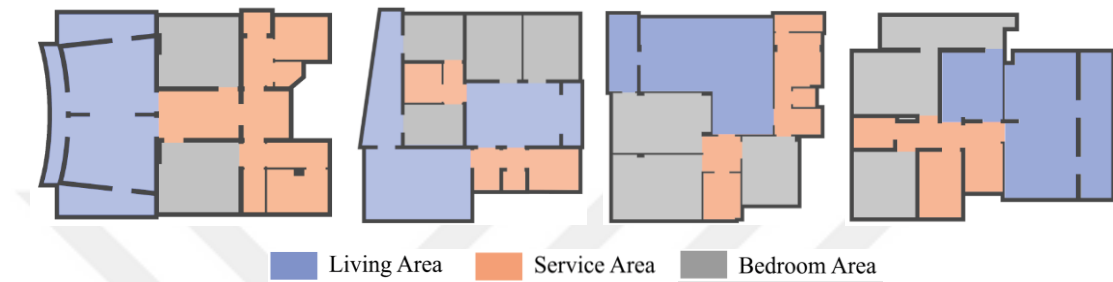


Figure 5.1: Functional Areas of The 1956 Apartment (1956), Özmutlu Apartment (1958), Yunus Emre Apartment (1962), Eren Apartment (1963)

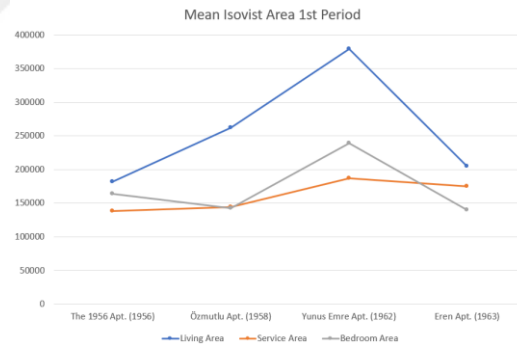


Figure 5.2: Mean Isovist Area, 1st Period

In the 1956 apartment, the mean isovist area values are almost identical for the Living Area, Service Area and Bedroom Area since all units were designed almost to the exact same measurements. In Özmutlu Apartment (1958), the two spaces that constitute the Living Area are dominant in size, thus an increase occurred in the isovist area value. However, the values in Yunus Emre Apartment (1962) reached a peak point for all three categories, before approaching their initial values again. The reason is that,

unlike the other three examples, Yunus Emre Apartment (1962) was not converted from a single-family house. Especially the fact that the Living Area consists of only the L-shaped living room, increased the value of the mean isovist area relatively. In the general trend of the table, the mean isovist value was found to be high in the Living Area, Bedroom Area and Service Area, respectively. However, in Eren Apartment (1963), the mean isovist value of the Service Area exceeded the value of the Bedroom Area. This is due to the linearisation of the living room. In other words, while the other units are clustered around the central hall and in relation to each other, the living room is separated from the whole plan and specialised.

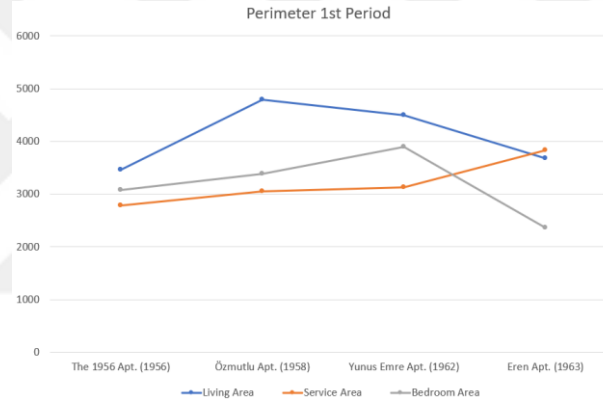


Figure 5.3: Perimeter, 1st Period

In The 1956 Apartment (1956), the perimeter values for each were approximately the same. In Özmutlu Apartment (1958), there was an increase in perimeter size. The reason for this is that the sitting room, which is also the central hall, was connected to other units. For this reason, the isovist polygon emerged as the spikiest convex shape in the Living Area. In Yunus Emre Apartment (1962), the emerging isovist polygon in the Bedroom Area gained more value compared to other areas, as the bedrooms were connected to the interconnecting hall, balcony and entrance hall and were bi-permeable spaces. However, in Eren Apartment (1963), the Living Area and Bedroom Area values decreased, with the Service Area value higher than

both. This is because all the units are lined up around the central hall. Thus, the isovist polygon created in the central hall reached all units to some extent and the spikiest polygon occurred in the Service Area.

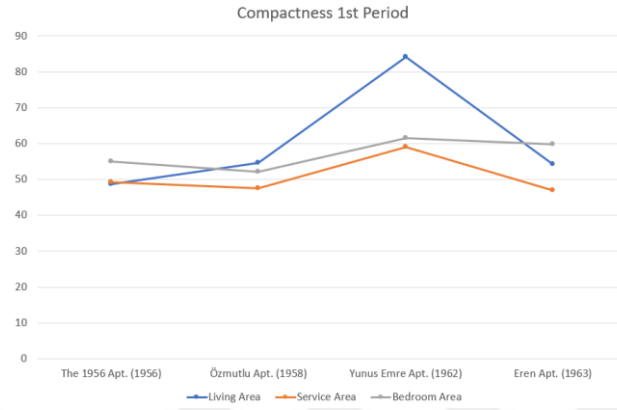


Figure 5.4: Compactness, 1st Period

In the 1956 Apartment (1956), the values of all three areas did not differ too drastically. In Yunus Emre Apartment (1962), the biggest difference in compactness was found between the Living Area and Service Area. This is because the other three examples were originally designed as detached houses and only Yunus Emre Apartment (1962) was designed as an apartment type dwelling. In Yunus Emre Apartment (1962), the area where the isovist polygon was found circular is the Living Area. The reason for this is that the Living Area consists of only one space, and it is the only dominant unit in terms of size. In Eren Apartment (1963), there was a dramatic decrease in the compactness value of the Living Area, which in turn, fell below the value of the Bedroom Area.

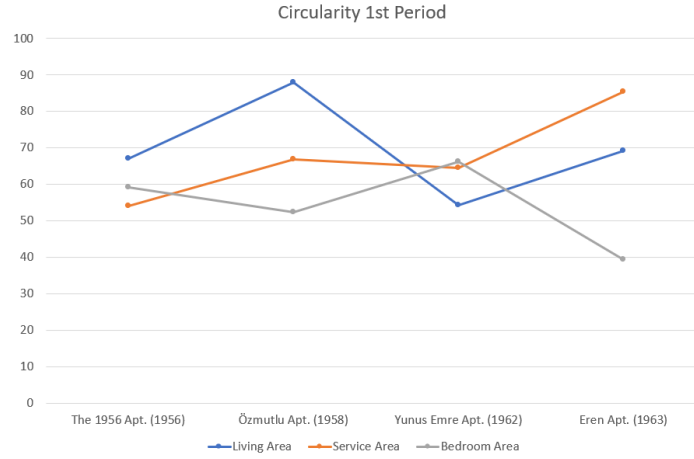


Figure 5.5: Circularity, 1st Period

The circularity value was approximately the same in all areas in The 1956 Apartment (1956) since the Living, Service and Bedroom Areas had not dominated. In Özmutlu Apartment (1958), the biggest difference in circularity value was between the Living Area and Bedroom Area. The reason for this is that the boundaries of the Living Area was convex, and it consisted of highly integrated spaces. However, in Yunus Emre Apartment (1962), due to the fact that the units of the Living Area were reduced to a single unit, and it is in the L form, the value of the perimeter was found to be high in the interconnected hall, and in the Living Area. The circularity value then declined dramatically and fell below both the Bedroom and Service Area. In Eren Apartment (1963), the highest circularity value was found in the Service Area.

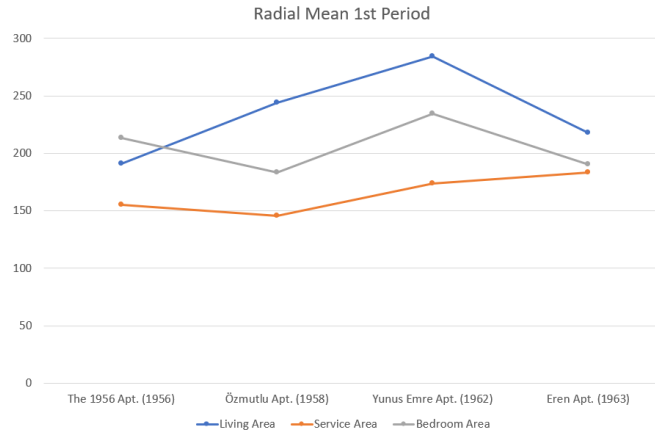


Figure 5.6: Radial Mean, 1st Period

The radial mean value generally increased for all three areas over time. For the Living Area and the Service Area, the peak was seen in Yunus Emre Apartment (1962), followed by a quick decrease; the values had then converged in Eren Apartment (1963). In The 1956 Apartment (1956), the radial mean value was higher than the Living Area due to one of the bedrooms being bi-permeable and connected to the central hall, and the bathroom corridor. However, in Özmutlu Apartment (1958) and Yunus Emre Apartment (1962), the dominant character of the Living Area caused the radial rays to be the longest. Although the radial mean value of the Living Area and Bedroom Area decreased in Eren Apartment (1963), centralisation occurred mostly in the Living Area. In Eren Apartment (1963), an increase in the radial mean value was observed in the Service Area due to the rectangular form of the interconnecting hall and the arrangement of the units around the interconnecting hall.

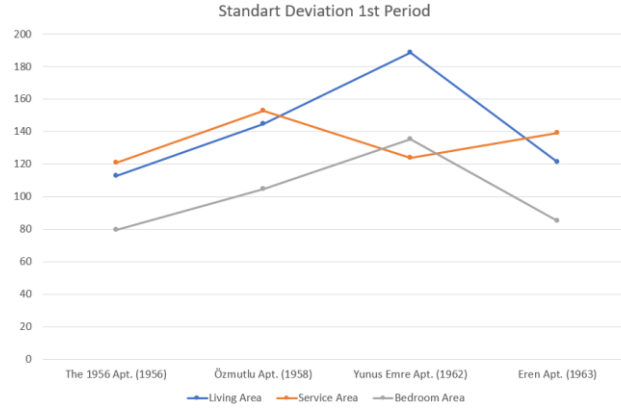


Figure 5.7: Standard Deviation of the Radial Rays, 1st Period

Due to the central hall was multi-permeable and connected with all the units, the standard deviation value of the radial rays in The 1956 Apartment (1956) was found to be high in the Service Area. In Özmutlu Apartment (1958), with the emergence of the interconnecting hall as a part of the Service Area, the deviation in the radial rays in this region was found to be the highest. In Yunus Emre Apartment (1962), the values of the Living Area and Bedroom Area peaked while the Service Area value dropped below the Bedroom Area. The reason for this is that the living room was designed in L shape and the interconnecting hall was accessed through the living room. In Eren Apartment (1963), the value of the Living Area decreased dramatically. In the end, the highest value was found in the Service Area, followed by the Living Area and Bedroom Area.

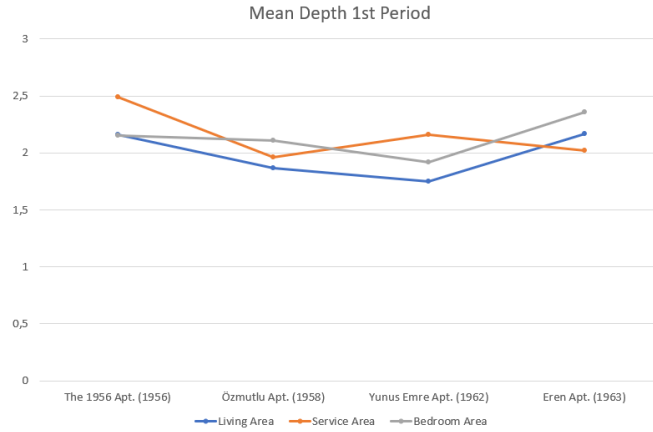


Figure 5.8: Mean Depth, 1st Period

While the value of the mean depth was found to be high in the Service Area in The 1956 Apartment (1956), it was the lowest in Özmutlu Apartment (1958). The reason for this is that the core which forms the Service Area in Özmutlu Apartment (1958) deepened due to the units such as office, kitchen, and balcony. Since the bedrooms and living room were accessed through the interconnecting hall, the mean depth value was equal for both the Bedroom Area and Living Area. The most accessible space in all dwellings is the Living Area. With the emergence of the interconnection hall in Özmutlu Apartment (1958), the depth of the dwelling was increased. While the living room where the guests were hosted, and the Living Area with a central hall feature found as the shallowest areas, the bedrooms were measured as the deepest units.

In Yunus Emre Apartment (1962), all areas were designed to be positioned separately. The relationship between the Service and Bedroom Area is provided through the Living Area. The strong permeability between the Bedroom Area and the Living Area caused the Service Area to be the deepest.

In Eren Apartment (1963), since the units were arranged around the central hall, the Bedroom Area and Living Area were found as the deepest and the Service Area was

found as the most accessible space. The spatial configurations affecting the mean depth were developed as a solution to the heating problem in the first-period dwellings. For this reason, the units were sequenced around the central hall which increased the permeability in the dwelling, reduced the depth and preserved the heat inside the dwelling at the maximum level.

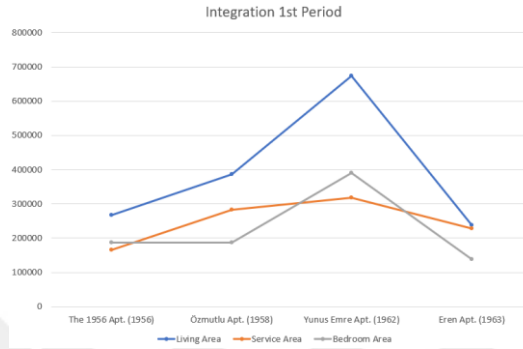


Figure 5.9: Integration, 1st Period

In The 1956 Apartment (1956), the space with the highest integration value was the Living Area. This was due to the low depth of the Living Area. The fact that the integration values similar to each other in The 1956 Apartment (1956), Özümtlu Apartment (1958) and Yunus Emre Apartment (1963) is related to the fact that the houses were designed as detached houses. In these houses, the connection and accessibility of the spaces were higher due to both the heating problem and the design principles of the detached house. However, in Yunus Emre Apartment (1962), due to the interconnecting hall, the highest integration value was found in the Living Area and followed by the Bedroom Area.

5.2 Analyses of the Second Group of Apartment Type Dwelling in the Feneryolu Neighbourhood (1965 - 1980)

The second period buildings were generally built on large plots with gardens. Each floor consists of two or three flats. The biggest improvement in this period is the basement floor. It is also the period when technology became introduced into housing. Boiler rooms, shelters, and housekeeper flats were available in the buildings of this period.

5.2.1 External Factors that Affected the Apartment Type Dwellings in the Second Group (1965 - 1980)

The date range for examining the external factors of the second group was determined to be 1965-1980. Infrastructural, technological, legislative, and sociological factors in the fifteen-year period are the chosen matter of this topic. These issues consist of factors that affect the production of apartment-type dwellings directly and indirectly in Istanbul generally, but specifically in the Feneryolu neighbourhood. These are listed as direct factors and indirect factors.

The factors that directly affect the production of apartment-type dwellings in the Feneryolu neighbourhood between the years 1965 - 1980 are as follows,

- Law of Property Ownership.
- Production of construction material in Turkey.
- Standardised materials; affordable and efficient construction systems.
- Central heating systems in apartment type dwellings.
- Build and sell technique.

The factors that indirectly affect the production of apartment-type dwellings in the Feneryolu neighbourhood between the years 1965 - 1980 are as follows,

- New industrial zones.
- Increasing the accessibility between the European and Asian continents by building the First Bosphorus Bridge.
- Establishment of Göztepe Training and Research Hospital
- Informal growth of İstanbul.
- Global Economic and oil crises.

5.2.2 Excluded and Included Spaces in the Apartment Type Dwellings in the First Group (1965 - 1980)

Name - Year	Floor	Area m²	Central Hall	Corridor	Interconn- ecting hall	Living Room	Sitting Room	Salle-à- manger	Kitchen	Cellar	Storage Room	Office	Guest's Room	Wc	Bathroom	En-Suite Bathroom
Nilüfer Ap.(1967)	B+4	108														
Özen Ap. (1969)	B+4	105														
The 1970 Ap.(1970)	B+4	95														
Uğur Ap. (1973)	B+4	110														
Galip Bey Ap(1977)	B+10	110														

Table 5.2: The units of “Nilüfer Apartment (1967), Özen Apartment (1969), The 1970 Apartment (1970), Uğur Apartment (1973), Galip Bey Apartment (1977)”.

Interior spaces of the second group of apartment type dwellings:

- The second group of apartment type dwellings consist of an average of 105 square meters of spatial arrangement.

- The central hall no longer exists.

While the spaces related to the interconnection hall in Nilüfer Apartment (1967) and Özen Apartment (1969), a new unit, the corridor, was included in the interior after The 1970 Apartment (1970).

- The sitting room no longer exists.
- The Living Area consists of only the living room. However, only Özen Apartment (1969) contains a salle-à-manger.
- There is always a separate unit for the kitchen.
- There is a storage room and a guest's room only in Nilüfer Apartment (1967).
- All dwellings contain shared bathrooms.
- All dwellings contain separate WCs apart from the bathrooms.

5.2.3 Space Syntax Analyses Results of the Apartment Type Dwellings in the Second Group (1965 - 1980)

The syntactic analysis results and diagrams of the typical floor plans of Nilüfer Apartment (1967), Özen Apartment (1969), The 1970 Apartment (1970), Uğur Apartment (1973) and Galip Bey Apartment (1977) apartment type dwellings are found below:



Figure 5.10: Functional Areas of Nilüfer Apartment (1967), Özen Apartment (1969), the 1970 Apartment (1970), Uğur Apartment (1973), Galip Bey Apartment (1977).

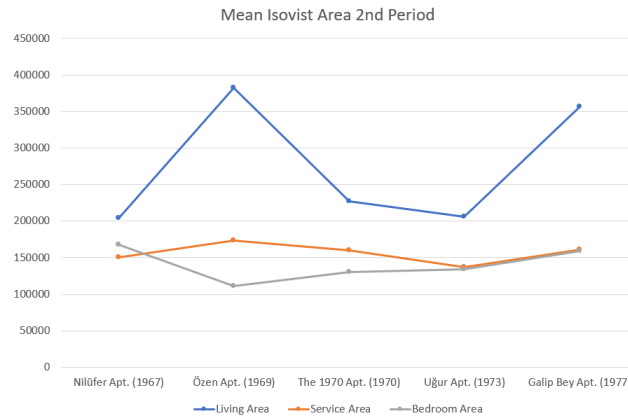


Figure 5.11: Mean Isovist Area, 2nd Period

In Nilüfer Apartment (1967), the mean isovist value was almost equal for each three areas since the units were designed almost in the same size. The biggest difference of the mean isovist value in Özen Apartment (1969) was found between the Living Area and Bedroom Area. The reason for this is that the living room was L-shaped and designed together with the *salle-à-manger*. Another reason is that the Service Area is divided into two as the interconnection hall and the kitchen unit.

In The 1970 Apartment (1970), the disappearance of the interconnecting hall and the existence of rectangular-shaped spaces such as corridors in the Service Area resulted in a decrease in the mean isovist area value in the Living Area. In Uğur Apartment (1973), the mean isovist values of the Service Area and Bedroom Area were not widely separated.

In Galip Bey Apartment (1977), the value of the Living Area increased, whilst the values of the Service Area and Bedroom Area slightly increased. The reason for this is that the Living Area was reduced to a single unit.

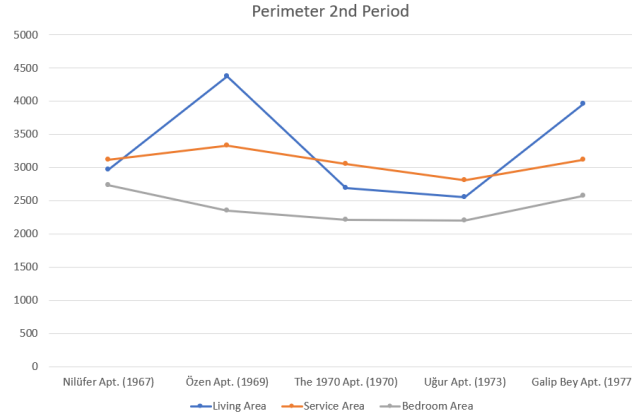


Figure 5.12: Perimeter, 2nd Period

In Nilüfer Apartment (1967), there was very little difference in perimeter values. In Özen Apartment (1969), the perimeter value of the Living Area peaked, the Service Area slightly increased whilst the Bedroom Area decreased mildly. The reason for this is the form of the living room alongside its connection with the balcony, entrance hall and the interconnection hall. Since the Living Area is multi-permeable, the isovist polygon is found to be spiky and therefore a high perimeter value.

In The 1970 Apartment (1970), the perimeter value of the Living Area fell below the Service Area due to the emergence of the corridor. In Uğur Apartment (1973), the highest values were found in the Service Area, followed by the Living Area, then Bedroom Area. Again, the reason for this was corridorisation. The second highest value was found in the Living Area due to the L form of the living room and its connection with the balcony.

In Galip Bey Apartment (1977), the value of the Living Area rose more sharply than the Service and Bedroom Area. The highest perimeter value was found in the isovist polygon created in the living room because of the size of the Living Area and its location at the short end of the rectangular corridor.

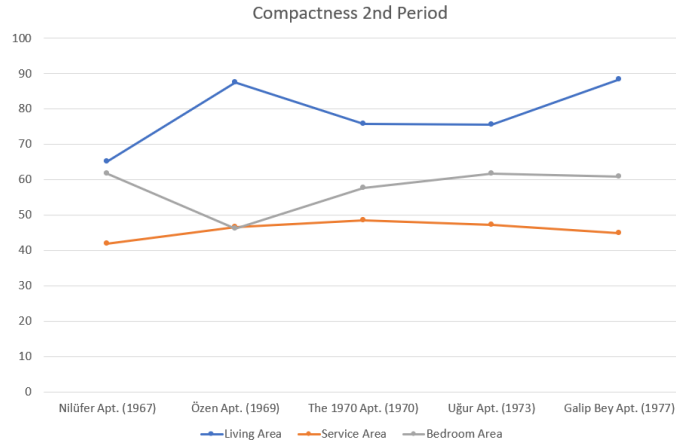


Figure 5.13: Compactness, 2nd Period

In the second group dwellings, the compactness value was found mostly in the Living Area. In Nilüfer Apartment (1967), the compactness value was found to be high in Living Area and Bedroom Area. The reason for that was the connection of the Living Area and Bedroom Area through the interconnecting hall. Although linearisation was not very high in the plan scheme, the compactness value of the Service Area was relatively low.

In Özen Apartment (1969), the compactness value of the Bedroom Area decreased, dropping the same amount as the Service Area, while the Living Room value increased. The reason for this is that the form of the interconnecting hall resembled a corridor, and all the remaining units were separated from the Living Area.

In The 1970 Apartment (1970), the first example of a corridor in the scope of this study emerged. Since the Living Area is disconnected from all units except the corridor and the Bedroom Area through the balcony, the compactness value of the Living Area decreased, while the compactness value of the Bedroom Area increased.

Uğur Apartment (1973) had approximately the same character and values as The 1970 Apartment (1970). The units are arranged around an L-shaped corridor. Linearisation was found the highest in the Living Area. In Galip Bey Apartment (1977), as a result of the central heating system, the Bedroom Area and the Living Area were separated from each other, and the living room and other spaces were connected by a long corridor. For this reason, the living room became a linear space.

Throughout the whole period, the compactness value was found to be highest in the Living Area, followed by the Bedroom and Living Area.

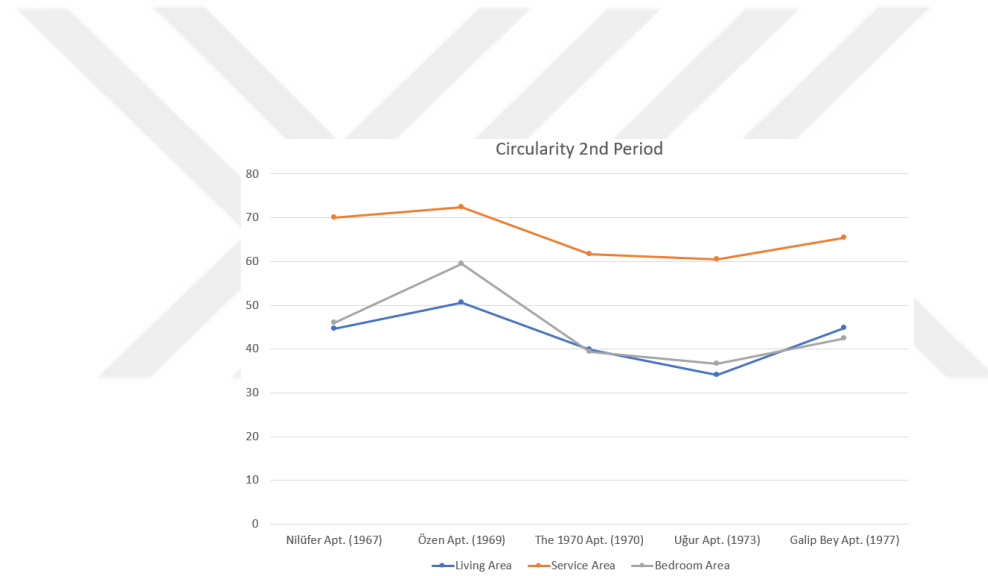


Figure 5.14: Circularity, 2nd Period

In the second group apartments, the area with the highest level of circularity was the Service Area. Circularity values of the Living Area and Bedroom Area fluctuated at a similar rate. The circularity value of the Bedroom Area was slightly higher than the Living Area overall. Although there was not a big change in the kitchen, the Service Area units, such as interconnecting hall and corridor had the highest circularity value.

The interconnecting hall and corridor were the two units with the highest integration values in apartment type residences. For this reason, the value of the convex space formed by the dimensional tightening of the isovist polygon was found to be the highest in the Service Area for all apartments in the second group.

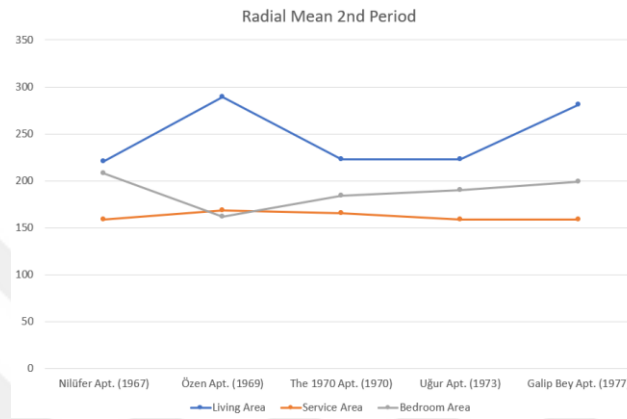


Figure 5.15: Radial Mean, 2nd Period

The radial mean value was found mostly in the Living Area in the second-period apartments. The size and forms of the Living Area and Bedroom Area units were approximately the same in Nilüfer Apartment (1967). Therefore, the radial mean value was found mostly in the Living Area and Bedroom Area, while it was found the least in the Service Area.

In Özen Apartment (1969), the difference between the Living Area and Bedroom Area was evidenced to be the largest. The reason for this is that the Living Area units, the living room, and the salle-à-manger were designed in one space in an L form.

In The 1970 Apartment (1970), the longest radial ray was found in the Living Area, followed by the Bedroom Area, as the Living Area dominated the scheme in size.

Likewise, this situation did not change in Uğur Apartment (1973) and Galip Bey Apartment (1977). Looking at the general values of the radial mean in the second-period apartments, the highest value was found in the Living Area, followed by the Bedroom Area, and the Service Area slightly lower than the latter.

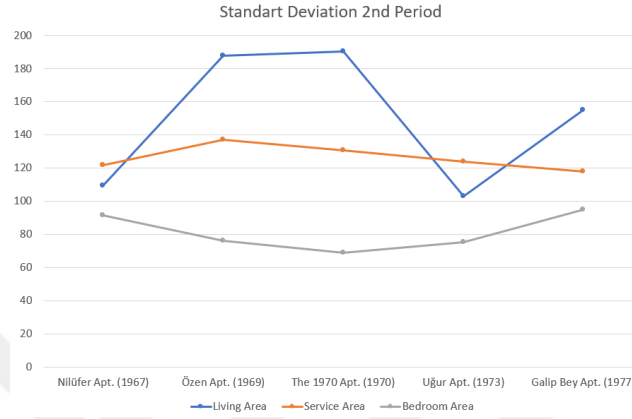


Figure 5.16: Standard Deviation of the Radial Rays, 2nd Period

Standard deviation value of the radial rays rocketed sharply before decreasing dramatically for the Living Area. Initially, the Living Area was lower than the Service Area in Nilüfer Apartment (1967). The Service Area was multi-permeable and provided integration with units of different size. For this reason, deviations occurred in the radial ray lengths.

However, the standard deviation value of the Living Area reached the highest point in both Özen Apartment (1969) and The 1970 Apartment (1970). The reason for this is that the Living Areas are designed in L form and in one unit. Also, the characters of the Living Areas are multi-permeable and bi-permeable. In Uğur Apartment (1973), it again fell below the Service Area. This is because the spatial organisation in Uğur Apartment (1973) was designed around a central corridor. In Uğur Apartment (1973), the standard deviation value of the Living Area was found to be high. The reason for this is due to the irregularity in the form of the living room and the fact that the living

room was located at the end of a long corridor. The value of the Service Area had always remained lower than both the Living and the Bedroom Area.

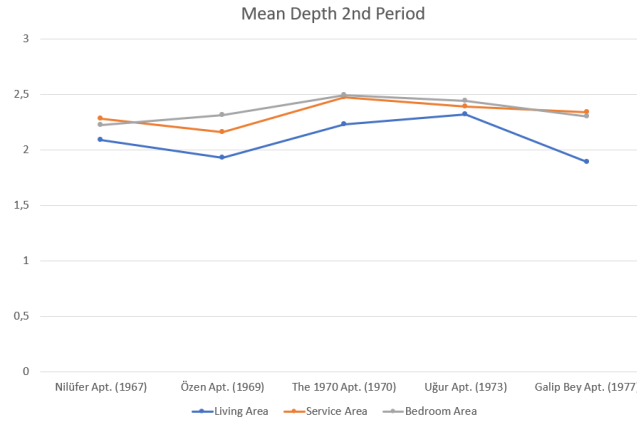


Figure 5.17: Mean Depth, 2nd Period

In Nilüfer Apartment (1969), the mean depth values were almost identical for the Service Area and Bedroom Area. The mean depth value of the Service Area, since the units were located in two different areas within the residence, was the highest. The existence of the interconnection hall in the residence increased the mean depth of the Service Area. Since the access to the Bedroom Area was provided via the interconnected hall, the second deepest area was calculated as the Bedroom Area. The Living Area was the area that could be reached with the least effort. Therefore, the mean depth value of the Living Area was the lowest. Access to the bedrooms was provided from the entrance hall and the interconnecting hall in Nilüfer Apartment (1967), while in Özen Apartment (1969), access to the entire Bedroom Area was provided with the interconnecting hall. Therefore, the highest mean depth value was found in the Bedroom Area while the lowest mean depth value was found in the Living Area.

In The 1970 Apartment (1970), with the disappearance of the interconnection hall, the mean depth value of the Service and Bedroom Areas were found almost completely even. The lowest mean depth was found in the Living Area.

In Uğur Apartment (1973), the mean depth value was approximately the same all over the plan scheme. This is because the units were located around a short corridor. In Galip Bey Apartment (1977), the units with the highest depth were the Service and Bedroom Areas. The reason for this is that the units were detached from the living space by a long corridor. The most easily accessible unit in this dwelling was only the living room.

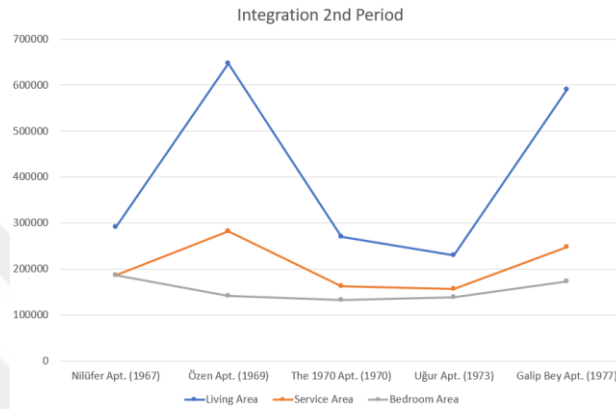


Figure 5.18: Integration, 2nd Period

In Nilüfer Apartment (1967), the highest integration value was found in the Living Area. This is because the interconnection hall, hence the Bedroom Area, could be accessed from the living room. In Özen Apartment (1969), the integration value of the Living Area peaked. The reason for this is that the *salle-à-manger*, living room and balcony coexisted, and the living room was connected to the interconnection hall.

With the disappearance of the interconnection hall in The 1970 Apartment (1970), the integration value of the Living area decreased, but it remained higher than both the Service and Bedroom Areas. Since Uğur Apartment (1973) had the same characteristics of the unit sequence as The 1970 Apartment (1970), there was not much difference in the integration values.

With the existence of the long and rectangular corridor in Galip Bey Apartment (1977), the depth of the dwelling increased. The integration value of the Living Area increased drastically since it was the closest unit to be reached with less effort. The main reason for the construction of the dwellings with the units organised around a long corridor is the central heating system. However, another reason is that due to the Condominium Law (Kat Mülkiyeti Kanunu) of 1965, the acceleration of apartment building and the shrinking of the parcels by the land subdivision works, the units of apartment buildings were organised along a long corridor.

5.3 Analyses of the Third Group of Apartment Type Dwelling in the Feneryolu Neighbourhood (1980 - 2000)

The most important change in period structures was the emergence of the English basement^{xiv}. Basement and Ground floors were allocated to car park areas. In addition, elevator and fire escape were available in the third-period structures. In the first half of the period, the apartments consisted of six to seven storeys, while in the second half, the number of floors increased up to ten to eleven storeys.

5.3.1 External Factors that Affected the Apartment Type Dwellings in the Third Group (1980 - 2000)

The date range for examining the external factors of the third group was determined as 1980-2000. In this context, infrastructural, technological, legislative, and sociological factors in the twenty-year period are the matter of this topic. These issues consist of factors that affect the production of apartment-type dwellings directly and

indirectly in Istanbul generally, but specifically in the Feneryolu neighbourhood. These are listed as direct factors and indirect factors.

The factors that directly affect the production of apartment-type dwellings in the Feneryolu neighbourhood between the years 1980 - 2000 are as follows,

- Construction zoning law.
- Natural Gas in Houses.

The factors that indirectly affect the production of apartment-type dwellings in the Feneryolu neighbourhood between the years 1980 - 2000 are as follows,

- Establishment of mass housing fund and mass housing administration.
- Legislation of the slum areas.
- Gölçük Earthquake in 1999.

5.3.2. Excluded and Included Spaces in the Apartment Type Dwellings in the Third Group (1965 - 1980)

Name - Year	Floor	Area m ²	Central Hall	Corridor	Interconn- ecting hall	Living Room	Sitting Room	Salle-â- manger	Kitchen	Cellar	Storage Room	Office	Guest's Room	Wc	Bathroom	En-Suite Bathroom
Uyum Ap.(2000)	B+7	87														
Sevgili K Comp. (2008)	B+9	110														
Şafak Ap. (2010)	B+7	95														
Ekşioğlu Ap. (2014)	B+12	93														
Çamlık Ap. (2019)	B+15	95														

Table 5.3: The units of “Mehmet Ayvacı Apartment (1983), Tellioğlu Apartment (1984), Alpan Apartment (1987), Güzide Apartment (1993), Dr Sami Aksu Apartment (1999)”.

Interior spaces of the third group of apartment type dwellings:

- They consist of an average of 128 square meters of spatial arrangement.
- The interconnection hall no longer exists.
- The spaces are connected by the corridors only.
- There is a salle-â-manger and a guest's room only in Mehmet Ayvacı Apartment (1983).
- The Living Area consists of only the living room. However, there is a sitting room only in Alpan Apartment (1987).
- The sitting room no longer exists.
- There is always a separate unit for the kitchen.

- There is a cellar only in the Alpan Apartment 1987.
- There are common bathrooms in all dwellings.
- There are separate WCs apart from the bathroom in all dwellings.
- There are en-suite bathrooms in Alpan Apartment (1987), Güzide Apartment (1993), and Dr Sami Aksu Apartment (1999).

5.3.3 Space Syntax Analyses Results of the Apartment Type Dwellings in the Third Group (1980 - 2000)



Figure 5.19: Functional Areas of Mehmet Ayvacı Apartment (1983), Tellioğlu Apartment (1984), Alpan Apartment (1987), Güzide Apartment (1993), Dr Sami Aksu Apartment (1999).

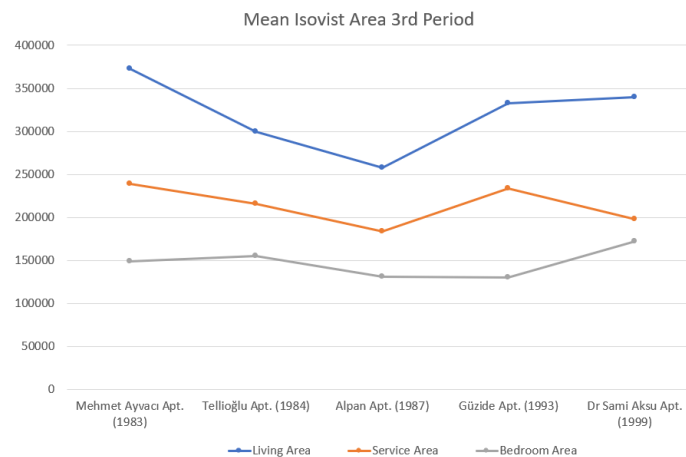


Figure 5.20: Mean Isovist Area, 3rd Period

In the mean isovist area values of the third group, a notable difference was found between each area throughout the period. The major reason for this is the complete disappearance of the interconnection hall and the decrease in living area units.

In Mehmet Ayvacı Apartment (1983), the highest mean isovist area value was found in the Living Area. The reason for that is the existence of a living room and a *salle-à-manger* in the dwelling. In addition to that, the wideness of the door between the Living Area and entrance hall brings about a large isovist polygon. The lowest mean isovist area value was found in the Bedroom Area because the bedrooms are arranged around a corridor and their integration is low.

In Alpan Apartment (1987), the value of the isovist area in the Living Area dropped because the Living Area consisted of only the living room. The existence of a longer corridor in Alpan Apartment (1987) caused a decrease in the mean isovist area value of the Service Area. Although the mean isovist value of the Living Area in Alpan Apartment (1987) was slightly closer to the Service Area, in Güzide Apartment (1993), the difference between the value of the Living Area and Service Area remained approximately the same, and their values increased. The reason for the increase in the isovist area value of the Living Area is related to the high integration between the living room and the entrance hall, as in Mehmet Ayvacı Apartment (1983) and Tellioglu Apartment (1984). For this reason, the living room can be perceived as larger than it is.

In Dr Sami Aksu Apartment (1999), the value of the Living Area marginally increased. The reason for this is that the Living Area was positioned at the end of a long corridor and the balcony is placed in the focal point of the living room. With the decrease in the value of the Service Area and the increase in the value of the Bedroom Area, the values of the two areas converged.

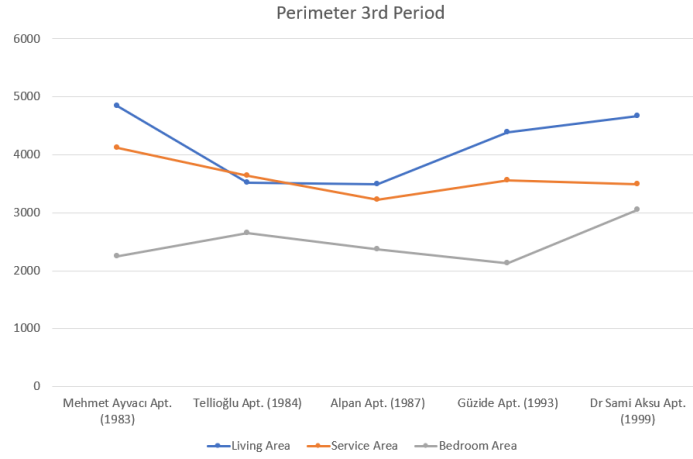


Figure 5.21: Perimeter, 3rd Period

In general, the perimeter value was found mostly in the Living Area. In Mehmet Ayvacı Apartment (1983), the area with the highest perimeter value was the Living Area and the Service Area while the lowest value was in the Bedroom Area. The reason for this is that the living room, salle-à-manger, and balcony that constitute the Living Area coexisted, and integrated highly with the entrance hall, guest room and the living room. The Bedroom Area was separated from the Living Area and lined up along the corridor, thus the perimeter value was found to be relatively low.

In Telliöğlu Apartment (1984), although the perimeter value of the Living Area fell below the value of the Service Area, it then rose again, and had the highest value of all areas. Since the entrance hall was located between the corridor and the living room and its integration with the living room is high, the perimeter value of the Service Area was thus found to be the highest.

In Alpan Apartment (1987), the isovist polygon was found to be spiky due to the form and size of the Living Area. Therefore, a slight increase occurred in the perimeter value. In Güzide Apartment (1993), the high level of integration between the Living

Area and the entrance caused the isovist perimeter values to be increased. Hence, the length of the corridor in the residence and the size of the bathroom, WC and kitchen units, an increase was observed in the Service Area perimeter value. The Bedroom Area consistently remained the lowest.

In Dr Sami Aksu Apartment (1999), the value of the Bedroom Area increased and came close to approaching the value of the Service Area. The reason for that was the rectangular bedroom and the existence of an en-suite bathroom. In addition, the location of the master bedroom at the end of a long corridor was one of the factors affecting the isovist polygon. The increase in the perimeter value in the Living Area was due to the relationship between the living room and the balcony. In addition, the location of the living room at the other end of the corridor also caused an increase in the perimeter value.

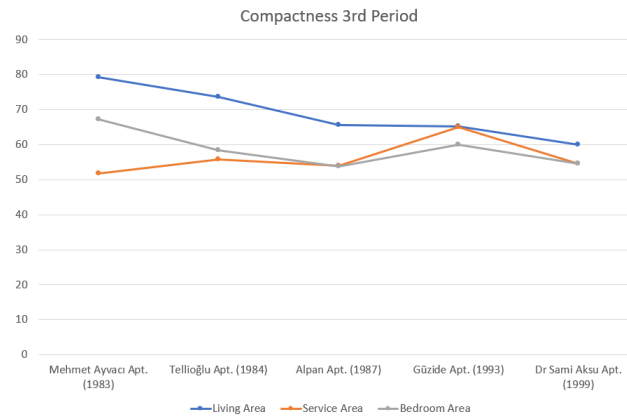


Figure 5.22: Compactness, 3rd Period

Regarding the compactness value for the third-period apartments, values were notable in the Living Area, followed by Bedroom Area and Service Area respectively, whilst simultaneously remaining very similar to each other. In Mehmet Ayvaci

Apartment (1983), compactness value was found to be the highest in the Living Area. As a result of the coexistence of the living room and the dining room, and the dining area can only be accessed from the living room, the Living Area was specialised. With the emergence of the long corridor in Telliöğlu Apartment (1984), linearisation occurred both in the hall and all over the scheme. Thus, there is an increase in the compactness value of the Bedroom Area.

In Alpan Apartment (1987), the compactness value of the Service Area and the Bedroom Area were at the same level. This is because bedrooms are clustered around the short, L-shaped corridor, increasing circularity.

In Güzide Apartment (1993), the Bedroom Area had the lowest value, whereas the Service Area and the Living Area had identical values. The reason for this is that the widespread build and sell technique with the urban transformation law resulted in the construction of rectangular-shaped apartment layouts in small parcels. Thus, the bedrooms were located along the long corridors and the rectangular living areas were located at the short edge of the corridors. This resulted in the linearisation of the entire plan scheme in Dr Sami Aksu Apartment (1999).

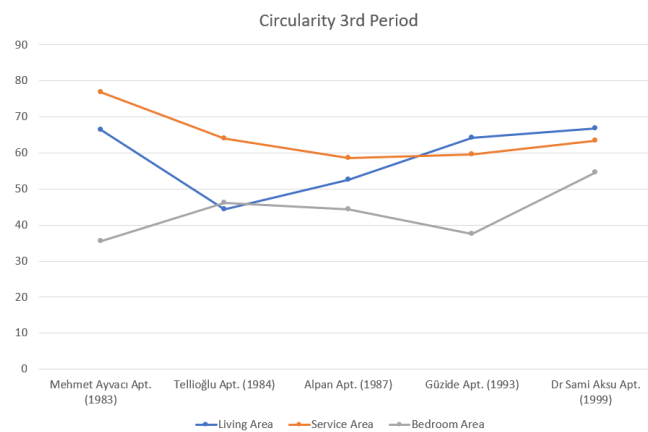


Figure 5.23: Circularity, 3rd Period

In the third-period apartments, the circularity value was found to be highest in the Service Area. However, in Güzide Apartment (1993) and Dr Sami Aksu Apartment (1999), the circularity value of the Living Area exceeded the Service Area. This is due to the configuration of long corridors and wide entrance halls merging with living rooms. The value of the Bedroom Area, on the other hand, was found to be the lowest in Mehmet Ayvacı Apartment (1983), while it was slightly greater than the Living Area in Telliöğlu Apartment (1984). It then experienced a decrease in Güzide Apartment (1993) and showed a rapid increase in Dr Sami Apartment (1999), approaching the value of the Service Area. The reason for this is the design of smaller size flats in smaller parcels.

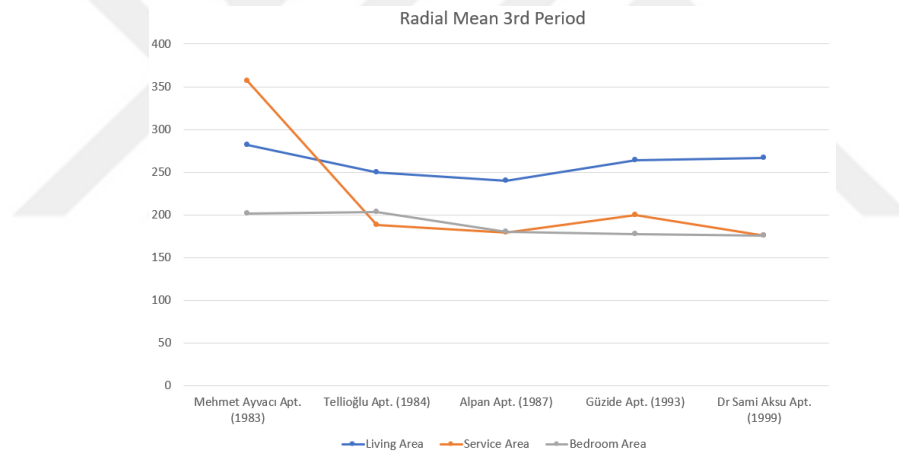


Figure 5.24: Radial Mean, 3rd Period

In the third-period apartments, the radial mean values remained stable for the Living Area and Bedroom Area. However, while the Service Area had the highest value in Mehmet Ayvacı Apartment (1983), it fell below the Bedroom Area with a dramatic decrease in Telliöğlu Apartment (1984). This was due to the Service Area in Mehmet Ayvacı Apartment (1983) consisting of an entrance hall, short corridor, kitchen, bathroom, and WC.

However, in Tellioğlu Apartment (1984), Alpan Apartment (1987), Güzide Apartment (1993) and Dr Sami Aksu Apartment (1999), long shaped spaces emerged due to corridorisation. The positioning of bedrooms and living rooms on the short sides of rectangular corridors also caused the radial rays to be found at the highest value in the corridors. In Dr Sami Aksu Apartment (1999), the value of the Service Area and Bedroom Area were found the same level while the value of the Living Area was higher.

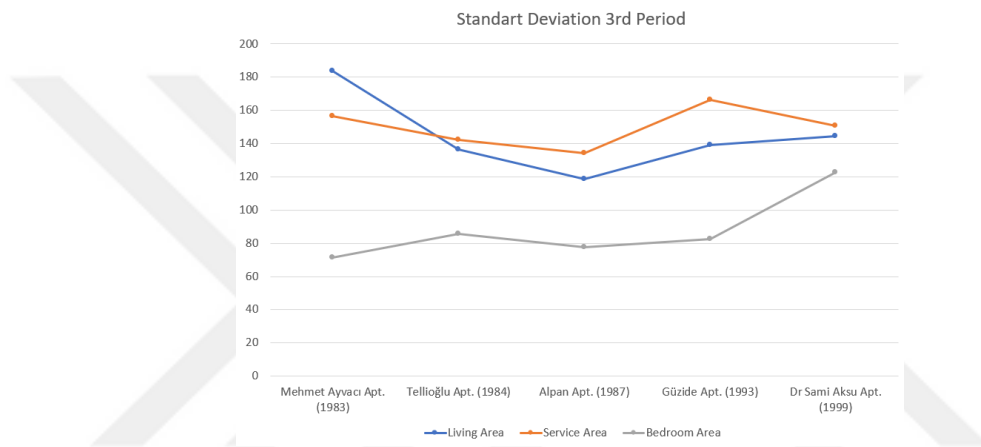


Figure 5.25: Standard Deviation of the Radial Rays, 3rd Period

The standard deviation value of the radial rays of the Living Area followed by the Service, then Bedroom Area were found to be the highest to lowest values respectively. However, in Mehmet Ayyacı Apartment (1983), the highest standard deviation value was found in the Living Area, due to the coexistence of the Living Area and salle-à-manger as well as the connection of the Living Area to the entrance hall via a wide door.

In Tellioğlu Apartment (1984), the value of the Living Area fell below the Service Area with a sudden decrease. However, it remained stable above the Bedroom Area throughout the period. Although the value of the Bedroom Area rose in Dr Sami

Aksu Apartment (1999), it was found to be the lowest. This significant increase in Dr Sami Aksu Apartment (1999) occurred due to the size of the columns, the shrinkage of the units and different size of spaces such as balconies and en-suite bathrooms.

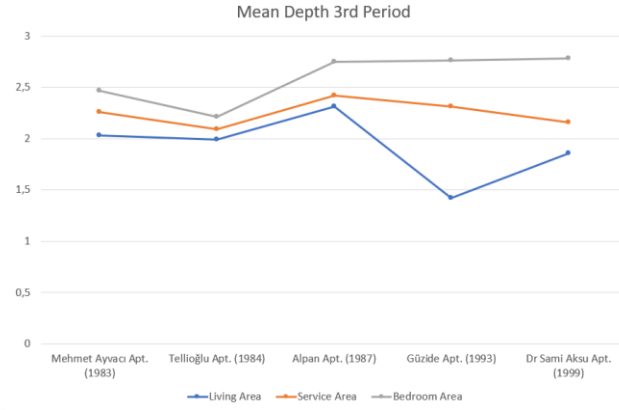


Figure 5.26: Mean Depth, 3rd Period

Although the Bedroom Area has the highest mean depth value in Mehmet Ayvaci Apartment (1983), Tellioglu Apartment (1984) and Alpan Apartment (1987), the depth value of the Living Area was low but close to the value of the Bedroom Area due to the existence of both the living room, salle-à-manger and sitting room.

The units lined up along long corridors after Güzide Apartment (1993), have increased the depth value all over the plan scheme. Since the Living Area is reduced to a single unit and is the most dominant unit, the region with the lowest mean depth was the Living Area.

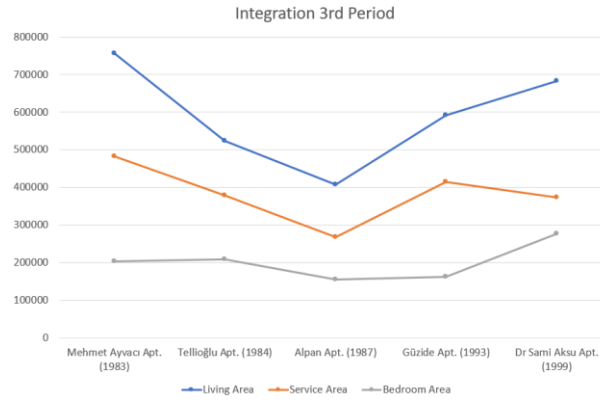


Figure 5.27: Integration, 3rd Period

The integration values of the Living Area followed by the Service, then Bedroom Area were found to be the highest to lowest values respectively. The apartment type dwelling with the highest integration value of the Living Area is Mehmet Ayvacı Apartment (1983). The reason for this is that dining activities were also carried out in the Living Area. Due to the dominance of the Living Area, the integration rate between the Living Area and the entrance hall was notably high.

The least integrated spaces were bedrooms. Tellioğlu Apartment (1984) had approximately the same character and value with Mehmet Ayvacı Apartment (1983), but the integration value of the Living Area decreased. The reason for this is the lack of a special unit for dining activities in the Living Area. The reason for the increase in the integration value of the Living Area and Service Area in Güzide Apartment (1993) was that the living room-kitchen connection is not provided through the corridor but through a wide entrance hall and wide doors.

In Dr Sami Aksu Apartment (1999), the integration value of the living space increased, the depth of the bedrooms increased, and the integration value decreased

considerably. The most important reason for this is that the circulation in the house was provided through long corridors.

5.4 Analyses of the Fourth Group of Apartment Type Dwelling in the Feneryolu Neighbourhood (2000 - 2020)

The most important difference in the apartments of the fourth period is that the parcels of the apartment buildings are relatively smaller than the previous periods. In addition, the increase in storey heights is another important change. Apartment buildings were built with an average of fourteen to fifteen storeys. The central heating system was replaced by natural gas. The basement floor is completely allocated for the car park, shelter, and water tank.

5.4.1 External Factors that Affected the Apartment Type Dwellings in the Fourth Group (2000 - 2020)

The date range for examining the external factors of the fourth group was determined as 2000-2020. In this context, infrastructural, technological, legislative, and sociological factors in the twenty-year period are the matter of this topic. These issues consist of factors that affect the production of apartment-type dwellings directly and indirectly in Istanbul generally, but specifically in the Feneryolu neighbourhood. These are listed as direct factors and indirect factors.

The factors that directly affect the production of apartment-type dwellings in the Feneryolu neighbourhood between the years 2000 - 2020 are as follows,

- Zoning plan / Urban Transformation.

- Internet access in Houses.
- New earthquake regulations.

The factors that indirectly affect the production of apartment-type dwellings in the Feneryolu neighbourhood between the years 2000 - 2020 are as follows,

- Mega projects: Marmaray.
- M4 Metro İstanbul
- Popularity of the Shopping Malls
- Urban Sprawl

5.4.2 Excluded and Included Spaces in the Apartment Type Dwellings in the Fourth Group (2000 - 2020)

Name - Year	Floor	Area m ²	Central Hall	Corridor	Interconn ecting hall	Living Room	Sitting Room	Salle-à- manger	Kitchen	Cellar	Storage Room	Office	Guest's Room	Wc	Bathroom	En-Suite Bathroom
Uyum Ap.2000	B+7	87														
Sevgili K Comp. 2008	B+9	110														
Şafak Ap.2010	B+7	95														
Ekşioğlu Ap.2014	B+12	93														
Çamlık Ap. 2019	B+15	95														

Table 5.4: The units of “Uyum Apartment (2000), Sevgili Korupark Compound (2009), Şafak Apartment (2010), Ekşioğlu Apartment (2014), Çamlık Apartment (2019)”.

Interior spaces of the fourth group of apartment type dwellings

- They consist of an average of 91 square meters of spatial arrangement.

- The spaces are connected with the corridors only.
- The Living Area consists of the living room only.
- There is always a separate unit for the kitchen.
- There are common bathrooms in all dwellings.
- Only in the 2008 and 2010 apartment exists an en-suite bathroom.

5.4.3 Space Syntax Analyses Results of the Apartment Type Dwellings in the Fourth Group (2000 - 2020)

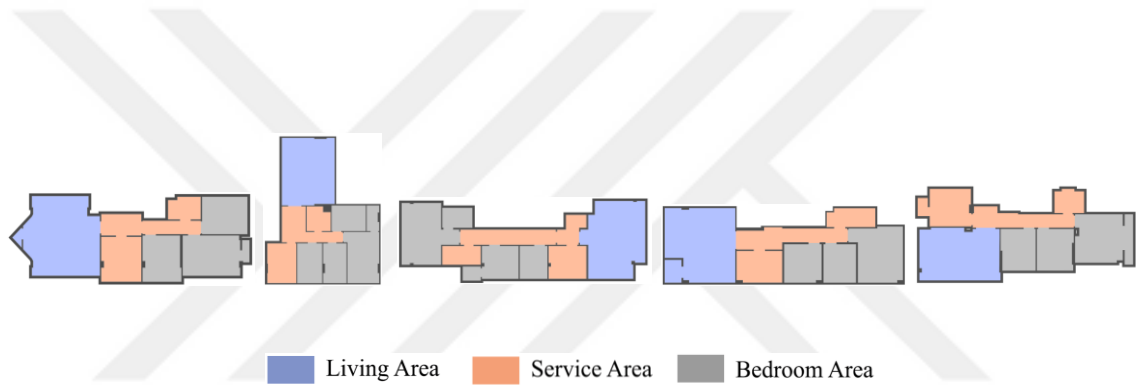


Figure 5.28: Functional Areas of Uyum Apartment (2000), Sevgili Korupark Compound (2008), Şafak Apartment (2010), Ekşioğlu Apartment (2014), Çamlık Apartment (2019).

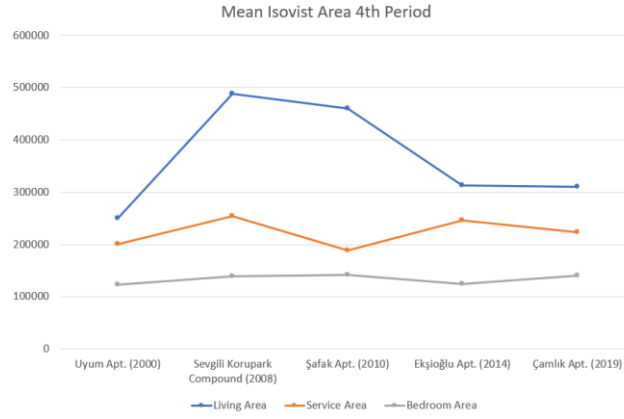


Figure 5.29: Mean Isovist Area, 4th Period

In Uyum Apartment (2000), the mean isovist value was highest for the Living Area and lowest for the Bedroom Area. In Sevgili Korupark Compound (2008), the mean isovist area value reached the peak point for the Living Area. The value of the Service Area and Bedroom Area slightly increased. The reason for that is that the residence area identity of the region, which is already important, gains even more importance with Marmaray. With the urban transformation law, the issues such as the densification of housing and the gradual shrinking of building plots were reflected in the housing design. In the fourth period apartment type dwellings which were designed to fit more units in a smaller area, all units except the Living Area had a low isovist area value.

In Şafak Apartment (2010), although the mean isovist area of the Living Area and Service Area slightly decreased, the value in the Living Area remained as the highest. In Ekşioğlu Apartment (2014), the Living Area decreased in value, but the mean isovist area value of the Service Area increased due to the growth of the kitchen size and the relatively spacious entrance hall. In Çamlık Apartment (2019), the values did not change considerably for all categories.

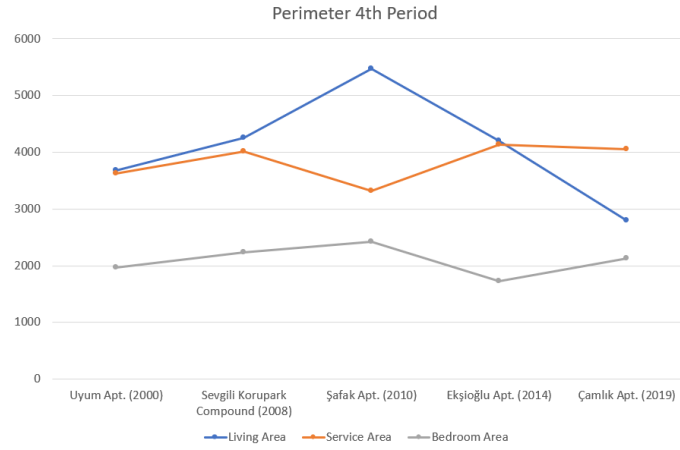


Figure 5.30: Perimeter, 4th Period

The perimeter value resulted in an inconsistent diagram over the period. Initially, the value of the Living Area and Service Area was at the same level and far greater than the Bedroom Area. In Uyum Apartment (2008), the values of the areas were almost identical for the Living Area and the Service Area. The perimeter value of the Bedroom Area remained the lowest throughout the period.

In Şafak Apartment (2010), the value of the Living Area rocketed sharply and reached the peak while also the value of the Bedroom Area reached its highest point. However, the Service Area showed an inverse trend and decreased. The reason for this is that the door at the beginning of the corridor restricts the relationship between the Living Area and the Bedroom Area.

In Ekşioğlu Apartment (2014), mean isovist area value of the Living Area and Service Area are almost identical. However, the value of the Bedroom Area dropped. Since the entrance hall is only connected with the Living Area and kitchen, Bedroom Area was separated and only accessed via a narrow corridor.

In Çamlık Apartment (2019), the highest perimeter value was found in the Service Area. The reason for this is the kitchen located at the end of the corridor. Since the balcony area is included in the Floor Area Ratio Regulation (KAKS) in the buildings of this period, and the small size of the parcels, balconies do not exist in most of the apartment type buildings. For this reason, the Living Area was limited to the living room only, and all activities within the scope of living space took place here.

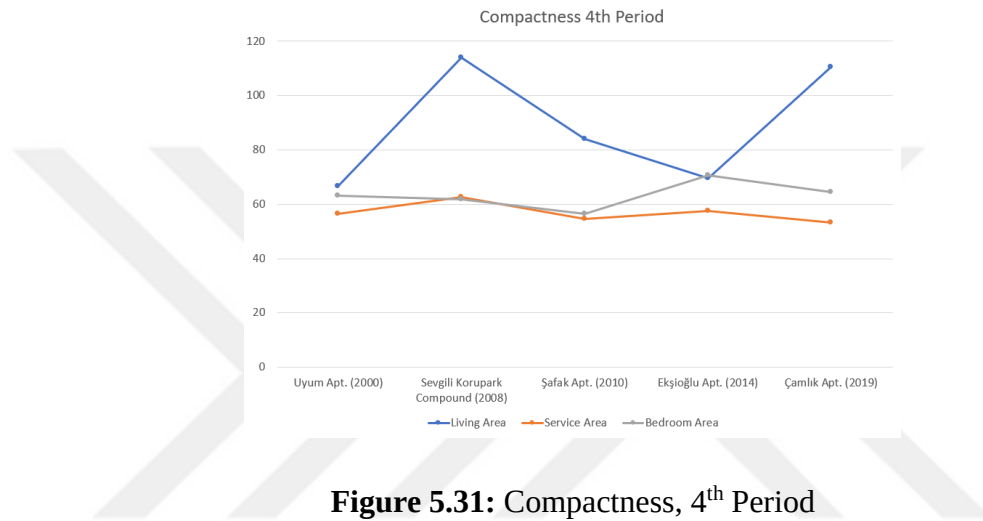


Figure 5.31: Compactness, 4th Period

Compactness values were found to be similar for the Bedroom and Service Areas throughout the period. A sharp increase in the compactness value of the Living Area was found in Sevgili Korupark Compound (2008) and Çamlık Apartment (2019).

The fact that the level of compactness was similar for all three functional areas in Uyum Apartment (2000) is because the units were arranged along a corridor. However, the wide entrance hall in Uyum Apartment (2008) disconnected the Living Area from the short corridor and reduced the integration value of the area, thus it caused linearisation in the Living Area.

In Şafak Apartment (2010), the compactness value of the Living Area decreased but remained the highest. In Ekşioğlu Apartment (2014), the value of the Living Area

and the Bedroom Area were almost identical while the value of the Service Area was the lowest. Although there are long corridors, linearisation is least in the Service Area due to the high integration of the wide entrance hall and the kitchen.

In Çamlık Apartment (2019), the compactness value of the Living Area increased drastically due to both the long rectangular form of the hall and the arrangement of all the units along a corridor. Bedroom and Service Areas decreased in value and the compactness value of the Service Area was found as the lowest value over the period.

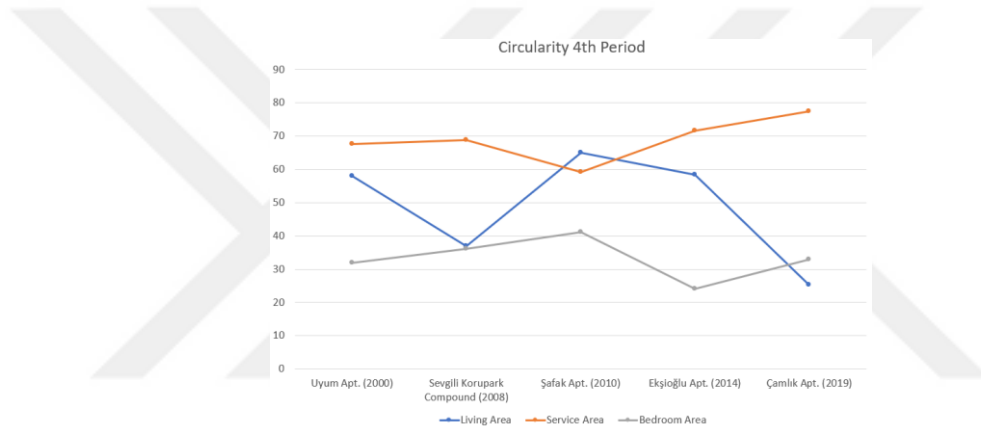


Figure 5.32: Circularity, 4th Period

The circularity values analysed for the fourth period resulted in an inconsistent diagram. In Uyum Apartment (2000), the highest value was found in the Service Area, followed by the Living Area and Bedroom Area respectively. The reason for this is the existence of a wide entrance hall.

However, in Sevgili Korupark Compound (2008), the Living Area values decreased and showed an almost identical result with the Bedroom Area. The value of the Service Area remained the highest and stable. In Şafak Apartment (2010), circularity was found high in the Living Area, and then in the Service Area, as a result

of the division of the corridor. The centralisation of daytime usage areas in the dwelling occurred through the division.

Since all units are uni-permeable that only connect to the corridor, the circularity value of the Service Area gradually increased in Ekşioğlu Apartment (2014) and Çamlık Apartment (2019) and reached the peak. However, in Çamlık Apartment (2019), the circularity value of the Living Area showed a drastic decrease and ended up as the lowest value. The value in the Bedroom Area was slightly higher than the Living Area. The most circular area was found in the Service Area.

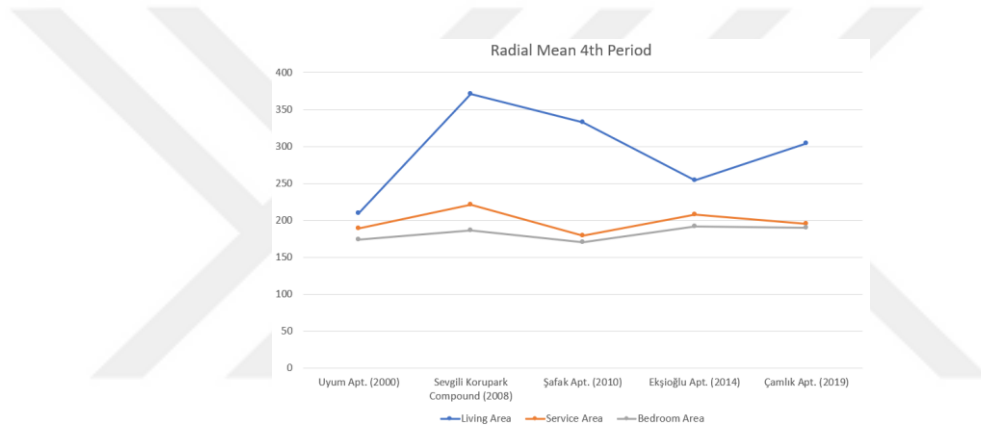


Figure 5.33: Radial Mean, 4th Period

The radial mean value increased in the Living Area throughout the fourth period. The Service Area and Bedroom Area values were approximate values over the period.

In Uyum Apartment (2000), radial mean values for all three categories are similar to each other. However, In Sevgili Korupark Compound (2008), the value of the Living Area reached the peak, while the Service Area increased slightly. The reason for this is that the unit that forms the Living Area consists of a large and relatively proper rectangle. In the Service Area, the existence of the large entrance hall connected with the living room increased the radial mean value of the Service Area.

Although the radial mean value of the Living Area increased in Şafak Apartment (2010), the highest radial mean value was found in the Living Area, meanwhile the value of the Service Area and Bedroom Area were lower than the Living Area. The reason for this was the deformity in the units since the form of the living room was designed according to the carrier system.

In Ekşioğlu Apartment (2014), the dominance of the living room size decreased relatively, and the rectangular form of the unit approached the square form. For this reason, the Living Area experienced a decrease in radial mean value, but it remained the highest value.

In Çamlık Apartment (2019), the radial mean value increased in the Living Area due to the rectangular for of the living room. The values in the Service Area and Bedroom Area were found almost identical.

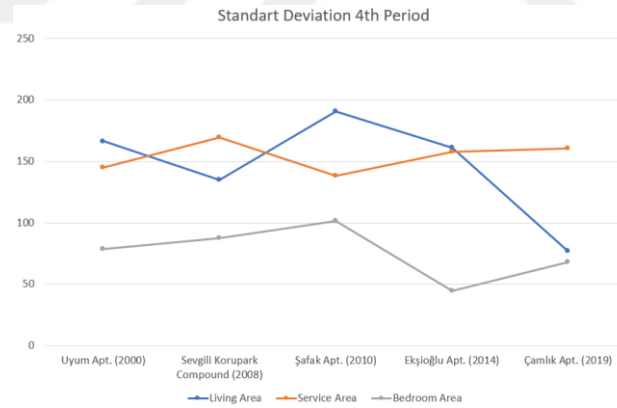


Figure 5.34: Standard Deviation of the Radial Rays, 4th Period

In the fourth-period apartment interiors, the standard deviation value of the radial rays in the Service Area slightly increased throughout the period. However, whilst the Living Area was the highest value in Uyum Apartment (2000), reached the

highest value in Şafak Apartment (2010) and it was found to be the lowest value in Çamlık Apartment (2019).

In Uyum Apartment (2000), the highest standard deviation values were found in the Living Area and Service Area respectively. The triangular balcony form in the Living Area and the wide entrance hall connected to the narrow corridor created different radial rays.

In Sevgili Korupark Compound (2008), the standard deviation value decreased below the Service Area due to the form of the Living Area. The highest standard deviation value was found in the Service Area, due to the location of the living room and kitchen on its right and left and creating an L-shaped circulation area with the corridor.

In Şafak Apartment (2010), different radial rays were detected in the scheme due to the effect of the column system on the form of the living room. Therefore, the highest standard deviation value was found in the Living Area and followed by the Service Area. The en-suite bathroom and balcony units located in the Bedroom Area caused an increase in the standard deviation value of the Bedroom Area.

In Ekşioğlu Apartment (2014), the value of the Living Area decreased and equalled the value of the Service Area. The reason for this is that the Service Area units were designed relatively wider. Further, the standard deviation value of the Bedroom Area decreased. The reason for this is that the bedrooms consisted of only one unit which was also uni-permeable, in other words, the units such as en-suite bathrooms or balconies were not encountered in the Bedroom Area.

In Çamlık Apartment (2019), the standard deviation of the Living Area was found to be far below the Service Area, very close to and just above the Bedroom Area

value. The reason for this is completely related to the sequence of units. The fact that the Service Area consisted of a long corridor and the kitchen unit was designed in a position that meets the corridor affected the standard deviation values. In addition, the balcony of the kitchen is also a factor in increasing the standard deviation value. The dramatic decrease in the value of the living room is related to the linearisation of the space, its uni-permeability and low integration value.

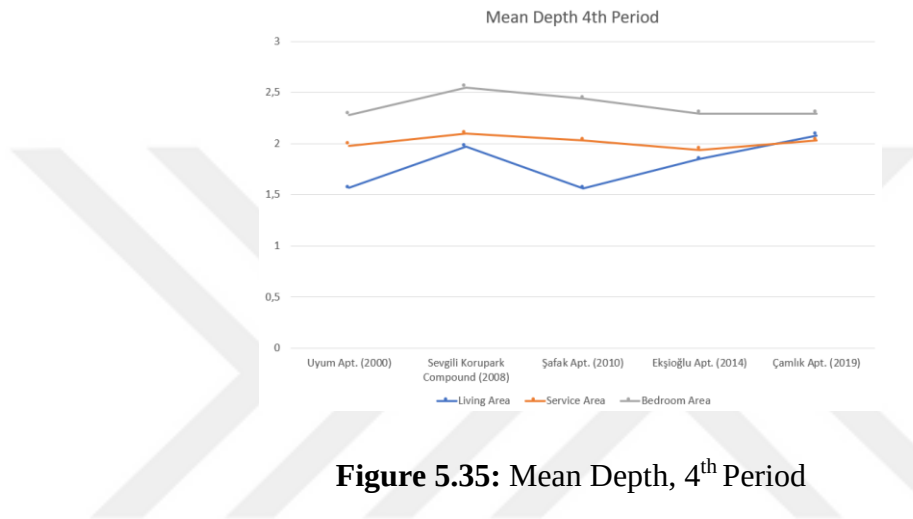


Figure 5.35: Mean Depth, 4th Period

Mean depth value was found the highest in the Bedroom Area throughout period and it was followed by Service Area and Living Area.

In Uyum Apartment 2000, while the highest mean depth area was found in the Bedroom Area, the shallowest area was the Living Area. The reason for this is the high integration between the Living Area and the entrance hall. However, the bedrooms are accessed via a long corridor caused an increase in the mean depth value of the Bedroom Area.

In Sevgili Korupark Compound (2008), mean depth value of the Living Area increased because of the sequence of the units. Due to the width of the entrance hall and

its connection with the living room, the mean depth value of the Living Area increased and approached the Service Area.

In Şafak Apartment (2010), the mean depth value of the Living Area dropped, the values of the Bedroom Area and Service Area decreased slightly. With a new arrangement created with corridors, the difference in mean depth between the Bedroom and Living Areas increased. In Ekşioğlu Apartment (2014) and Çamlık Apartment (2019), the mean depth value of the Living Area gradually increased and reached just above the value of the Service Area. Eventually, all the categories Ekşioğlu (2014) and Çamlık (2019) Apartments had high depth values.

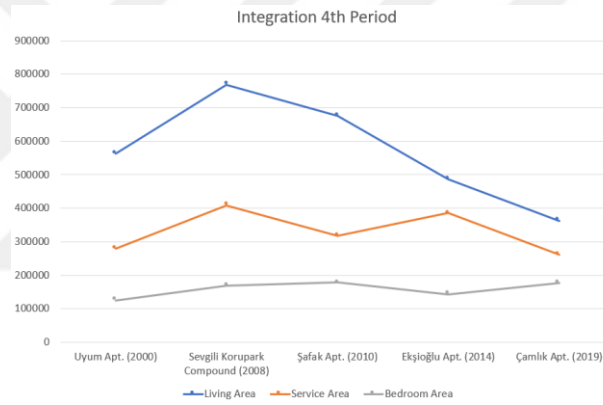


Figure 5.36: Integration, 4th Period

The integration values of the Living Area, followed by the Service then Bedroom Areas were found to be the highest to lowest values respectively. The apartment type dwelling with the highest integration value of the Living Area is Uyum Apartment (2000). The reason for this is that the triangular balcony enlarged space similar to the bay windows in a traditional Turkish house and also increased the integration value. Besides, dining activities took place in the living room because it was the only Living Area unit. In addition, internet access and computer were among the

factors affecting the use of space in the dwelling. However, the region with the least integration value found in the Bedroom Area. This situation is always the same in the 4th Period structures because of the long corridors.

In Sevgili Korupark Compound (2008), the integration value of the Living Area decreased. The reason for this is the access from the wide entrance hall to the living room. The corridor connecting to the Bedroom Area was located on the other side of the entrance hall. For this reason, the entrance hall acted as a central hall that caused an increase in the integration value of the Service Area.

From Şafak Apartment (2010) to Çamlık Apartment (2019), the integration value of the Living Area decreased gradually. In Şafak Apartment (2010), the Living Area, which was located on the short side of the rectangular corridor, was relatively distant from the other units due to the division of the corridor. Thus, the integration value lowered.

Similarly, in Ekşioğlu Apartment (2014), the integration value of the Living Area decreased and approached the value of the Service Area. The main reason for the decrease in values is that the living space consisted of only one unit that had low permeability. It is due to the fact that the Living Area was located at the very end of the corridor, centralisation was not provided. Likewise, the integration value of the Living Area decreased in Çamlık Apartment (2019).

The depth values for all categories were found to be closest to each other during the period in this sample. This is an indication that the Bedroom Area can be reached as effortlessly as the Living Area or vice versa, reaching both areas as difficult.

5.5 Synthesis

Technological, sociological, legislative, and economic changes have played a major role in housing production in Turkey. These changes have been the triggering factors for the apartment type housing production in Istanbul and the Feneryolu neighbourhood. Although some factors directly and some indirectly affected the case area, as a result, there have been differences in the plan schemes, space sequences and space functions of the apartment-type dwellings in the Feneryolu neighbourhood. The direct and indirect factors caused both the housing densification in the region and the coexistence of apartment type examples from different periods.

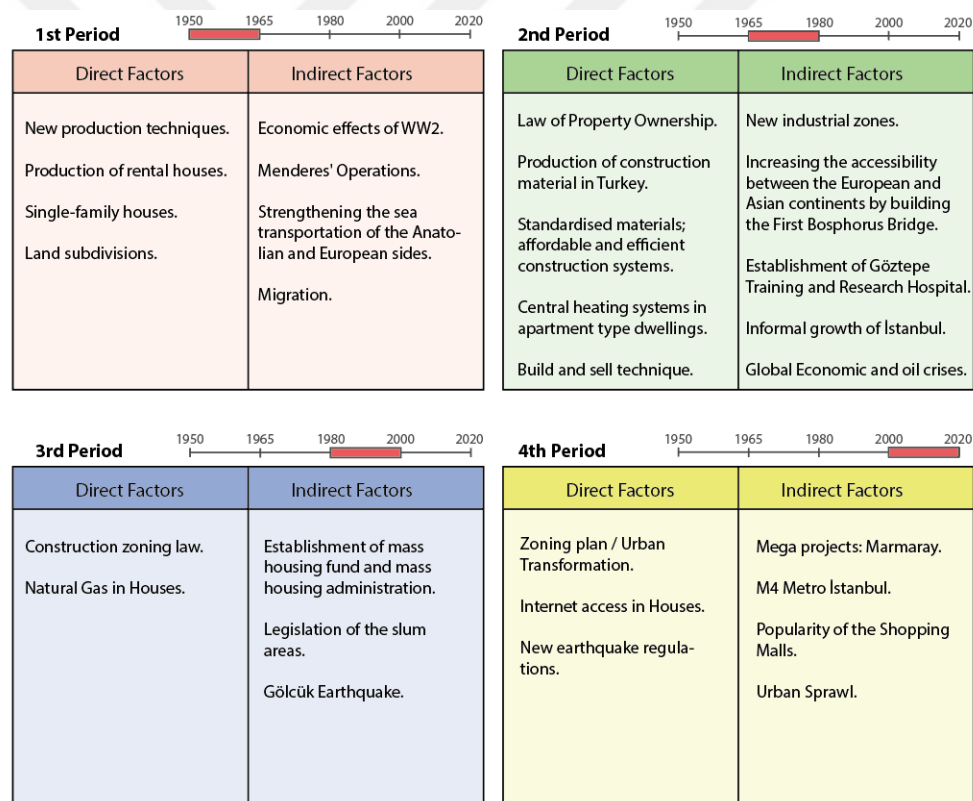


Figure 5.37: Direct and Indirect Factors that Affected the Apartment Type Dwellings

Spatial changes in apartment-type dwellings in the Feneryolu neighbourhood differentiated over time both in terms of size and function of the space. Several factors

such as lifestyle, housing production technique, central heating technology, land subdivision works have led to a decrease in units and compaction of action in the interiors of apartment-type dwellings. In other words, the activities in the functional areas were gathered in certain spaces due to the reduction in the number of units, which provide the space for more than one usage purpose. The table below shows the Service Area, Living Area and Bedroom Area units in the apartment-type dwellings examined in this thesis.

			SERVICE AREA										LIVING AREA			BEDROOM AREA	
			Central Hall	Corridor	Interconnecting Hall	Kitchen	Cellar	Storage Room	Office	WC	Bath-room	Living room	Sitting room	Salle-a-manger	Guest's Room	Bedroom	En-suite Bathroom
1st Period	Year	Floor	Area m ²														
	1956	3	105														
	1958	3	100														
	1962	B+5	110														
2nd Period	1963	3	100														
	1967	B+4	108														
	1969	B+4	105														
	1970	B+4	95														
3rd Period	1973	B+4	110														
	1977	B+10	110														
	1983	B+5	125														
	1984	B+7	110														
4th Period	1987	B+9	145														
	1993	B+11	140														
	1999	B+11	120														
	2000	B+7	87														
	2008	B+9	110														
	2010	B+7	95														
	2014	B+12	93														
	2019	B+15	95														

Table 5.5: The Units of the Apartment Type Dwellings in Feneryolu

As seen in the table, there were diversity in Service Area and Living Area units in the 1st Period and the first half of the 2nd Period. Due to the immigration to the region and the Law of Property Ownership in 1965, the transition to the apartmentisation process took place in this period. Since the buildings did not include the central heating system in the 1st period, the central hall became an important unit for heating the

dwelling. In addition, several spaces were found for various actions in the Service Area such as kitchen, cellar, and office areas.

In the Living Area, there were a sitting room for daily usage, *salle-à-manger*, and a living room specially reserved for the guests. Bedroom Area consisted of guest room and bedrooms. Although there was an increase in the number of floors and the size of the domestic spaces since the second half of the second period, there was a decrease in the number of units in three functional areas.

In the 3rd and 4th Period apartments, there was a significant decrease in space variety of the Service and Living Areas. However, an en-suite bathroom was included in the Bedroom Area. Due to the urban transformation laws, the opening of Marmaray Railway and the popularity of being a residential area, a densification occurred increasingly in the urban texture. The most significant reason for the decrease in the unit diversity, and monotony of the interior space is the small and rectangular form of the building plots due to the land subdivision works. Especially in the 4th Period apartments, even the WC was removed from the plan scheme to save space. For this reason, the housing form was formed with units arranged around a long corridor. In the consequence of differentiating of the planning scheme, changes occurred in the syntactic values.

Mean Isovist Area:

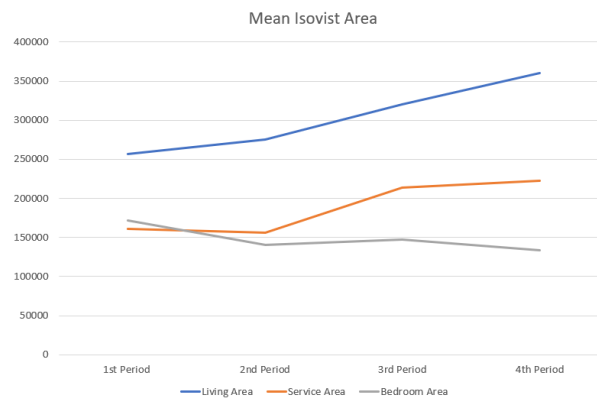


Figure 5.38: Mean Isovist Area of the Functional Areas in Four Periods

For the Living Area the highest mean isovist value was found in the fourth period and the lowest value was found in the first period apartments. However, although the fourth period apartments' value in the Service Area was the highest, it was followed by the third period apartments with a very similar value. The lowest values of the Service Area were also almost identical in the second and first period apartments. For the Bedroom Area, the highest mean isovist value was found in the first period apartments while it was found to be the lowest in the fourth period apartments.

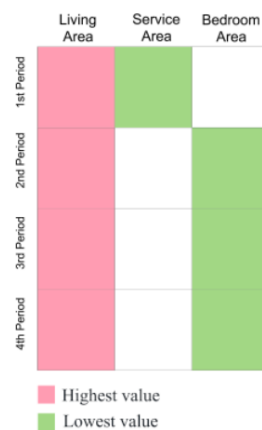


Table 5.6: The Functional Areas with the Highest and Lowest Mean Isovist Area

Generally, in the table, the highest mean isovist area value was found in the Living Area for all four periods. While the lowest mean isovist area value was found in

the Service Area in the first period, it was found in the Bedroom Area in the 2nd, 3rd and 4th-period apartments.

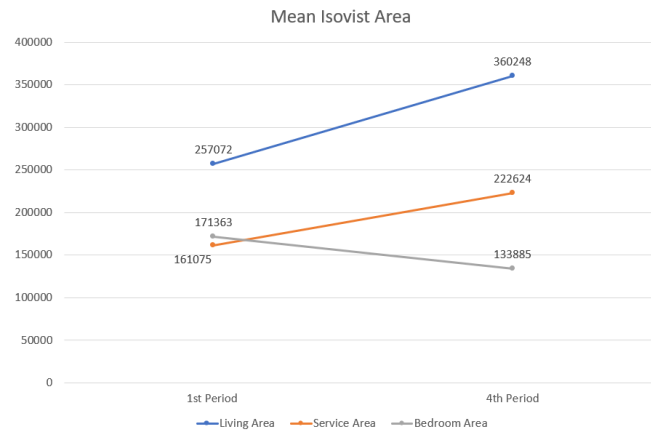


Figure 5.39: Trend Graph of the Mean Isovist Area

In the graphs of mean values, mean isovist value of the Living Area showed an upward trend. While the value of the Bedroom Area decreased, the value of the Service Area increased and exceeded the Bedroom Area value.

The direct factors of these trends are the fact the focal point of the Living Area is the TV with the introduction of television to social life in 1968. The presence of television increased the isovist value of the living space. The reduction in housing sizes due to land subdivisions, and therefore the living area units becomes a single and dominant unit, has led to an increase in the mean isovist area value. For the same reason, the mean isovist area values decreased due to the shrinkage of the Bedroom Areas and their separation from the Living Area. The reason for the increase in the mean isovist area in the Service Area is the disappearance of the units that previously served as the central hall and had the function of Living Area at the same time. Instead of the central halls or interconnecting halls, all units are reached through the long corridors only.

The Indirect factors of these trends are predominantly the build-sell technique and fact that the region is an urban transformation area.

When the apartment-type dwelling units are examined, in connection with the aforementioned reasons; the units that compose the Living Area have decreased in quantity and consequently reduced to a single unit, living room. While the central hall and interconnecting hall, which were only circulation areas in the Service Area, were placed in two different locations of the dwelling and provided internal circulation, however, with the corridorisation, this function is only provided by the corridor. For this reason, the corridor became a unit that connects to all neighbouring spaces and therefore has a high isovist area value.

Perimeter:

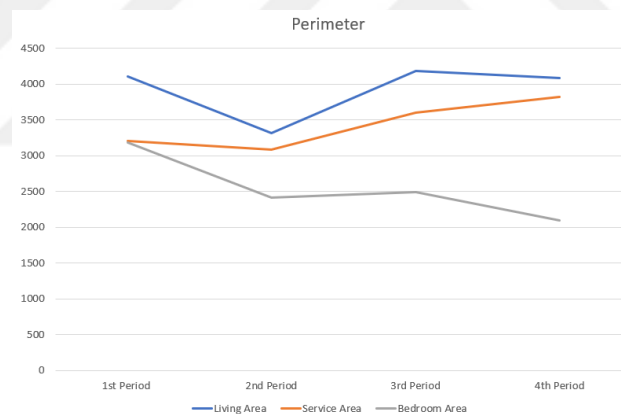


Figure 5.40: Perimeter value of the Functional Areas in Four Periods

The perimeter value was found to be the highest in the Living Area of the third, first and the fourth periods with very similar values. However, it was found far below in the second period apartments.

For the Service Area, it was found the highest in the fourth period and the lowest in the second period apartments. A drastic difference between the values was found in the perimeter values of the Bedroom Area. While the Bedroom area of first period

apartments found the highest in value, it was found the lowest in the fourth period apartments.

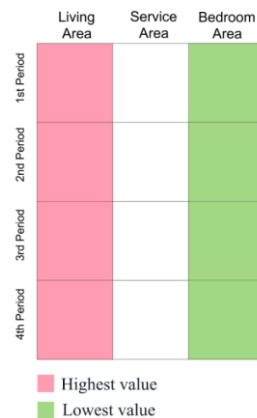


Table 5.7: The Functional Areas with the Highest and Lowest Perimeter value

Overall, the highest perimeter value for all periods was found in the Living Area while the lowest value was found in the Bedroom Area.

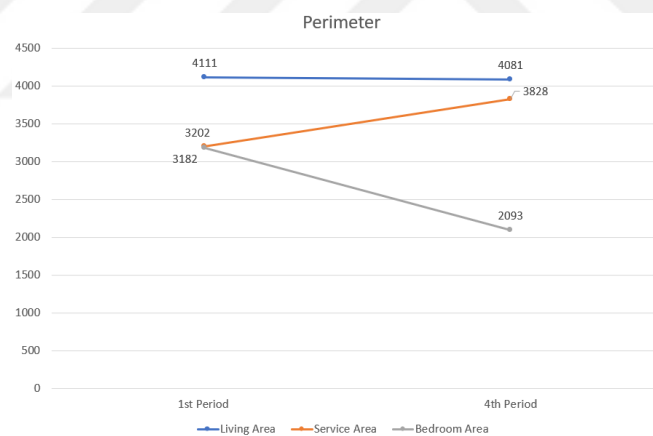


Figure 5.41: Trend Graph of the Perimeter

In the line graphs of the isovist perimeter; decrease – increase and slightly decrease with a fluctuation in Living Area values were observed. The general trend showed a slight increase. Service Area values gradually increased, while Bedroom Area values decreased dramatically.

Due to the Law of Property Ownership and development in the infrastructure the neighbourhood became a popular residential area. In addition, the fact that the houses

produced by the build-and-sell technique are built on plots divided into smaller parcels with the land subdivision works is another direct factor. In particular, the reason for the gradual increase in the Service Area is that the units of the 3 functional areas are lined up around a corridor. The decrease in the value of the Bedroom Area is that the bedrooms remain in the background in the linearised plan scheme due to the corridorisation. The fact that bedrooms are in the background as secondary units and that the parent bathrooms are added to the spatial sequence is also related to the privacy factor, but in this case, the relationship between privacy and space sequence has become a chicken-egg problem.

Compactness:

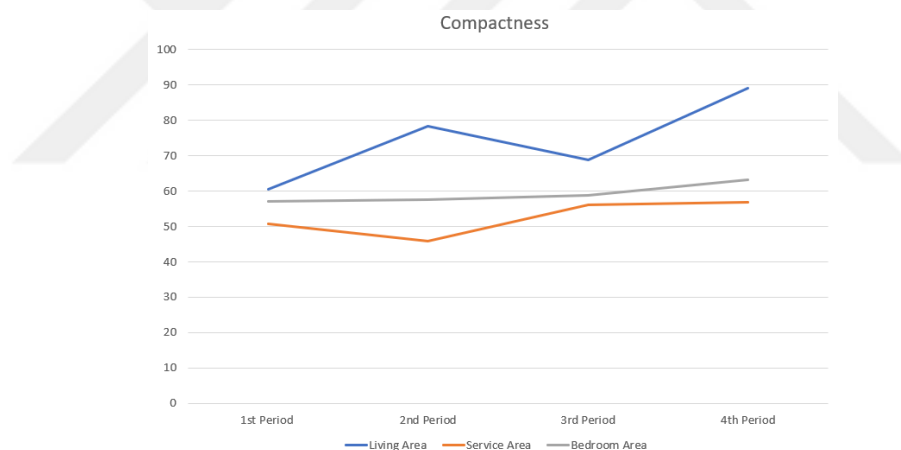


Figure 5.42: Compactness value of the Functional Areas in Four Periods

The compactness value of the Living Area was found to be the highest in the fourth period apartments. The lowest value was found in the Living Area of the first period apartments.

Compared to the values in Living Area, the Service Area found the lowest in compactness value. However, the highest compactness value of the Service Area was found in the fourth period apartments and followed by the third period apartments with

a similar value. The lowest value of the compactness in the Service Area was found in the second period apartments.

A slight difference occurred in the values of the Bedroom Areas. While the compactness value of the Bedroom Area in the fourth period apartments was mildly higher, the lowest value was found in the first period apartments.

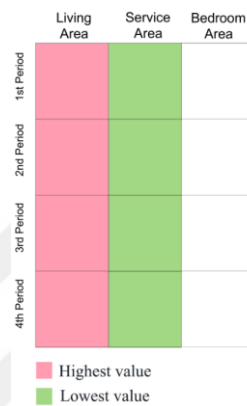


Table 5.8: The Functional Areas with the Highest and Lowest Compactness value

Overall, the highest compactness value was always found in the Living Area while the lowest value was found in the Service Area of the apartment type dwellings throughout the periods.

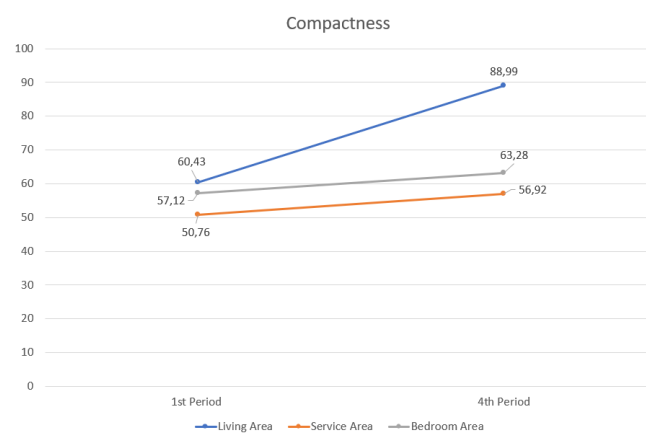


Figure 5.43: Trend Graph of the Compactness

The value of the Living Area showed an upward trend. The value of the Bedroom Area increased slightly and did not change drastically. There is also an increase in the general trend of the Service Area.

The compactness value reveals the orientation values of the geometric form in the interior. In other words, an increase in the compactness value means an increase in linearity in the plan scheme. The plan scheme is not defined as "central" in this context. An increase in the compactness value was observed in the analysed plan schemes in general.

The indirect reasons for this trend are the increase in transportation on the Anatolian and European sides, the increase in construction in this area, the fact that the Feneryolu neighbourhood is a popular residential area. In addition, in the region, which is actively under the effect of urban transformation, there are apartments built-in narrow plots due to the limited land supply, increase in land values, demand problems and emergence of rental houses in previous years. In consequence of the search for rational plan solutions for rectangular parcels, long corridors have emerged and increased the compactness value of the plan schemes. This situation was incited by the central heating system in the second period, natural gas in the third period, and internet access in the fourth period. These three factors have affected the centrality in the plan schemes due to the solution of the heating problem of the house and the acquisition of an individual time-spending habit in the house.

Circularity:

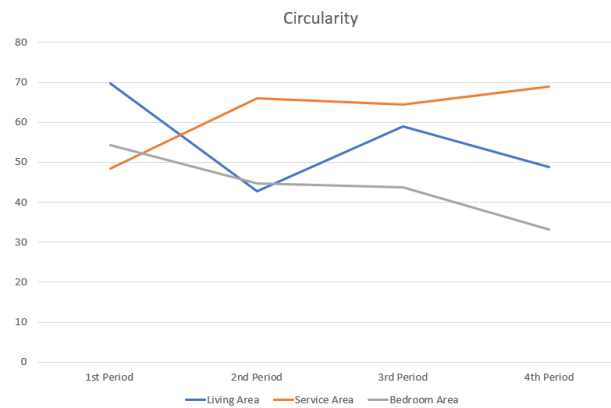


Figure 5.44: Circularity value of the Functional Areas in Four Periods

The circularity value for the Living Area was found to be the highest in the first period apartments, while the lowest value was found in the second period apartments. For the value of the Service Area, the highest circularity value was found in the fourth period while it was the lowest in the first period apartments. However, for the Bedroom Areas, the first period apartments were found to be the highest in circularity value while the fourth period apartments were found to be the lowest.

	Living Area	Service Area	Bedroom Area
1st Period	Highest value	Lowest value	
2nd Period	Lowest value	Highest value	
3rd Period		Highest value	Lowest value
4th Period		Highest value	Lowest value

■ Highest value
■ Lowest value

Table 5.9: The Functional Areas with the Highest and Lowest Circularity value

Overall, the highest value was found in the Service Area in the second, third and fourth-period apartments. However, in the first-period apartments, the highest

circularity was found in the Living Area. The lowest circularity value was found in the Bedroom Area in the third and fourth-period apartments. While in the first-period apartments, it was found to be the lowest in the Service Area, in the second-period apartments circularity value of the Living Area was found to be the lowest.

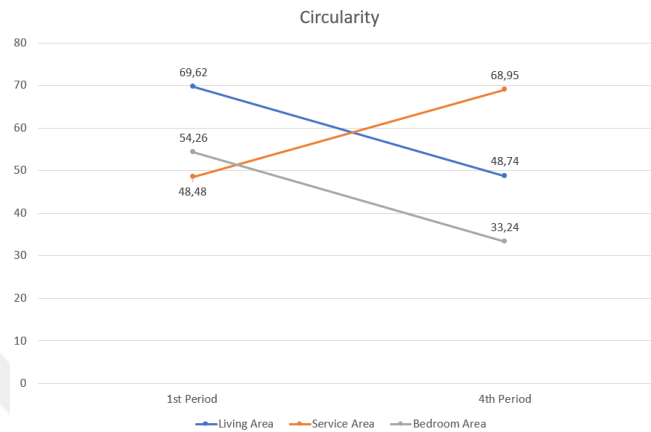


Figure 5.45: Trend Graph of the Circularity

The circularity value of the Living Area is in a downtrend. The Bedroom Area value also formed a rapid decline diagram. However, contrary to these, the Service area value increased rapidly in the second period and then continued to increase slightly. High circularity value of a place means that the place is a control point. The point where the rays with different angles intersect is the point where centralisation, and controllability and thus integration are the highest. The reason why the circularity value generally showed a decreasing trend in all period apartments and functional areas is the evolution of the dwelling from single-family house to apartment type dwellings. This means; In the first period apartments, while multipermeable units are located in the central area of the house and connected to other multipermeable or bipermeable units; In the fourth period apartments, multipermeable units are now just corridors, and the neighbouring units to which they are connected are only the unipermeable or bipermeable units.

It can be said that the reasons for this are the same as those affecting the compactness value. The increase in technology in dwelling has changed the spatial organisations and permeability values. The indirect factor causing this is the shrinking and narrowing down the plan schemes as a result of intense urbanisation.

Radial Mean:

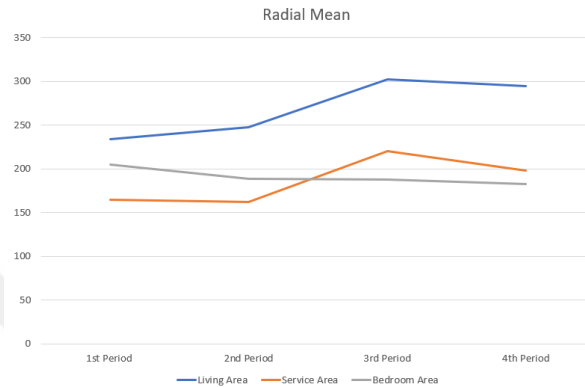


Figure 5.46: Radial Mean value of the Functional Areas in Four Periods

The Living Area of the third period apartments were found to be the highest in radial mean value and followed by the fourth period. On the other hand, the lowest radial mean value was found in the Living Area of the first period apartments.

For the Service Area, the highest value was found in the third period apartments while the lowest was found in the second period.

Bedroom Area values dropped slightly throughout the periods. The values found to be the highest in the first period buildings. However, it was the lowest for the fourth period buildings.

	Living Area	Service Area	Bedroom Area
1st Period	Highest value	Lowest value	
2nd Period	Highest value	Lowest value	
3rd Period	Highest value		Lowest value
4th Period	Highest value		Lowest value

■ Highest value
■ Lowest value

Table 5.10: The Functional Areas with the Highest and Lowest Radial Mean value

Overall, the highest radial mean value was always found in the Living Area in all the period apartments. In the first and second period apartments, it was found the lowest in the Service Area. However, in the third and fourth period apartments, the value of the Service Area increased, and the lowest value was found in the Bedroom Area.

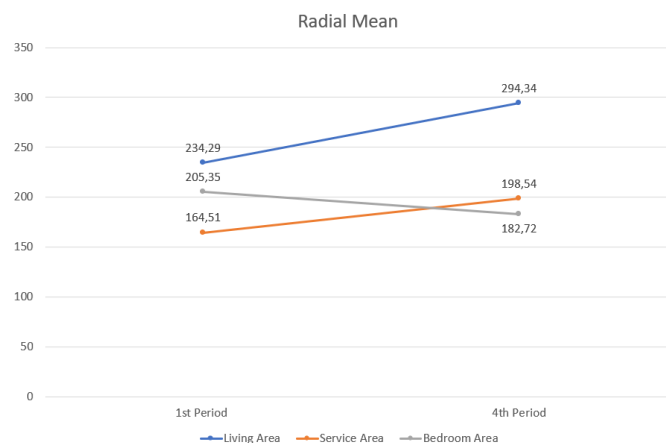


Figure 5.47: Trend Graph of the Radial Mean

The radial mean value of the Living Area showed an upward trend. On the contrary, the Bedroom Area value decreased slightly for four periods. Service Area, on the other hand, showed a sudden increase in the apartments of the third period, exceeded the Bedroom Area value and showed an uptrend.

As a result of linearisation, living spaces are separated from the whole plan scheme and are bipermeable or unipermeable units, positioning on the short side of a long rectangular corridor, causing an increasing trend in radial mean value, and having the highest value among functional areas.

The increase in the radial mean value in the Living Area may be an indication of the increasing importance of social spaces such as kitchen, or the "socialisation" of these spaces. Indirect factors of changes in the radial mean value are dense urbanisation and the fact that the Feneryolu neighbourhood is an accessible and popular neighbourhood. The direct factors caused by the indirect factors are the construction techniques and the creation of spatial organisations in accordance with the landform.

Standard Deviation:

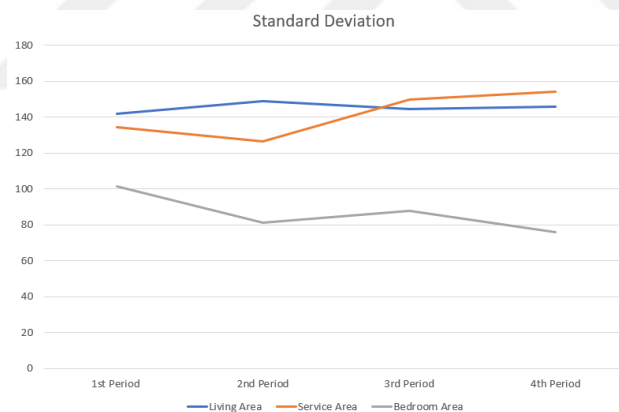


Figure 5.48: Standard Deviation value of the Functional Areas in Four Periods

The standard deviation values of the Living Area remained almost stable throughout the period. The value of the Service Area was found to be the highest and above the Living Area values in the third, and the fourth- period apartments. However, the lowest value of the Service Area was found below the Living Area values in the first, and the second-period apartments. Standard deviation in the Bedroom Area was

found to be the highest in the first-period apartment, while it was found the lowest in the fourth-period apartments.

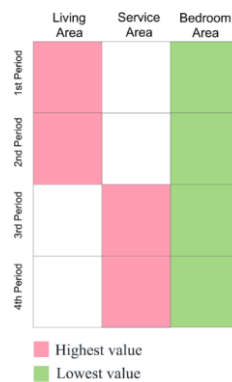


Table 5.11: The Functional Areas with the Highest and Lowest Standard Deviation value

Overall, the highest standard deviation value was found in the Living Area of the first and second-period apartments while it was found to be the highest in the Service Area of the third and fourth-period apartments. However, the Bedroom Area remained the lowest in the value for all the period apartments.

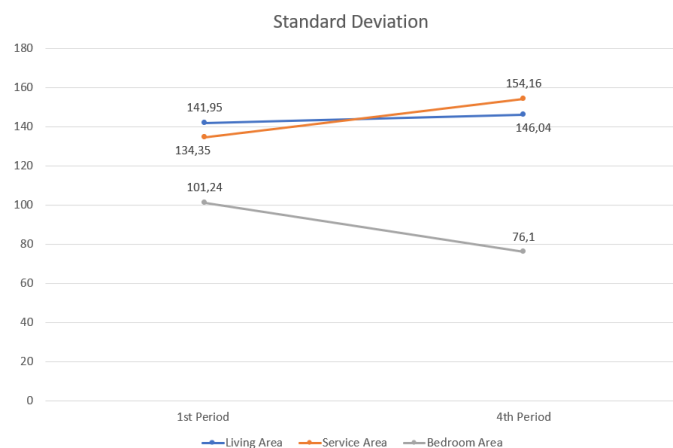


Figure 5.49: Trend Graph of the Standard Deviation

The functional area where the standard deviations of the radial rays were measured as the highest was the Living Area and showed a slight rise over the period. The Service Area showed a rapid increase in the apartments of the third period,

exceeded the value of the Living Area and generally increased. On the contrary, the Bedroom Area decreased gradually during the period.

An increase in the standard deviation indicates linearisation in the form. The reason for the high standard deviation value in the Living Area and Service Area is because these two functional groups are designed in accordance with the geometry of the plot, they are considered in linear form. The spatial organisation around a long corridor is another factor in the increase in the standard deviation value. The standard deviation value of the Bedroom Area is low due to the compact organisation of the bedroom units.

In addition, the most important indirect factor causing the trends in the standard deviation value is the Gölcük earthquake that occurred in 1999. The direct factor affecting the interior space caused by the indirect factor is the earthquake regulations that came into force after the earthquake. Fire escapes, fire halls, the gross cross-sectional area of the column or shear wall, the body width of the beam, and the useful height of the beam and the column are the determining factors in the spatial organisations. The indentation-protruding surfaces of the column, fire hall or fire escape in the interior caused standard deviations in the radial rays.

Mean Depth:

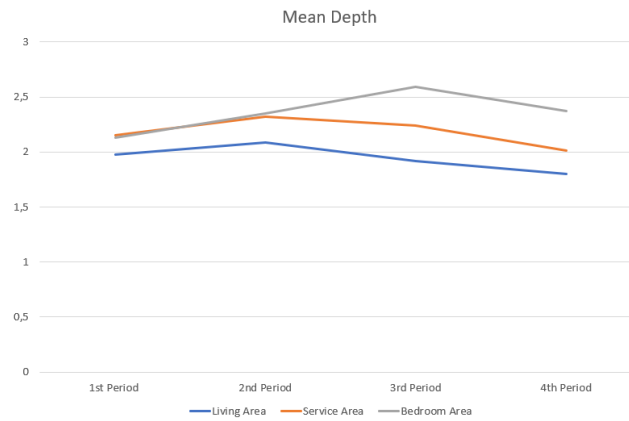


Figure 5.50: Mean Depth value of the Functional Areas in Four Periods

The mean depth value of the Living Area was found to be the highest in the second-period apartments while the lowest was in the fourth-period apartments. The first-period apartments showed similar values in Service Area and Bedroom Area, above the Living area. For the Service Area, the highest value was found in the second-period apartments and the lowest value was in the fourth-period apartments. However, the highest value for the Bedroom Area was found in the third-period apartment, and it was followed by the fourth, second, and the first-period apartments.

	Living Area	Service Area	Bedroom Area
1st Period	Lowest value	Highest value	
2nd Period	Lowest value		Highest value
3rd Period	Lowest value		Highest value
4th Period	Lowest value		Highest value

■ Highest value
■ Lowest value

Table 5.12: The Functional Areas with the Highest and Lowest Mean Depth value

Overall, while the lowest mean depth value was always found in the Living Area, the value in the Bedroom Area was found to be the highest. However, in the first-period apartments, the highest mean depth value was found in the Service Area.

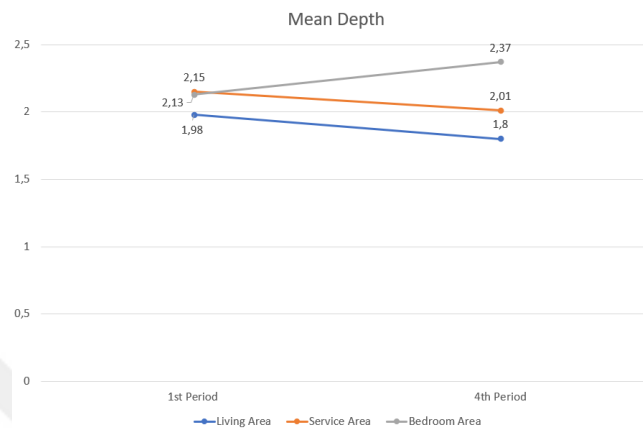


Figure 5.51: Trend Graph of the Mean Depth

The mean depth value of Bedroom Area shows an increasing trend in the general table. Living area and Service Area decreased almost equally. As a result, the area with the lowest mean depth value is the Living Area. This situation is directly related to the organisation of space.

The fact that the centralisation is in the living room, the television is becoming the focal point of the living room, having guests in the living room and the use of the living room as the sitting room have reduced the mean depth value of the Living Area. In addition, the bedrooms have turned into spaces where the residents spent time during the day. With internet access and smartphones, bedrooms turned into units where the individual wants to spend time alone, work, watch movies and have fun. Undoubtedly that, a factor such as corridorisation has a big impact on this situation as well. Since the units that compose the circulation area have decreased in quantity, a single unit that is multipermeable is a corridor and is connected to all neighbouring units. In addition, the

kitchen space was designed to be directly related to the Living Area. Therefore, the mean depth value of the Service Area shows a downward trend. The indirect factor that causes the spatial change, and therefore the change in the mean depth value, is that the neighbourhood is a popular residential area.

Integration:

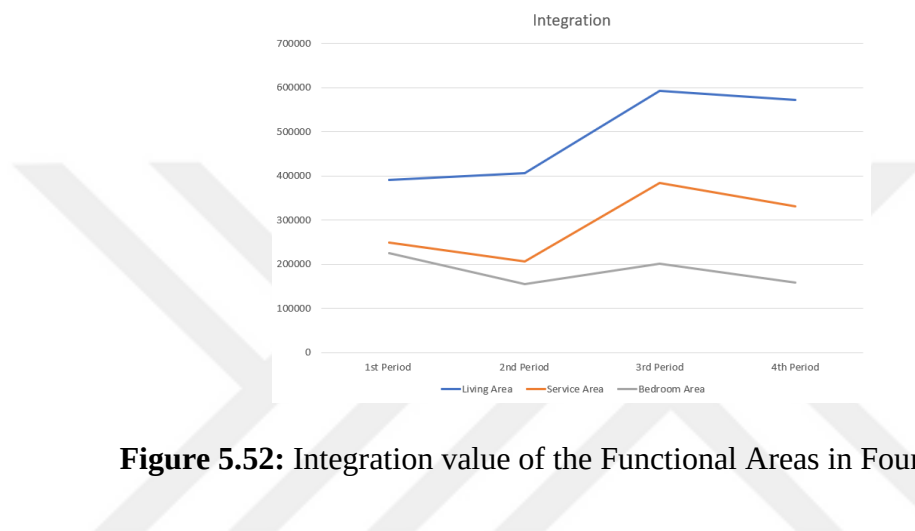


Figure 5.52: Integration value of the Functional Areas in Four Periods

The highest integration value of the Living Area was found in the third-period apartments, and it was followed by the fourth-period apartments. However, the values in the second and first-period apartments were far below and similar in value.

In the Service Area, while the highest integration value was found in the third-period apartments, the lowest value was in the second-period apartments with a great difference. The value of the first-period apartments was found to be the highest in the Bedroom Area. In addition to that, the lowest values were similarly found in Bedroom Areas of the second and fourth-period apartments, respectively.

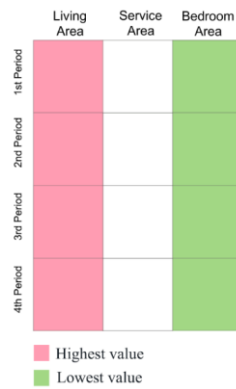


Table 5.13: The Functional Areas with the Highest and Lowest Integration value

Overall, while the highest integration value was always found in the Living Area, the Bedroom Area was always the least integrated for all the periods.

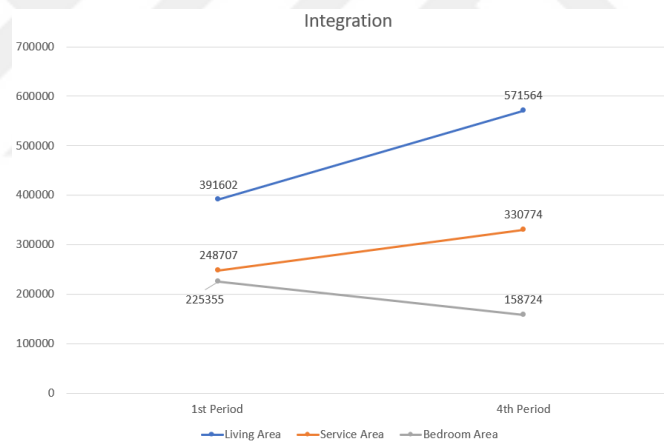


Figure 5.53: Trend Graph of the Integration

The integration value of the Living Area increased approximately two times and showed an increasing trend. The value of the Service Area in the third period apartments rocketed then dropped gradually but overall, it showed an upward trend. The value of the Bedroom Area decreased slightly over the entire period.

Integration value works inversely with mean depth value. While the Living Area and the Service Area are designed in the forefront and integrated, the Bedroom Area is

designed in the background with a high mean depth value. For this reason, the Living and Service Areas were the areas with the lowest integration value over the plan schemes. This is because of the indirect and direct factors that affect the space syntax.

Indirect factors are the fact that the area is a popular residential neighbourhood and is accessible. Therefore, due to the urban transformation activities in the region, increase in urban density, the restriction of the spatial organisations that come with the subdivision works and earthquake regulations, there has been linearisation in the plan scheme, and the bedroom areas have become the least integrated units of the dwellings.

5.6 Chapter Assessment

The history and construction process of the Feneryolu neighbourhood, which is a case study area, were investigated. As a result of the research, it was decided to investigate the syntactic changes of the interior spaces of the apartment type houses. Details on how to carry out the study is described in chapter 4. In this context, the houses selected for the study were examined in four periods according to their construction dates.

In this chapter, for each period, the external factors affecting the apartment type residences, the spaces included and excluded from the plan scheme, and the syntactic analyses of the plan schemes were made, and the results were discussed.

First of all, for each period, the external factors affecting the apartment type residences were examined under two subheadings as direct and indirect factors. In addition, excluded and included spaces were processed in an excel table for each group.

In order to make spatial analyses, the plans of the apartment type houses in each group were analysed in Syntax 2D programs. Mean isovist area, perimeter, compactness, circularity, radial mean, standard deviation of the radial rays, mean depth, and

integration parameters were measured in plan diagrams divided into 3 functional areas. These functional areas are Living Area, Service Area, and Bedroom Area.

In the synthesis section, firstly, direct, and indirect factors affecting apartment-type dwellings and the table for the units of apartment type dwellings, which was titled as excluded and included spaces, were examined. As a result of the comparisons made, the external factors have resulted in the densification of housing in the region, shrinkage in parcels, changes in spatial sequences, reduction in the size of dwelling plans, thus decrease in the number of units in three functional areas.

Drastic changes in apartment-type dwelling schemes have also caused changes in syntactic values. Therefore, the numerical changes in the syntactic values of the apartment type houses due to the external factors were visualized through line graphs. For each parameter mentioned above, the average values of the syntactic values of the apartment type houses examined in four periods are calculated and the resulting trend was examined.

In addition, the functional areas with the highest and the lowest values for each parameter are determined and demonstrated with tables.

CHAPTER VI

CONCLUSION

In this thesis, the analyses made from 1950 to 2020 are discussed with the breaking points in four periods. In this process, in addition to the housing change, the socio-economic situation in Turkey, the technological factors affecting the spatial behaviours and space syntax, the housing forms changing depending on the housing production styles were examined and the results were synthesised.

There are four phases considered in the analysis. These phases have occurred with the breaking points where technological, legislative, social, and infrastructural developments took place. Breaking points are effective on housing typologies, materials, space syntax and space usage. For this reason, in this thesis where spatial changes are discussed, the factors, laws or developments that determine the breaking points should also be taken into account. In this context, in the examination of the development or transformation of apartment-type dwellings in Turkey, the beginning of the first phase has been shaped with the process of rapid apartment building, especially rental houses, which started from the late 1950s, even though it slowed down in the 1950s due to economic reasons within the systematic structuring of the thesis.

It is also the beginning of the process that took its current form with the transition from share ownership and cooperative order to full house ownership with the Condominium Ownership Law in 1965, which started with the change in the 1954 with the Deed Law and triggered the second phase. The housing production model, which is

among the developments of the second phase of the thesis, is the Build-Sell Model. The legal regulations on condominiums made in 1954 and 1965 and the apartment-type dwellings designed and built by the contractors constitute the dominant house typologies of the period. In the second period of the 1950s, the fact that the central heating system became widespread in the house, the television entered the houses in the 1960s, production in construction material in Turkey, affordable and efficient constructions with standardised materials are the most important factors affecting the apartment-type dwelling's change in the second period.

Although it does not seem to interfere directly with the spatial sequence, with the construction of the first Bosphorus Bridge in 1973, the connection of the European and Asian continents by road, thus facilitating transportation, has been instrumental in the formation of new residential areas in the city. This situation led to the concentration in the existing urban fabric and thus to subdivision.

Mass housing projects were built in the late 1960s but the boom in housing development took place with the Mass Housing Law in the early 1980s. This is the initial factor that creates the third phase. The third phase covers the years 1980 and 2000. The apartment-type houses encountered in this period consist of higher buildings due to the release of the construction servitude and the popularity of the private sector in the field of construction. Among the developments of the third phase are Mass Housing Law, Establishment of Mass Housing Fund and Mass Housing Administration, the widespread use of Natural Gas instead of the central heating system in dwellings. The 1999 Gölcük earthquake occurred in this period, but it showed its effects in the fourth phase with the new earthquake regulations.

Finally, the years covering the fourth phase are 2000-2020. The most important factor among the developments of the fourth phase is the earthquake regulations that came to the agenda after the 1999 earthquake. In addition, the increase in the number of mega projects such as Marmaray, metro and shopping centres caused an increase in housing in the vacant parts of the city and resulted an increase in land values. With the Urban Transformation Law and the Law No. 6306 on the Transformation of Areas under Disaster Risk, the city has witnessed large, medium, and small-scale housing projects. In the interior of the house, changes have occurred in the behaviour of the actors in the house due to internet access and the role of smartphones in daily life.

All four phases are shaped by the breaking points in Turkey's structure shaped by socio-economic, social, and legal regulations.

In the Feneryolu neighbourhood, the first phase apartment type dwellings were generally converted from single-family houses to apartment type dwellings. For this reason, single family house traces are seen in the first period apartments. These traces are space syntax and space functions. In the second, third and fourth phase houses, especially the presence of television and the decrease of the units that make up the Living Area to a single unit caused an increase in the mean isovist area value. When the perimeter values were examined, the most drastic change was found in the Bedroom Area. The decrease in the values of the Bedroom Area, where a gradual decrease is observed from the first to the fourth period, can be interpreted in the context of spatial organisations. When all the layouts in the four periods are evaluated, it is clearly seen that the differentiation in the perimeter value, the decrease in the Bedroom Area and the increase in the Service Area.

A decrease was observed for the Bedroom Area in both the mean isovist area and the perimeter values. In this case, it can be said that the privacy factor is effective in the spatial organisation of dwellings. As visibility decreases, privacy within the residence may increase. This can be read well when *Table 5.5* is examined. In particular, the addition of the parent bathroom to the spatial sequence in the third and fourth phase buildings is a factor that increases the depth and decreases the visibility value. However, at this point, a question arises: *Is the privacy increasing in the dwelling due to the rationally designed spatial organisations in accordance with the land geometry, or is it because the privacy factor is a determining factor of the spatial organisation, thus spaces are designed with high depth and low perimeter values?* The reason might be derived from either macro scale parameters or micro scale changes in spatial configurations, so the answer to this question is both scales that they may create this result. On the other hand, when the recent buildings are examined, the fact that the en-suite bathroom unit is included in the layout instead of the guest WC, the bedrooms are positioned along long corridors, the kitchen becomes a social unit and it is integrated with the Living Area might be another answers to this question.

When all four phase plans were examined, an increase in compactness values was observed in general. Due to the strengthening of Istanbul's transportation between the continents by land and sea, the increase in accessibility and the creation of new housing zones, the land supply was insufficient against the increasing housing demand. The construction of houses on narrow plots due to land subdivision works can be discussed as direct factors affecting the spatial sequence and the compactness value of the spaces. This situation is directly related to the "economy", which is one of the main factors affecting the housing and space syntax.

On the other hand, technological advances within the dwelling, such as central heating system in the second period, natural gas in the third period and internet access in the fourth period, have affected centrality through corridorisation in space syntaxes and reveal a linear plan scheme. The concept of centrality not only gives a measurement in relation to the shape of the space, but also gives us how central that point of view is depending on how large the value of any point in the space is. In this context, in the plans examined from the first to the last phase, the tendency to decrease in centralisation in the plan schemes has emerged especially in the Living Area due to the fact that the last phase apartments were constructed on narrow plots and designed with long corridors.

One of the most important reasons that cause linearisation, especially in the Service Area, is the decrease in the permeability values of the spaces. Since the kitchen is one of the Service Area units, it can be said that it has become a part of the circularity in the 2nd, 3rd, and 4th-period apartment type dwellings. However, in addition to being one of the Service Area units, the kitchen has become a "frequented place" unit where users can socialise.

In addition, since the units of the Service Area is located in the centre and is an area handled with the fire safety hall and stairs, it is in a more circular geometric formation. However, the only unit in the Service Area that is spatially separated is the kitchen. Therefore, it can be said that the circular structure of the Service Areas, the bipermeable or multipermeable units forming a contour around the kitchen and the linearisation are generally a result of the zoning and fire regulation laws such as the use of elevators and the use of stairs in Turkey.

It was found that the radial mean values for the Living Area and Service Area increased in parallel in the plan schemes of the apartment type dwellings examined

starting from the second phase buildings. It can be said that the formation of plan schemes with high linearisation values due to land geometry reveals monotype plan morphologies. The increase in the value of the Service Area as well as the Living Area may show the potential of the kitchen to be a social space on its own. In this context, the The Bedroom Area was designed as the secondary unit, although the units were organised in a very compact manner. While this increases the standard deviation value for the Service Area, it may cause a decrease in value for the Bedroom Area. At this point, especially after the second-period buildings, the proliferation of the Service Area units, exit corridors, and the earthquake regulations reported in 2007 and the changes in spatial morphology explain the increase in the standard deviation value.

The fact that the development of electronic devices in the residence caused the mean depth values of the Bedroom Areas to be increased gradually in the third phase apartments and relatively decreased in the fourth phase apartments. This is related to individuality and privacy factors in the dwelling. As a result, it can be interpreted that the spaces have become indistinguishable as day-night spaces in terms of usage of space. However, another detail that needs to be mentioned is this; there is also a state of "physical privacy" in the dwelling. Especially in the third and fourth phase buildings, with the addition of the en-suite bathroom to the configuration, it may be interpreted that the night places of children and parents are completely separated. In this regard, one of the important results of the thesis is the alteration of the bathroom and bedroom units in relation to Altman's (1975) concept of privacy. Similarly, Hanson (1998) stated that in the study of configuration of English country houses, women's and children's rooms are generally more segregated than the rest of the house. This also corresponds with the concept of privacy.

The fact that the presence of anteroom/entrance hall units in the first phase buildings, and the disappearance of welcoming spaces as the housing sizes decreased in the third and fourth phase buildings led to the integration value of the Living Area increase over time. When examined configuratively, the disappearance of the entrance hall in the last period apartment type dwellings and the increase of integration in the Living Area is a design change data that should be emphasised during the time period from the 1950s to 2020.

In this thesis, apartment-type dwelling typologies built in Istanbul, Feneryolu from 1950 to 2020 are demonstrated. The reason why the case area was chosen as the Feneryolu neighbourhood is that apartment-type dwellings produced with different typologies and morphologies past 70 years and are present in the Feneryolu neighbourhood in 2020. Moore's (1972) diagram of four lifestyles and environmental preferences *Figure 2.11* can be shown as the main reason for the typological diversity of the apartment type dwellings in the Feneryolu neighbourhood. When the historical development of the region is examined, it is seen that the region was a prestigious region that was previously defined as a prestigious suburb, preferred by the upper class, and far from the city centre. In the following years, the area was densified for various reasons, became a residential area that is suitable for children, and was preferred by families. Due to urban transformation and urban densification, the area where apartment buildings are dominant is also preferred by users whose priority is "consumption" (Moore, 1972). For this reason, the current appearance of the Feneryolu neighbourhood is dominated by apartment-type residences, in which the spatial sequences have been transformed over the years.

In conclusion, this research aimed to show the syntactic and social changes of the apartment type houses in Istanbul. It was distinct from the studies given in the literature in terms of methodology. By making analyses within the framework of space syntax concepts such as occlusivity, connectivity, variance, skewness, relative asymmetry, which are not covered in the appendices of this thesis, the semantic and syntactic structure on the basis of space can be examined. Subsequent works can be about not only the whole house but also a specific unit such as kitchen, or Service Area. Micro-scale studies can provide data that contributes to a better understanding of a functional area and understanding of changes in space use.

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ENDNOTES

ⁱ Democrat Party (DP): It is the first party established after the Republican People's Party (CHP), which was founded by Mustafa Kemal Atatürk. DP remained in power between 1950 and 1960.

ⁱⁱ Black sea origin constructors are who migrate from the Eastern Black Sea region to Istanbul or another big city and carry on usually small-scale construction business. They are known for constructing low-cost and therefore mid-quality buildings, especially in the 1970s when the build-and-sell technique became widespread.

ⁱⁱⁱ Tanyeli, in his article titled "Reading housing and modernization from the metropolis" "*Konutu ve Modernleşmeyi Metropolden Okumak*", mentioned that modernisation and housing production were not only in architects' power but also non-architects' such as writers, soldiers, contractors and even homeowners who want to reflect their taste through the house they live in. The non-professional actors had an effect on the design and modernisation of the house.

^{iv} Radial length is each of the rays transmitted to the polygon walls from the node that forms the isovist polygon in space.

^v The train line was established in 1873 as the first phase of the Baghdad - Istanbul train line and was between Haydarpaşa and Gebze. However, in 2013, the current train line went under a renovation project. Marmaray, which is the new name of the train line, connects the two continents with a tunnel under the sea of Marmara and extends from Halkalı to Gebze.

^{vi} In this cartoon, a rich man demolishes his mansion to demonstrate his own taste.

^{vii} Pay-i Taht: Capital city. The city of the *Taht* (Throne).

^{viii} "The name of the Sixth Region, established in the most developed regions of Istanbul, is inspired by Sixieme Arrondissment (Sixth Region), where the most distinguished and modern sections of Paris, where Ottoman bureaucrats lived" (Aydın, 2019).

^{ix} "Apartment Building: A New Housing Type in Galata"

^x The Mass Housing Fund and Administration in Turkey (TOKİ)

^{xi} In 1893, Moda: 150 buildings; In 1901, Kadıköy: 100 buildings; in 1911, Moda: 50 buildings burnt down.

^{xii} According to the Law of Ebniye (1882), if mansions within large parcels are to be built in certain areas of Istanbul, these areas can be opened for development without the Sultan's permission. With the Ebniye Law, the regulation that imposed restrictions on

the use of wood in building construction in the city affected only the attached buildings, and the use of wood in detached buildings continued until the early republic period.

^{xiii} Salle-à-Manger: A French word for ‘dining room’. However, in Turkish apartment type dwellings, besides the dining room function, it is used to enlarge the living room for guests through a large door.

^{xiv} English basement: Half buried basement floor.

