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PART B: ART, HUMANITIES, DESIGN AND PLANNING

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# Reading the Figure of the Public Architect in the Republican Era through Mithat Yenen's Urban Planning Practice[1]

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**Abstract**

During the Ottoman and Republican periods, public buildings were symbols of legitimacy and strength of the government. The actors behind those projects demanded and administrated by the government were public architects. In the early periods of the Republic, from Architect Kemaleddin to the foreign architects tasked with building modern Republican cities represented different figures of public architects. By 1940's, a figure of the public architect emerged who determined the principles of urban planning, worked in institutionalization process, and contributed to the production of the built environment. Mithat Yenen, as one of those public architects contributed forming the principles the institutionalization process of urban planning and since 1940's. He was both close to the bureaucracy and administration, additionally capable of guiding technical processes due to his professional background.

The aim of the article is to understand the figure of public architect by 1940's when the production of urban plans and important developments in institutionalization started to occur, through Mithat Yenen's urban planning practice and reveal his contributions to the understanding and institutionalization of urban planning. The scope of the study mainly goes on the axes of Yenen's career. The study describes the process first between 1920's-1940's which represents the figures of public architects before Yenen and between 1940's-1960 which included Yenen's contributions to urban planning could be followed. The main method of the study places Yenen's contributions in the context of the period through his personal archive and projects published in periodicals, as well as organizations and processes.

## 1. INTRODUCTION

In both Ottoman and Republican periods, government itself, represented its legitimacy through public buildings. Consequently, the number of architects commissioned by the government for the design and implementation of these constructions increased over the years, forming a group of professionals that can be defined as "public architects". As Tanyeli mentions, "the reconstruction of architectural profession" has occurred by the Republican Era and thus, the definition and the mission of architect has evolved [1]. Architect has become not only the constructor of buildings but also one of the figures in charge of "nation building"[2] with their knowledge and experience. The areas in which public architects had been operating have also undergone changes over time as well as their capability, quality of knowledge, working standards and architectural practices. Those changes are not easy to frame in strict and rigid periodization since the diversity of the projects public architects got involved in and of their educational and professional background.

Beginning from 1910's, Kemaleddin, Vedat Bey and Giulio Mongeri could be seen as public architect as the members of the First National Architectural Movement. They all worked in different kinds of public buildings for the government. Kemaleddin was one of the most significant figures as a public architect

[1] The preliminary version of this paper was presented at the Mimar Kemaleddin Symposium organized by Gazi University Faculty of Architecture in Ankara on December 27-29, 2023.

[2] This definition was used in the headline of "Modernism and Nation Building: Turkish Architectural Culture in the Early Republic" by Sibel Bozdoğan [2].

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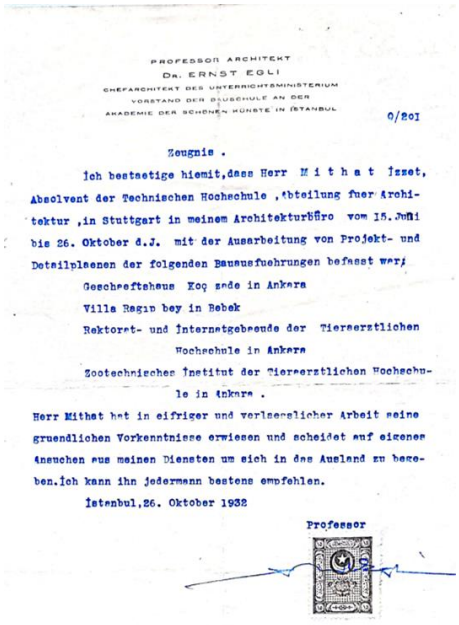
between 1910's and 1927. He differs from Vedat Bey and Mongeri by his understanding of conservation and research on building techniques [4]. He completed most of his projects by government controlled as well as his individual projects. His professional education was affected by modern educational movement of Ottoman and he played a role in the construction or restoration of many public structures as a member of a governmental institution. Additionally, he analysed and documented existing architecture in his writings [5]. After the establishment of the Republic, he became an architect of the Republic and contributed the housing projects and educational buildings in Ankara under the Ministry of Foundations until 1927 [6].

He became an architect who worked as "an officer" of the state both in Ottoman and Republican era in public building projects which were necessities of public including housing projects, schools, commercial buildings etc. Besides, he also tried to produce and teach the architectural knowledge by analysing the existed architecture and consider about the preservation of historical buildings [4]. Kemaleddin was an architect most closely aligned with the public architecture of the modern Republic among other architects of the late Ottoman period with his contemporary professional education, mastery of the technical, educational, and theoretical aspects of architecture, and his literary contributions proposing solutions to current urban and architectural issues.

In the Early Republican Period, the government instrumentalized the production of the built environment to modernize both the nation and appearance of cities. In this process, several architects and urban planners from German-speaking countries were invited to Turkey such as Robert Oerley, Hermann Jansen, Theodor Jost, Clemens Holzmeister, Carl C. Lörcher as experts and advisors. In 1930's, Turkey also became an option to live and work in for German-speaking architects such as Martin Wagner, Ernst Reuter, Bruno Taut, Paul Bonatz because of the political environment in their countries. They worked in government institutions, give lectures within universities and contributed the planning of modern cities as requested by the government. Egli and Taut especially focused on understanding Turkish urbanism and architecture, as well as producing modern buildings and cities [7]. Those people were "experts" whose duty was to teach new generation of architects the modern principles and implementing on architecture and urban planning either in professional education or public institutions [8]. For instance, the main figure of this study, Mithat Yenen was student at the Stuttgart University [9], he completed one of his office internships in Egli's office in 1932 [10]. Therefore, he worked not only on Egli's freelance architectural projects but also in public projects in the Construction Office of the Ministry of Education (Maarif Vekaleti İnşaat İşleri Dairesi) [Figure 1]. In following years, he also worked in urban planning of Ankara with Jansen until 1939. Additionally, he mentioned in his self-resume [11] that he worked with Wagner, but it is unclear whether he worked while Wagner was working on the Istanbul plan or during his time as a consultant at the Ministry of Public Works [12]. It was possible to see these figures influences in his early works.



PROFESSOR ARCHITEKT
Dr. ERNST EGLI
CHEFARCHITEKT DES UNTERRICHTSMINISTERIUM
VORSTAND DER BAUSCHULE AN DER
AKADEMIE DER SCHÖNEN KÜNSTE IN ISTANBUL

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Zeugnis .

Ich bestaetige hiemit,dass Herr M i t h a t İzzet, Absolvent der Technischen Hochschule ,Abteilung fuer Architektur ,in Stuttgart in meinem ArchitekturBüro vom 15.Juni bis 26. Oktober d.J. mit der Ausarbeitung von Projekt- und Detailplaenen der folgenden Bauausfuehrungen befasst war;

Geschaeftshaus Koç sade in Ankara
Villa Regip bey in Bebek
Rektorat- und Internatsgebaeude der Tieraerztlichen Hochschule in Ankara
Zootechnisches Institut der Tieraerztlichen Hochschule in Ankara .

Herr Mithat hat in eifriger und vorlaeufiger Arbeit seine gruendlichen Vorkenntnisse erwiesen und scheidet auf eigenes Ansuchen aus meinen Diensten um sich in das Ausland zu begeben.Ich kann ihn jedermann bestens empfehlen.

Istanbul,26. Oktober 1932

Professor

***Figure 1.*** *Ernst Egli's reference letter for Mithat Yenen, 1932 [10].*

Working with "modern experts" was not enough to achieve to build a modern environment. It was necessary to have proper, experienced architects and engineers in urban planning. Therefore, in 1930's, during the institutionalization process of the Republic, there have been a series of legal regulations in the field of architecture and urban planning [12]. One of these regulations was constituted in 1936. It was stated that urban planners could be employed in the ministry only if they have graduated from the selected institutions by the government such as Technical University, Academy of Fine Arts etc. [13]. During this period, the inadequate and inexperienced personnel of technical departments were causing a problem. The new regulations of urban planning could not be implemented, and the development of cities could not be completed within the planned timeframe. Therefore, critics were raised during this period against the employment of foreign architects responsible for construction and urban planning in the several departments of the Ministry of Public Works and various governmental institutions. It was argued that qualified Turkish architects needed to be experienced in construction and urban planning [14, 15]. However, inadequacy of technical personnel was still be discussed until the mid-1950s [16].

Many architects who became influential in architecture and urban planning were studied architecture in abroad such as Germany and France as well as in Technical University, Academy of Fine Arts. For instance, Sabri Oran[3], Mithat Yenen, Arif Hikmet Holtay and Kemali Söylemezoğlu graduated from Stuttgart Technical University or Sedad Hakkı Eldem and Orhan Alsaç graduated from Academy of Fine Arts. These figures were some of public architects who worked with foreign architects who worked in government institutions as consultants, lecturers and implementers, as their assistants, students and colleagues thanks to their capability of the language and their educational background [Figure 2] in 1940's and in 1950's. In following years, Oran worked for Istanbul Municipality [18]. Holtay later taught at the Academy of Fine Arts, while Söylemezoğlu worked in the İller Bankası, taught in the Academy of Fine Arts, and Istanbul Technical University [19]. Architects who were proficient in foreign languages and studied modern architectural education, worked in various positions in government institutions at the same time. For instance, by 1939, Mithat Yenen worked in the Municipal Planning Committee (Belediyeler İmar Heyeti) [3] and Kadastro Umum Müdürlüğü Fen Müşavirliği [20] and master plan of Ankara with Jansen [3]. Also, Orhan Alsaç worked in both urban planning department in İstanbul Technical University after mid-1940 and the Urban Planning Technical Committee under the Ministry of Public Works [21]. These figures influenced the course of architecture and urban planning practices, bureaucracy, and education after starting to work in public institutions.

[3] Sabri Oran graduated before Mithat Yenen. He helped Yenen for finding construction internship [17].

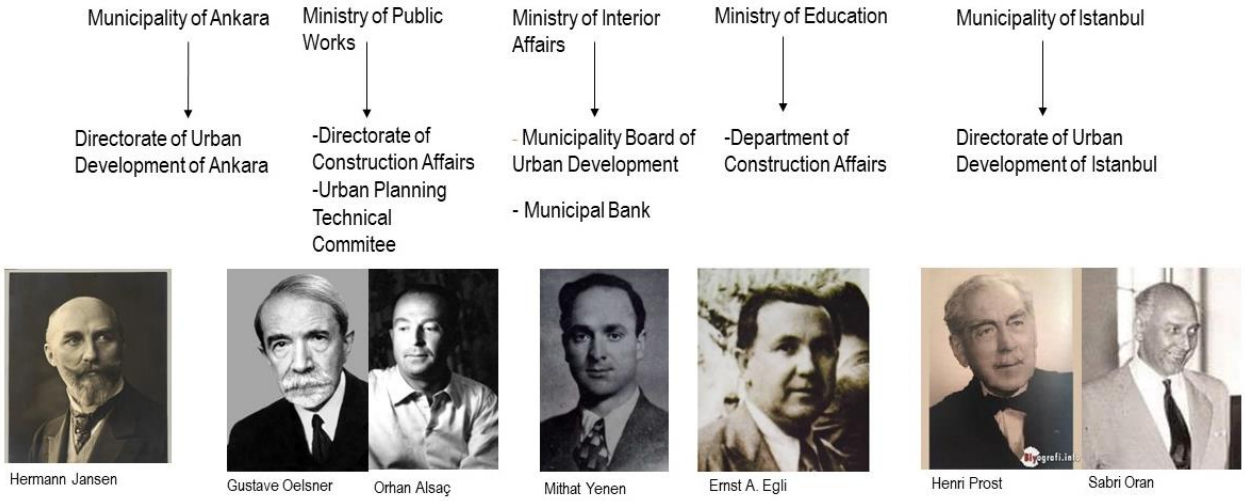


***Figure 2.*** *Institutions responsible for construction and urban planning in 1930s.*

The main focus of the article, Mithat Yenen was one of influential figures of urban planning in the Republican era. He was born in Thessaloniki in 1908. He graduated from Stuttgart Technical University in 1935 and began his career as an urban planner at the Municipal Planning Committee (Belediyeler İmar Heyeti) in 1936. His career in urban planning continued with pioneering roles in the organization of the Ministry of Urban Development and Settlement in 1958 and serving as undersecretary of the Ministry from 1960 to 1966. From 1966 until his retirement, he served as the head of the Greater Istanbul Master Plan (Büyük İstanbul Nazım Planı) [3]. Based on his biography, it is clear that among the Republican Era public architects mentioned above, he was an architect who was closer to the bureaucratic side of architecture. This study aims to propose an alternative approach to describe the figure of public architect by focusing on the professional practice and contributions of Mithat Yenen. Additionally, the study draws the frame the features of public architects according to their professional practice, educational background, socio-cultural situation in the context of the period they effectively worked. Secondly, it aims to determine Yenen's role among the other public architects by locating Yenen and his contributions into this frame.

The methodology of the study could basically be explained as induction from Yenen's professional practice, educational background and contributions to the bureaucracy in urban planning to the public architect figure in the Republican era. Mithat Yenen's urban planning practice and his work were determined as the main axes of the article. Therefore, the periodization of the study was arranged before and after the 1940s, when Mithat Yenen began to be more visible in his professional practice. This period also the same years when institutional and legal transformations in urban planning were started to implement. The time frame of the study is limited to 1960 which is accepted the starting point of "planned period" because of the establishment of the State Planning Organization, in the history of urban planning in Turkey. This limitation is because with the planned period, urban planning practice became more government-controlled and integrated into economic development plans.

The written documents in the Oğuz Yenen archive and the personal letters in the Nezihe Çakıroğlu archive, allowed to obtain the information about Yenen's educational life. All materials in both archives were used with family members' permission. Written documents from his personal archive, articles published in professional journals, memoirs of various architects of the period were overlapped with the information and discussions related to the public architecture practice of the period in secondary literature to reveal Mithat Yenen's role in the public architecture of the period. Additionally, the legal regulations on planning and the laws related to the institutionalization of public institutions were reviewed to examine Yenen's contributions to the bureaucratic process of urban planning within the context of the period. The archives of İller Bankası and the Ministry of Environment, Urbanization and Climate Change were researched for Yenen's urban planning projects to examine the main principles of urban planning among

the public architects of the period through Yenen's work. However, no projects were accessible in those archives. Only two of Yenen's urban planning projects were found in the professional publishings, named Mimarlık and Belediyeler. The design decisions in these plans were described in the context of understanding of urban planning of the period.

## 2. THE CONTRIBUTIONS OF MITHAT YENEN IN THE NEW ERA OF URBAN PLANNING (1940's-1960)

Educated architects and urban planners contributed as experts to the production of the built environment in government institutions in the 1940s. Therefore, they also shaped the urban planning understanding of the period and started a new era which effected the process of urban planning until 1960. Public architects who work with foreign advisors and lecturers as their assistant or student in the 1930s, started to work as urban planning experts in institutions such as Iller Bankası, Ministry of Public Works, Istanbul/Ankara Municipality or give lectures the Academy of Fine Arts by 1940s [12]. Mithat Yenen was one of these influential figures of this period because of his educational background and directive positions that he worked in. Therefore, his understanding of urban planning was similar with the understanding of the period, and he directly affected the institutionalization process of urban planning both in 1940's and 1950's.

### 2.1. Understanding of Urban Planning

When Mithat Yenen became chef of the urban planning department of the Municipal Planning Committee by 1941, he found the opportunity to visit various cities in Anatolia [22]. According to his resume, during he was working in Iller Bankası, Yenen was involved in the preparation of "development and implementation plans for around 500 cities and towns through competitions, government tenders, or directly under the organization of the bank itself" [11]. It is possible to read Yenen's understanding of urban planning through his projects. Although he contributed numerous planning projects in both the Municipal Planning Committee and Iller Bankası, only two of urban planning projects could be found that he worked as urban planner: Urban plan of Çubuk in Ankara and Simav in Kütahya [4]. The explanation reports of these projects also reflected the understanding of urban planning of the period.

The urban plan of Çubuk was made in 1938 by Yenen. In the explanation report, he states that the expansion area was thought to be towards the northeast considering the town's geographical features [23]. The road axes were also planned according to the topography. Important squares for the town's circulation, such as the government square, market square, car park, and sports field were associated with public buildings such as the government building, community centre, hotel, hospital, mosque, school, etc. One of the most characteristic aspects of the plan is the conversion of residential buildings in the old neighbourhood into detached and simple row houses through 'substantial renovation' [23]. Additionally, it is noted that no more roads were to be opened except for the four main roads passing through the government square. Other secondary roads connected to the main road were conceived as green belts [Figure 3]. The plan features prominent squares and tree-lined roads. The squares were designed to be more integrated with public buildings, while the residential texture was arranged around them [Figure 4]. In the newly constructed public buildings, the existing construction techniques and scale of the town were preserved.

[4] The original plans could not be found in the archives of the Ministry of Environment and Urbanization or the archives of the İller Bankası.


**Figure 3.** *The view of public square and buildings, Çubuk, Ankara, 25.06.1938, Mithat Yenen [23].*

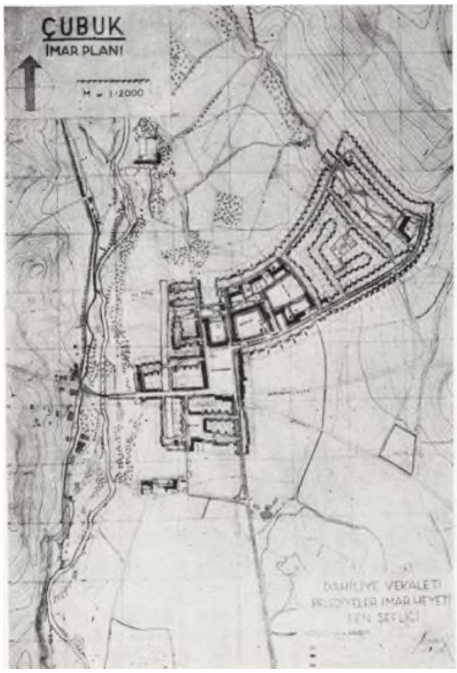


**Figure 4.** *The plan of Çubuk, [23].*

The second urban planning project of Yenen was Simav in Kütahya in 1944. Primary aim of the plan was described as preserving the town's structure and creating green areas. Main arteries for entering and exiting the town were additionally designated [Figure 5]. The sectional drawings of roads on the left side resemble the drawings by Jansen in the Bahçelievler Construction Cooperative Project [Figure 6]. It is known that Yenen worked with Jansen between 1936 and 1939, and he was also the one who translated Jansen's original text into Turkish [26]. Therefore, he might have been influenced by Jansen's approach. Jansen's and Yenen's perspective on urban planning also resembles that of Camillo Sitte. Moreover, it is possible to see the modern approach to city planning by Yenen by considering locality, climate, material etc. as Egli and Taut did. In fact, several German-speaking urbanist architects of this period also influenced by this thought [7]. Sitte's approach which was still influential in 1920's and early 1930's, advocates for topographically adapted and residences with gardens [12]. However, figures such as Taut, Egli and Wagner separated from this idea and defended more rational solutions which suggested more fruitful relationship with nature, local and economical residences etc [27]. Yenen's urban planning approach was mix of these ideas which advocated an urban planning relating to local characteristics and preserving the existing urban fabric but also houses with gardens and green belts. However, upon examining the proposed plans, significant interventions into the urban fabric were noticeable. While it

was tried to integrate spacious squares and public buildings with local characteristics, they often dominate over the existing urban fabric. Preserving the existing urban fabric and local features was also the main principle of understanding of urban planning of 1940's.

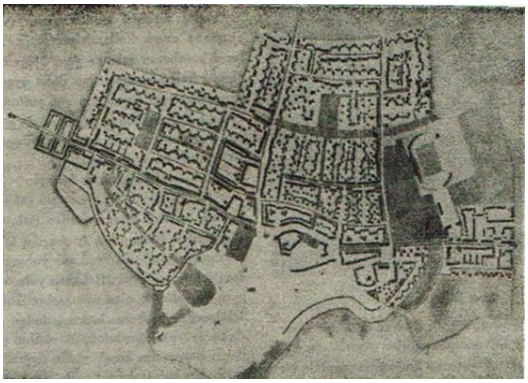

***Figure 5.*** *The site plan of Simav by Mithat Yenen, 1944 [24].*

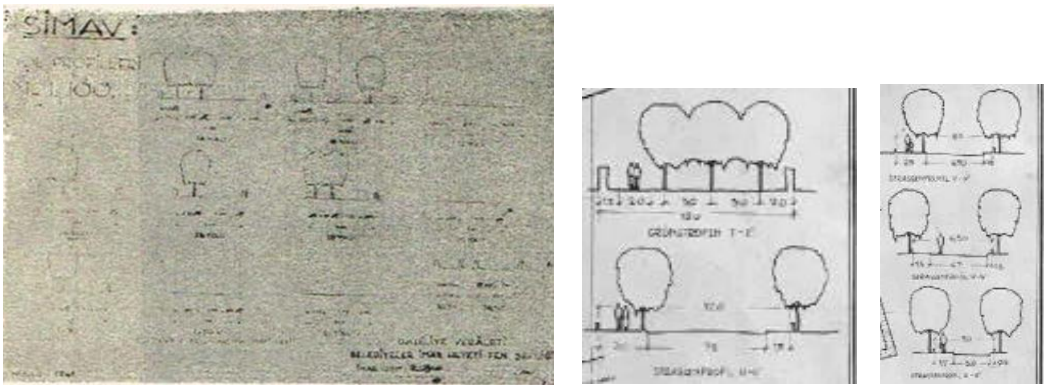


***Figure 6.*** *Examples of road profiles of Simav by Mithat Yenen in 1944 [24] and Bahçelievler Yapı Kooperatifi by Jansen in 1939 [25].*

### 2.1.1. The effect of urban planning competitions by Iller Bankası

One of the effects that extended persistently the urban planning approach which began to take shape in the early 1940's was the establishment of the Iller Bankası and the urban planning competitions organized by this institution in 1950's. While Yenen was one of jury members of these competitions because of his bureaucratic position in Iller Bankası, he played a role reshaping main principles of urban planning competitions.

In 1945, the Municipal Planning Committee and the Municipal Bank (Belediyeler Bankası) was brought together to establish Iller Bankası [28]. This institution played a significant role in urban planning and development especially in the 1950s. Mithat Yenen worked in 1945-1949 as the Director of Technical Affairs which was the department of urban planning of the institution [12]. By 1949, he became the general manager of Iller Bankası and the organizational structure of the urban planning department also changed [29], probably by Mithat Yenen. Iller Bankası presented one of the first example of the organizational structure of an urban planning institution. The institution also influenced the quality of urban planning competitions. In 1933, the organization of architectural competitions was presented as one of the options to manage the urban planning process with the Building and Roads Law (Yapı ve Yollar Kanunu) [30]. While the first examples were seen in the early 1940s, a series of competitions organized by Iller Bankası in the 1950's [31]. By looking at the jury members of these competitions, it could be seen not only bureaucratic figures such as mayors or the general managers of several institutions but also the public architects (Table 1). This situation shows that in urban planning competitions, the appropriate project was selected with the decision of not only architects but also the bureaucrats and local administrators.

In Table 1, it could be seen that the same architects were placed in different competitions repeatedly even the same jury in some of competitions. For instance, Yenen and Holtay were students of Paul Bonatz in Stuttgart, so it became possible to see those names in the same jury. Similarly, Alsaç was Gustav Oelsner's assistant both in the Ministry of Public Works and Technical University. Therefore, the network and relationships clearly affected in forming of the jury.

***Table 1.*** *The urban planning and architectural design competitions in which Mithat Yenen served as a jury member [32].*

| Name of competition | Year | Jury | Awarded project |
|---|---|---|---|
| Samsun Şehri İmar Planı | 1942 | Rüstem Mesut, Hayri Sayman, Mithat Yenen, Sinan Mimaroğlu, Burhan Ongun, Şekip Akalın ve Rüştü Özdil | None-first winning award; Semih Rüstem Temel the second, Asım Kömürcüoğlu the third |
| Adana Belediye Sarayı | 1944 | Paul Bonatz, Arif Hikmet Holtay, Mithat Yenen | Kemali Söylemezoğlu, Ratip Erhan, Orhan Tolon |
| Adana Numune Evleri | 1944 | Paul Bonatz, Arif Hikmet Holtay, Mithat Yenen | None of the first or the second awarding |
| Ödemiş İmar Planı | 1945 | Şefik Refik Soyer, Henry Prost, Recai Akçay, Muammer Çavuşoğlu, Dr. Niyazi Erzin, Şekip Akalın, Mithat Yenen, Mutahhar Başoğlu, Paul Bonatz, Ernst Reuter, Gustav Oelsner | None-first winning award; Selman Yönder, İzzet Aydınoğlu ve Celile Berk, Kemal Ahmet Aru, Orhan Sefa the second Necmi Ateş, Feyyaz Tüzüner ve Asım Kömürcüoğlu the third |
| İzmit Belediye ve Otel Binası | 1948 | Gustav Oelsner, Mithat Yenen, Recai Akçay, Kemal Öz, Abidin Mortaş, Orhan Alsaç | Kemali Söylemezoğlu, Kemal Ahmet Aru, Gündüz Özdeş |
| İzmir (Uluslararası) İmar Planı | 1951 | Sir Patrick Abercrombie, Paul Bonatz, Rauf Onursal, Mithat Yenen, Cevat Erbel, Orhan Alsaç, Kemal Ardova, Necmettin Emre, Muammer Tansu | Kemal Ahmet Aru, Gündüz Özdeş, Emin Canbolat |
| Eskişehir (Uluslararası) İmar Planı | 1952 | Zahit Mutlusoy, Hicri Sezen, Mithat Yenen, Cevat Erbel, Celal Uzer, İlhan Ersoy | Melahat Topaloğlu, Mehmet Ali Topaloğlu, Bülent Berksan |
| Malatya İmar Planı | 1953 | Sabahattin Kürüklü, Orhan Alsaç, Mithat Yenen, Zahit Mutlusoy, Recai Akçay, Halit Femir, Celal Ulusan, Talat Özışık | Melahat Topaloğlu, Mehmet Ali Topaloğlu, Bülent Berksan |


***Figure 7.*** *For the Izmir Urban Planning Competition, Mithat Yenen (top, third from the left), Talat Özışık, and architects from Izmir during a coastal tour in Izmir [33].*

It is possible to follow how the understanding of urbanism formed in these years from these competitions. The jury reports of architectural competitions indicated some common points in the winning projects. International Urban Planning Competition of İzmir in 1951 was a significant example (Figure 7). In the competition, participants were expected to propose the organization of a port in Alsancak, establishing connections between the port and the industrial zone and railway, arranging the neighbourhoods where workers and the poor reside [31, 34]. The jury members were Sir Patrick Abercrombie, Paul Bonatz, Rauf Onursal, Mithat Yenen, Cevat Erbel, Orhan Alsaç, Kemal Ardova, Necmettin Emre and Muammer Tansu. Kemal Ahmet Aru and his team won the competition, and the urban plan was implemented in 1953 [34]. According to the competition report, this plan was selected as it responded to needs of the city, was feasible for implementation, and proposes an alternative to the municipality for urban planning [35]. As in this example, it could be seen that the awarded projects were to be feasible, compatible with the urban fabric, expanding transportation opportunities, creating a comprehensive road network, and determining the development areas and functions of the city according to its character. Therefore, public architects, including Mithat Yenen, also played a decisive role in determining certain principles of the understanding of urban planning in 1950's.

### 2.2. The Institutionalization of Urban Planning

Mithat Yenen's one of most fundamental contributions to urban planning as a public architect was during the institutionalization process. The new legal regulations for urban planning in the 1930's were insufficient, and there were deficiencies within the institutions themselves. Consequently, during the institutionalization process, urban planning proceeded through various institutions affiliated with the Ministry of Public Works but organizationally independent, gradually centralized until 1960 (the establishment of the State Planning Organization). In this study, it will be discussed this institutionalization process through the First Turkish Building Congress in 1948 and the establishment of the Ministry of Public Works and Settlement in 1958, both of which involved contributions from Mithat Yenen.

The legal regulations of the 1930s imposed significant responsibilities on the municipalities of the period [30]. However, many of these institutions faced problems in implementing the new regulations [12]. Moreover, some of public architects working particularly in urban planning institutions have been aware of deficiencies in planning practice. Therefore, they wrote critical and explanatory articles in periodicals about how existing practices should be implemented. Those writings work as a guide for municipalities and architects who work with the new regulations [36, 37]. One of those writers was Mithat Yenen since he was working in the Municipal Planning Committee. It is possible to find his articles on such periodicals as Belediyeler, İller ve Belediyeler, Mimarlık, Türk İdare Dergisi about urbanism, drawing topographic maps, implementation of new regulations and bureaucratic phases in urban planning.

#### 2.2.1. The First Turkish Building Congress

When the deficiencies in existing laws and public organizations were recognized, public architects made several changes by 1945 both in the implementation of planning practices and in bureaucratic processes. The most important event which gave a start to this transformation process was the publishing of reports of the preparation phase of the First Turkish Buildings Congress (Birinci Türk Yapı Kongresi) organized by the Ministry of Public Works in 1946. Reports on various topics such as basement construction, earthquakes, project applications, architectural principles, maps, urban planning, legislation related to urban planning, housing, and fee schedules for freelance work were published in 1946 [38]. However, the congress convened in 1948 [39]. One of the important steps taken at the congress for the institutionalization of urban planning was the discussions proposing the centralization of relevant institutions to enable them to work more orderly and systematically. In this regard, the reports criticized the division of technical personnel and resources in the Ministries of Interior Affairs and Public Works, each having separate offices and technical committees dealing with urban planning and construction affairs. Therefore, the debate arose on whether a single authority would be more beneficial instead of a "dual-headed" urban planning organization consisting of both the Ministry of Public Works' Urban

Planning Technical Committee and the Ministry of Interior's Iller Bankası [38]. This debate would eventually lead to the establishment of the Ministry of Urban Development and Settlement in 1958, in which Mithat Yenen also participated in the drafting of the establishment law and organization [40].

Another important topic discussed at the congress was the need for new legislation regarding urban planning. Mithat Yenen was involved in preparing reports on implementation principles and legislation related to urban planning. The working group included Mithat Yenen, Arif Hikmet Holtay, Asım Kömürcüoğlu, Celal Esat Arseven, Kemal Ahmet Aru, Gustav Oelsner, Orhan Alsaç, Henry Prost, Sedat Hakkı Eldem, and Seyfi Arkan [38]. One of the notable aspects highlighted in the response written by Mithat Yenen and Cevat Erbel in the urban legislation study was that in the newly completed draft of the Building and Roads Law, some of regulations remained similar with the existing Municipal Building Roads Law No. 2290. It was emphasized that these regulations needed to be re-examined and regulated according to the inadequacies and deficiencies of the existing law to respond the needs of the time [38]. The decisions and opinions presented in both sections of the congress formed the basis of the Urban Planning Law (İmar Kanunu) [41], which will going to establish in 1956.

In summary, it is obvious that as a result of this congress, public architects themselves systematically identified problems and worked together to find solutions, and they also became the architects of legal regulations that would directly influence the production of the built environment.

### 2.2.2 The establishment of the Ministry Urban Development and Settlement (1956-1958)

After the First Building Congress in 1948, public architects achieved two important turning points in the institutionalization and regulation process of urban planning: the new Urban Planning Law of 1956 and in the constitution of the Ministry of Urban Development and Settlement in 1958 [41]. Mithat Yenen himself becomes a significant figure in both the implementation of the urban planning law and the establishment of the ministry's organizational structure [40, 42].

According to Geray, this new law was more realistic than the previous one [43]. For instance, the previous law requested municipalities to complete the urban plans in five years but, most of municipalities in Anatolia couldn't achieve to complete even existed situation maps of the city. Therefore, new law regulated this part accordingly the scale of the institutions. Moreover, municipalities were expected to plan not only inside the city borders but also the adjacent areas [43]. According to Tekeli, this was a pioneer step to understanding of regional planning which will rise in 1960's [12]. However, the new law didn't contain regulations about the implementation of these new rules in urban planning or how to treat historical buildings/areas. Instead, the law mentions that new directives will be prepared about these additional subjects by the Ministry of Public Works [41].

Following the new Urban Planning Law, the Ministry of Urban Development and Settlement was established on May 9, 1958, with Law No.7116 [44]. Thanks to the newly constituted ministry, the institutions previously responsible for urban planning under the Ministry of Public Works have entered a more systematic and hierarchical organization as a result of the institutionalization process of urban planning which started to centralize since 1933. Furthermore, departments were no longer divided between construction and urban planning; instead, it could be seen diversification based on areas of expertise in departments such as urban planning, housing, construction material, land and the resettlement works. This organizational structure forms the basis of the current organizational chart of the Ministry of Environment, Urbanization and Climate Change (Çevre, Şehircilik ve İklim Değişikliği Bakanlığı) (Figure 7). Mithat Yenen worked as the Director of Planning and Urban Development Department (Planlama ve İmar Müdürlüğü) in this institution from 1958 to 1960 [18, 46] and led the process for implementing the new urban planning law [47]. In 1960-1966, he became the undersecretary of the Ministry of Urban Development and Settlement [48].

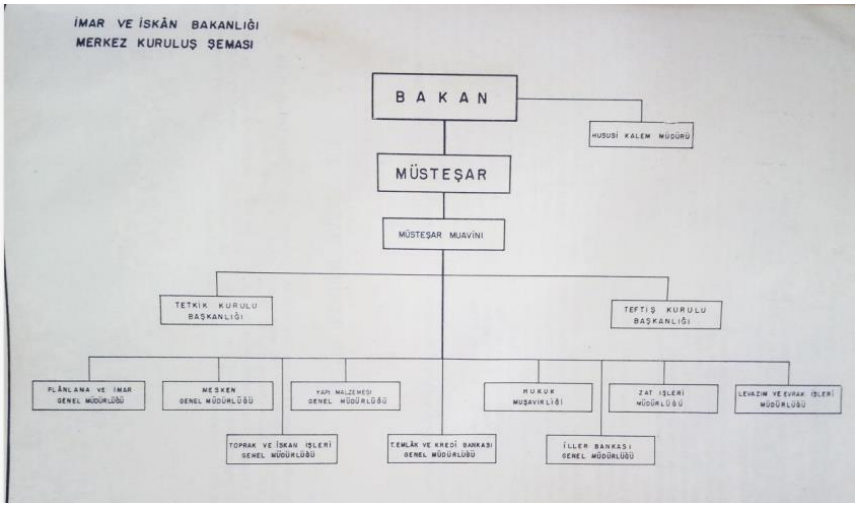


***Figure 8.*** *Organizational structure of the Ministry of Urban Development and Settlement in 1961 [45].*

## 3. EVALUATION AND CONCLUSION

During the Republican Era, starting with Kemalettin, the public architect figure emerged who was involved not only in the design and production aspects of architecture but also in its technical, theoretical, and later bureaucratic dimensions. In the 1920s, the public architect figure represented by Kemalettin contributed to various areas of architecture while working for a government institution, implementing the rules set by the state, and working on the government's architectural demands as an officer. However, Kemalettin's multidisciplinary approach, which combined technique and theory, and his contribution to the production of architectural knowledge, brought him closer to not only being an architect of the government but also the definition of modern public architect. In the 1930's, the involvement of foreign architects in public institutions for the building of a modern nation with a modern appearance of cities has marked a turning point in the character of public architecture. These foreign architects were technical advisors of government's institutions and reshaped the educational system. Therefore, they contributed to build a modern architectural sense. They affected not only the understanding of urban planning and construction knowledge but also gave a direction to educational and professional background of public architects of 1940's and 1950's including Mithat Yenen.

Mithat Yenen influenced both the understanding of urban planning and the institutionalization process of urban planning. In 1940's, his understanding of urban planning which was based on preserving the existing urban fabric and relationship with nature was parallel to the period's because of the similarity between his professional education and the influence of German-speaking architects and urban planners. However, in the 1950's, this "romantic" understanding evolved into taking more rational inputs into consideration such as accessibility, economic and social conditions, traffic network etc. It is possible to see this change in both understanding of Mithat Yenen and general in the country. For instance, in the jury reports of the urban planning competitions which organized by Iller Bankası, the projects which suggested more feasible, compatible with the urban fabric, expanding transportation opportunities, creating a comprehensive road network, and determining the development areas and functions of the city according to its character, were chosen to be implemented. This syncronical change of understanding effected by the transformation of the government, economical politics. This transformation also changed the main focus of the understanding of urban planning from locality to economic and rational solutions.

Mithat Yenen, who began his career as an architect and urban planner, worked in the technical affairs of planning and contributed significantly as an organizing and decision-making public architect throughout various stages of institutionalization. He was closer to the bureaucratical side of the urban planning rather than implementing. He was aware of the importance of properly structured institutions in the urban planning process when he was working for Iller Bankası and institutionalization contributed to the process by 1949. The First Turkish Building Congress had also a significant role in the institutionalization process of urban planning. It provided an official media for architects of the period to discuss problems of

current architectural and planning practices. Mithat Yenen contributed preparing reports on implementation principles and legislation related to urban planning. This work prepared for a more centralized and systematically structured urban planning institution and planning practice in the 1950's.

Mithat Yenen was not the only figure who had contributions in the process of institutionalization in urban planning. In those years, there were several institutions which responsible for construction and urban planning. Each institution was responsible for working to the Ministry of Public Works, but they were not within the same organizational structure. As seen, almost each institution has architects from German-speaking countries serving as chief advisors. Figures such as Mithat Yenen, Orhan Alsaç, and Sabri Oran were positioned between the technical personnel and chief advisors responsible for executing tasks in these institutions. Their proficiency in language as well as their expertise in architecture further strengthens their role. Moreover, those figures kept working as a bridge between the bureaucratic and technical aspects of urban planning and effected directly the production of the built environment in following years not only with the urban planning production but also with the contributions to the professional education and determining urban planning principles in the country. Moreover, within the new regulations of urban planning, there was a disconnection between the decisions taken by the administration and the municipalities responsible for implementation. Therefore, these figures worked as a "bridge" between the administration and implementers, made it possible for technical personnel of the time to find explanatory articles on urban planning and implementation principles in the periodicals they followed.

This study contributed to the literature by attempting to explain the content of public architecture from 1920's to 1960, a relatively unexplored area in architectural history, through Mithat Yenen who was one of significant figures in urban planning. He was more influential in the institutionalization process which contains the new legal regulations and systematic organizations rather than implementing. He was mostly positioned as the manager of the planning process and determining necessities. Besides, he effected this process by his knowledge which based on his modern architectural education and his contemporary urban planning principles. In conclusion, the legal regulations and organizations implemented during the institutionalization process of planning and architecture were the work of a group of public architects who were both close to bureaucracy and possessed professional knowledge and perspective. They also took role in educating new generation of architects and bringing bring urban planning into modern standards. Their efforts, ideas, and experience have directly influenced the formation of the production of buildings environment and planning. Mithat Yenen was also one of the architects belonging to this group.

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# Decoding Walking Speed for Sustainable and Livable Cities: A Thematic Review

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**Abstract**

Walking speed, a fundamental yet often overlooked aspect of pedestrian behavior, is a critical factor in shaping the design and functionality of sustainable and livable cities. This thematic review analyzes the multifaceted determinants of walking speed, drawing upon research from transportation planning, urban design, public health, and biomechanics. We explore how individual attributes, such as age, gender, and fitness level, interact with environmental conditions, including terrain, weather, crowd density, and the quality of pedestrian infrastructure, to influence walking speeds. We also delve into the role of psychological factors, such as motivation, stress, attention, and cultural dimensions, recognizing that social norms and clothing choices can impact pedestrian movement. By decoding these complex interactions, this review aims to highlight the significance of walking speed in creating truly walkable urban environments. We argue that incorporating an understanding of walking speed into data-driven urban design interventions can lead to a multitude of benefits, including reduced car dependence, increased active transportation, and enhanced pedestrian safety, ultimately contributing to more sustainable, equitable, and livable cities.

## 1. INTRODUCTION

Walking, a fundamental mode of human movement, is more than just a means of transportation; it is integral to the vitality, health, and sustainability of urban environments [1]. The principle of sustainable urban design seeks to create built environments that meet present needs without compromising the ability of future generations to meet theirs [2]. This requires the careful integration of social, economic, and environmental considerations in the design and planning of cities, with a strong emphasis on reducing car dependence, promoting public health, and enhancing quality of life.

Walkability, a cornerstone of sustainable urban design, defines the ease, comfort, and safety with which people can walk within a given area [3]. Achieving high levels of walkability involves addressing a complex network of factors: a diverse mix of land uses, pedestrian-friendly infrastructure that prioritizes human scale, well-connected street networks, and a vibrant street life that fosters social interaction. However, a crucial element often overlooked in walkability discussions is walking speed.

Walking speed is not merely a measure of individual pace. It reflects a dynamic interplay between the physical attributes of the built environment, individual characteristics, social norms, and psychological influences [4]. By understanding the factors that affect walking speed, we gain a deeper understanding of how individuals experience their urban surroundings.

Optimizing walking speed contributes significantly to sustainable urban design due to its impact on:

- **Reduced Car Reliance and Lower Carbon Emissions:** Walkable environments designed to facilitate faster, and more comfortable walking speeds can encourage a shift from driving to walking, particularly for short trips. This directly reduces car dependence and greenhouse gas

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emissions. Studies [5] show a correlation between improved pedestrian infrastructure, increased walking speeds, and subsequent reductions in vehicle miles traveled and carbon emissions.

- **Active Transportation and Public Health:** Walking, as a readily accessible form of physical activity, plays a vital role in improving public health. Creating urban environments that support faster and more enjoyable walking experiences can catalyze active transportation, combating increasingly sedentary lifestyles. Research [6] links increased walking speeds to higher levels of physical activity, contributing to improved cardiovascular health and lower obesity rates.
- **Efficient and Livable Urban Spaces:** By understanding and optimizing walking speed, urban planners can create more efficient and livable urban spaces [7]. For example, crosswalk timing based on average pedestrian speeds can significantly reduce wait times, improving both pedestrian and traffic flow efficiency.

This paper explores the multifaceted determinants of walking speed and their implications for sustainable urban design through the following research question: **How can understanding walking speed contribute to urban design practices to improve pedestrian mobility and create more walkable urban environments?**

This thematic review will address this question by examining:

1. **The Multi-faceted Determinants of Walking Speed:** We will analyze the individual, environmental, psychological, and cultural factors influencing walking speed, drawing upon diverse research in transportation planning, urban design, public health, and biomechanics.
2. **Walking Speed and Sustainable Urban Design:** We will explore the relationship between walking speed and the core principles of walkability and pedestrian-oriented design strategies.
3. **Sustainable Design Solutions for Optimizing Walking Speed:** We will examine specific urban design solutions that can be employed to optimize walking speed and create more pedestrian-friendly environments, including physical infrastructure improvements and integrating smart city technologies.

By decoding the complexities of walking speed, this review aims to provide valuable insights for urban designers, planners, and engineers, ultimately contributing to the creation of more sustainable, efficient, and livable urban environments.

## 2. RESEARCH PROCESS AND METHODOLOGY

This research utilizes a scoping review methodology, a valuable approach for investigating the range of literature related to walking speed. This method allows for a thorough examination of existing studies, offering a broad view of key themes and patterns within the body of work [8]. Articles were selected and analyzed based on predefined inclusion criteria, with the results organized into distinct thematic categories (Table 1). The goal of this section is to systematically present the scope of research on walking speed, identifying the main themes and sub-themes found in the literature.

***Table 1.*** *Search Strings Used Across Databases.*

| Database | Search String |
|---|---|
| *Web of Science* | (“walk*” AND speed*) OR (“walk*” AND pace*) OR gait AND analys*) |
| *ScienceDirect* | walking AND (speed OR analysis OR pace) OR gait analysis |

In conducting this scoping review, we followed the guidelines from the Preferred Reporting Items for Systematic Reviews and Meta-Analyses Extension for Scoping Reviews (PRISMA-ScR) framework. PRISMA-ScR is a widely recognized methodology, commonly applied in fields such as disaster preparedness and response studies [9]. The process is structured into three main stages: Identification, Screening, and Eligibility Evaluation (Table 2).

***Table 2.*** *Inclusion and Exclusion Criteria Applied During Screening and Eligibility Assessment.*

| Screening | | |
|---|---|---|
| | **Inclusion Criteria** | **Go to the Next Step** |
| *1-Title Screening* | The title included all these keywords: (walking speed, walking pace, gait analysis) | The title included one of these keywords: (walking speed, walking pace, gait analysis) |
| *2-Keyword Screening* | (walking speed, walking pace, gait analysis) were found in the article's keywords. | The keywords included one of these keywords: (walking speed, walking pace, gait analysis) |
| *3-Abstract Screening* | The problem statement clearly delved into walking speed. | The problem statement delved into walking speed |
| Eligibility Assessment | | |
| | **Inclusion Criteria** | **Exclusion Criteria** |
| *Introduction, methodology, and conclusion review* | Studies discuss, measure, analyze walking speed, measurement techniques, technologies, and models. | Solely focus on medical aspects, surgical techniques, disease specific concerns. |

## 3. DECODING THE DETERMINANTS OF WALKING SPEED: A MULTIDISCIPLINARY PERSPECTIVE

Walking speed is not a static value; it's a dynamic variable shaped by a complex interplay of factors, each contributing to the unique pace at which individuals navigate their urban environments. To effectively design for walkability and create truly pedestrian-friendly cities, we must unravel these multifaceted determinants. This requires drawing upon knowledge from diverse disciplines, including transportation planning, urban design, public health, and biomechanics, to understand how the human body, the urban landscape, and the human mind interact to shape the pedestrian experience.

### 3.1. Individual Attributes: The Human Factor

Individual attributes play a fundamental role in determining walking speed. Age, in particular, has a significant impact. As we age, physiological changes such as decreased muscle strength, reduced flexibility, and alterations in gait patterns contribute to a natural decline in walking speed [10]. Studies have shown that average walking speed decreases significantly with age, with individuals over 65 exhibiting speeds up to 20% slower than younger adults [11]. This age-related variation underscores the need to design urban environments that are sensitive to the needs of older pedestrians. Providing longer crossing times at intersections, incorporating ample resting areas along walkways, and ensuring well-maintained, even surfaces are just a few examples of how urban design can accommodate the varying speeds of older adults.

While gender is often considered a factor in walking speed, research suggests that any differences are often minimal and not necessarily deterministic. Some studies have observed slight variations, but these can often be attributed to factors like footwear choices, clothing styles, and cultural norms rather than inherent biological differences [12, 13]. Urban design should prioritize inclusivity, acknowledging that gender is not a reliable predictor of walking speed and focusing on creating environments that cater to the needs of all individuals.

An individual's level of physical fitness also influences their walking speed. Individuals who engage in regular physical activity and maintain a higher fitness level tend to exhibit faster walking speeds due to improved cardiovascular health, increased muscle endurance, and more efficient movement patterns [14]. This finding highlights the crucial link between walkability and public health. Cities that prioritize walkability and actively encourage walking as a mode of transportation are not only creating more sustainable environments but also contributing to the overall well-being of their residents.

Human perception plays a significant role in walking speed, as it is influenced by both the built environment (BE) and individual perceptions of safety, security, and attractiveness. According to Basu et al. [15], pedestrians' route choices are shaped by the characteristics of their surroundings and how these environments are perceived, particularly regarding the time of day. Pedestrians tend to favor routes that minimize walking time, feature lower posted speed limits, and offer comfortable walkway gradients. However, environmental factors such as poor lighting, the presence of vacant land, and perceptions of insecurity—especially at night—can cause pedestrians to slow down or avoid walking altogether. Female

pedestrians, in particular, tend to avoid poorly lit and uncomfortable routes at night. These findings suggest that perceptions of the environment significantly affect walking speed, as individuals adjust their pace based on their comfort, security, and the walkability of their route. This highlights the need for urban planning strategies that improve perceptions of safety and attractiveness to promote walking, particularly in suburban areas where lowering roadway speed limits and improving lighting can encourage more pedestrian activity.

Furthermore, our physical dimensions, specifically body size and composition, play a role in shaping our natural stride length and walking speed. Individuals with longer legs typically have a longer stride, allowing them to cover more ground with each step, which can lead to faster walking speeds [16]. Conversely, body weight can influence walking speed, as individuals with a higher body mass index may experience slower speeds due to the increased energy expenditure required to move their bodies [14]. Recognizing this variability in body size and composition is essential for inclusive urban design. Pedestrian infrastructure should be designed to accommodate a range of body sizes and ensure comfortable movement for all.

### 3.2. Environmental Conditions: Navigating the Urban Landscape

Beyond individual attributes, the physical environment presents a dynamic landscape that pedestrians must navigate, and this landscape directly impacts walking speed.

#### *Terrain: Hills, Stairs, and Uneven Ground*

Terrain, in particular, plays a significant role. Walking uphill demands more energy expenditure to overcome the force of gravity, resulting in naturally slower paces [17–19]. On the other hand, walking downhill can increase speed but requires greater control and balance to prevent falls. Stairs introduce a vertical challenge, necessitating adjustments in gait patterns and leading to varying speeds based on stair height and individual physical capabilities [20, 21]. Urban design should carefully address the influence of terrain on pedestrian movement. This might involve providing alternative routes with gentler slopes for those with mobility limitations, incorporating handrails on stairs for added support, or strategically designing pathways to minimize steep inclines.

#### *Weather Conditions: Rain, Snow, Heat, and Cold*

The whims of weather can also significantly influence walking speed. Adverse weather conditions, such as rain, snow, or extreme temperatures, introduce challenges to maintaining a consistent pace. Rain and snow reduce traction, making surfaces slippery and increasing the risk of falls, leading pedestrians to adopt a more cautious gait and slower speed [22]. Extreme heat or cold can impact physical comfort and lead to fatigue, further affecting walking speed and endurance [23]. Sustainable urban design should strive to create weather-resilient environments to mitigate the impact of these conditions on walking speed. This might involve incorporating covered walkways, designing shelters for protection from rain and snow, and considering heated pavements in colder climates to prevent ice buildup and improve pedestrian safety.

#### *Crowd Density: Navigating the Flow of People*

Moving through urban spaces often involves navigating crowds, and the density of people in a given area directly affects pedestrian flow and speed. Walking through crowded areas requires constant adjustments in path and pace to avoid collisions, resulting in slower overall movement, especially in confined spaces [24, 25]. As pedestrian density increases, personal space decreases, leading to more frequent changes in direction and speed, which ultimately slows down the entire flow of pedestrian traffic. Effective urban design strategies for managing crowd density and optimizing walking speed might include widening sidewalks in high-traffic areas, creating dedicated pedestrian plazas where foot traffic is prioritized, and implementing crowd management techniques during large events or peak hours.

### 3.3. Infrastructure Quality: The Foundation of a Walkable Environment

The quality of pedestrian infrastructure itself is a critical factor shaping walking speed.

#### *Sidewalk Width: Providing Ample Space to Move*

Adequate sidewalk width is essential for maintaining comfortable walking speeds. Narrow sidewalks can lead to congestion, forcing pedestrians to slow down or even step into the street to avoid collisions with other pedestrians or obstacles [26, 27].

#### *Pavement Quality: Ensuring Smooth and Safe Surfaces*

Similarly, the condition of the pavement surface has a direct impact on walking speed. Uneven or poorly maintained surfaces require pedestrians to exercise greater caution, leading to slower speeds, while smooth, well-maintained surfaces allow for faster and more comfortable walking [22]. Investing in high-quality pedestrian infrastructure with ample sidewalk widths and well-maintained surfaces is an essential step in promoting walkability and creating an environment where pedestrians can move comfortably and efficiently.

#### *Crossing Design: Optimizing Signals and Crosswalks*

Beyond the physical dimensions of infrastructure, the design of pedestrian crossings also plays a role. The timing of traffic signals, the length of crosswalks, and the presence of refuge islands can all influence walking speed and safety [28]. For instance, longer crossing times are particularly important for older adults and people with disabilities who have slower walking speeds, allowing them to cross safely without feeling rushed. A well-designed pedestrian crossing should be informed by an understanding of the average walking speeds of the local population, ensuring that signal timing and infrastructure design are tailored to accommodate their needs.

### 3.4. Factors: The Mind-Body Connection in Motion

While the physical environment sets the stage, psychological factors are equally important in influencing how people walk.

#### *Motivation and Purpose: The Power of a Destination*

Our mental state and the reasons behind our walk can significantly affect our pace. Individuals with a clear goal or purpose in mind, such as reaching a specific destination, completing an errand, or engaging in physical activity, tend to walk at faster speeds [29]. The presence of a defined objective, whether it's arriving at work on time or enjoying a pleasant park at the end of a walk, enhances focus and effort, resulting in a more determined and often faster pace.

#### *Stress and Emotional State: Impact on Gait and Pace*

Our emotional state also has a subtle but noticeable influence on our walking speed. When we are feeling stressed or anxious, our bodies react with muscle tension, reduced coordination, and a more hesitant gait, which translates to slower walking speeds [30]. On the other hand, when we are relaxed, content, or experiencing positive emotions, our movements tend to be more fluid and our walking speed often increases. This connection between our emotional state and our physical movement highlights the importance of creating urban environments that promote a sense of well-being. Designing urban spaces with stress-reducing elements such as green spaces, pleasant aesthetics, and minimal noise pollution can contribute to a more positive pedestrian experience and even encourage faster, more comfortable walking speeds.

***Attention and Distraction: The Perils of Divided Focus***

Furthermore, our ability to focus directly impacts our walking speed and safety. Distractions, such as using a mobile phone, listening to music, or being engaged in conversation while walking, can significantly reduce our awareness of our surroundings and lead to slower, more erratic walking patterns [31, 32]. These distractions divide our attention, impairing our judgment, reaction time, and spatial awareness, increasing the risk of accidents and collisions. While completely eliminating distractions in an urban environment is unrealistic, sustainable urban design can help mitigate their negative impact. Creating safe, dedicated pedestrian zones with clear signage and minimizing potential distractions like loud noises or flashing lights can encourage pedestrians to stay focused on their movements and enhance their safety.

### 3.5. Cultural Dimensions: Society's Influence on Pace

Finally, cultural dimensions play a unique and often overlooked role in shaping walking speed.

***Social Norms: The Pace of Life***

Cultural norms and societal expectations regarding what are considered an appropriate pace for walking vary widely across different societies [33]. Research has shown that people in Western countries often walk at faster speeds than those in some Asian and Middle Eastern cultures. These differences may stem from deeply rooted cultural values related to time, efficiency, and the overall pace of life. Acknowledging and respecting these variations in cultural norms is essential for designing truly inclusive urban environments. Pedestrian infrastructure should be planned and designed with sensitivity to these diverse cultural perspectives, ensuring that it accommodates a range of comfortable walking speeds and does not inadvertently privilege one cultural norm over another.

***Clothing and Footwear: Impact on Movement***

Similarly, clothing and footwear choices can impact walking speed, particularly when traditional attire or restrictive footwear influence stride length, gait patterns, and overall comfort. For instance, studies have observed that the abaya worn by women in some Middle Eastern cultures can affect their walking speed, particularly when navigating stairs [34]. Embracing inclusivity in urban design requires recognizing that cultural attire may have implications for pedestrian movement and ensuring that infrastructure design accommodates these variations.

## 4. WALKING SPEED AND SUSTAINABLE URBAN DESIGN

Sustainable urban design aspires to create built environments that nurture a harmonious balance between ecological responsibility, social equity, and economic prosperity. A central tenet of this design philosophy is walkability, aiming to elevate walking as a safe, convenient, and enjoyable mode of transportation [3]. However, achieving genuine walkability requires a more comprehensive approach than simply providing sidewalks and pedestrian crossings. It necessitates the design of a holistic pedestrian experience that thoughtfully considers all aspects of walking, including the often-overlooked factor of walking speed.

### 4.1. The Concept of Walkability: Designing for the Pedestrian Experience

Walkability is a multifaceted concept, encompassing a rich tapestry of factors that contribute to a positive pedestrian experience. A well-connected street network, rich with frequent intersections and offering a diverse array of route options, is essential. This empowers pedestrians to navigate their surroundings with ease and reach their destinations efficiently [4]. Consider a city where a network of walking paths forms an intricate web, providing pedestrians with the flexibility to choose the most efficient and enjoyable route based on their individual needs and preferences, whether it's a direct path for a brisk commute or a meandering route through a verdant park for leisurely exploration.

A vibrant mix of land uses, seamlessly integrating residential, commercial, and recreational spaces within comfortable walking distance, is another key ingredient of a walkable city. This reduces the need for car travel while creating a dynamic urban fabric that supports a diverse range of pedestrian activities. Envision a neighborhood where residents can effortlessly walk to the grocery store, meet friends for coffee, enjoy a leisurely stroll through a park with their children, all within a pleasant 15-minute radius, experiencing the richness of urban life along the way.

High-quality pedestrian infrastructure is equally paramount. This includes wide sidewalks, meticulously maintained pavement surfaces that are smooth and obstacle-free, safe crossings designed with clear sightlines to enhance visibility for both pedestrians and drivers, and well-designed lighting that provides a sense of security and comfort during evening hours.

Furthermore, thoughtful streetscape design plays a vital role in shaping a positive pedestrian experience. Attractive streetscapes adorned with trees offering shade, inviting benches for rest and contemplation, vibrant landscaping, and active building frontages create a pleasant and engaging atmosphere that beckons people to explore on foot and linger in public spaces.

Above all, a true sense of walkability hinges on safety and security. Pedestrians must feel secure from both traffic and crime to confidently navigate the city without fear or hesitation [35, 36]. This requires streets designed with traffic calming measures, such as reduced speed limits, narrowed lanes, and raised crosswalks, to prioritize pedestrian safety and create a more relaxed environment. Crossings should be clearly marked, well-lit, and equipped with countdown timers to provide clear information and minimize pedestrian anxiety. A bustling street with a diverse mix of pedestrians, cyclists, and transit users creates a natural sense of surveillance, deterring crime and fostering a sense of collective ownership of public spaces.

Walking speed, often an implicit consideration, is intricately woven into all these elements of walkability. A well-designed environment that facilitates faster, more comfortable walking speeds naturally encourages pedestrian activity, making walking a more appealing and efficient choice for short trips. This, in turn, contributes to reduced car dependence, less traffic congestion, lower emissions, and ultimately, a more sustainable and livable city for all.

### 4.2. Integrating Walking Speed into Sustainable Urban Design: A Data-Driven Approach

Creating truly pedestrian-friendly and sustainable cities requires going beyond simply acknowledging the importance of walkability. It necessitates the active integration of walking speed considerations into every stage of the urban design process. This is where a data-driven approach becomes paramount. By meticulously collecting and analyzing real-world data on actual walking speeds, urban designers can gain a nuanced understanding of how people move through the city and identify areas for improvement.

#### *Data as a Tool for Understanding Pedestrian Needs*

Data collection forms the foundation of a data-driven approach to sustainable urban design. By tracking walking speeds in different neighborhoods and across diverse demographics, we can glean valuable insights into the effectiveness of existing infrastructure and identify areas where interventions are needed. Are sidewalks wide enough to accommodate peak pedestrian flows? Are traffic signals timed appropriately for all user groups, including older adults and people with disabilities? Are pedestrian crossings designed to maximize safety and minimize wait times? This data can reveal patterns related to age, physical ability, and cultural norms, ensuring that urban design solutions are tailored to the specific needs of the local community.

#### *Transforming Traffic Planning Through Data-Driven Insights*

Traditional traffic planning, often reliant on outdated or generalized assumptions about walking speed, can lead to inadequate crossing times, particularly for individuals with slower paces [28]. For example, an

older adult attempting to cross a busy intersection with a short green light phase might be forced to rush, increasing their risk of falling or being struck by a vehicle. This scenario not only compromises pedestrian safety but also discourages people from choosing walking as a mode of transportation. By embracing data-driven traffic planning, we can transition from reactive solutions to proactive strategies that anticipate and address the needs of all pedestrians, regardless of their walking speed.
Collecting data on actual walking speeds allows traffic engineers to optimize traffic signal timing, ensuring that the green light phase at crosswalks provides ample time for even the slowest pedestrians to cross comfortably and safely. This data can also inform the design of pedestrian infrastructure, ensuring sidewalks are wide enough to prevent congestion and that crossing distances are manageable. Features like curb ramps and pedestrian refuge islands can be strategically implemented to enhance accessibility and provide safe havens for those who need additional time to cross. Areas with a higher concentration of older adults or individuals with disabilities, who often have slower walking speeds, may require wider sidewalks, longer crossing times, and more frequent resting areas along walkways.

Understanding how environmental factors influence walking speed is also crucial. The presence of hills, stairs, road width, and traffic volume can all affect pedestrian movement, and incorporating this understanding into traffic planning strategies can help create safer, more comfortable, and more efficient walking environments. In areas with high pedestrian activity, reducing speed limits, installing speed bumps, or narrowing traffic lanes can help prioritize pedestrian safety and encourage a shift towards slower, more human-centered traffic flows.

***Pedestrian-Oriented Urban Design: Putting People First***

Pedestrian-oriented urban design takes a human-centered approach, placing the needs and experiences of pedestrians at the forefront of planning and design decisions. This means creating urban spaces where walking is not merely an option but a truly enjoyable, efficient, and engaging experience. Understanding walking speed plays a key role in this vision, as it allows designers to create spaces that resonate with the natural rhythms of human movement.

Creating dedicated pedestrian zones and plazas, free from motorized traffic, offers a powerful strategy for enhancing walkability. These car-free spaces provide a sanctuary from the stress and danger of traffic, allowing people to walk at their own pace, engage in social interactions, and enjoy their surroundings without feeling rushed or unsafe. To illustrate, a bustling pedestrian plaza filled with outdoor cafes, street performers, public art installations, and comfortable seating, where people can gather, relax, and experience the city at a human scale, free from the noise and pollution of cars.

Designing mixed-use neighborhoods, where residential, commercial, and recreational spaces are strategically interwoven within walking distance, further reinforces walkability. When daily needs like grocery shopping, dining, healthcare services, and recreational activities can be easily met on foot, walking becomes a more convenient and appealing choice for everyone, regardless of their walking speed. This fosters a sense of community, reduces car dependence, and supports local businesses.

A well-connected street network, featuring frequent intersections and diverse route options, provides greater flexibility for pedestrians, allowing them to choose the most efficient and comfortable path to their destination. This reduces the need for long, monotonous routes, making walking a more pleasant and engaging experience. By understanding the impact of street connectivity on walking speed and pedestrian behavior, urban designers can create networks that intuitively guide people through the city, fostering a more seamless and enjoyable walking experience.

***Sustainable Urban Design: Building for the Pedestrian***

Integrating walking speed considerations into every facet of urban design is a cornerstone of creating truly sustainable cities. By understanding how people move and experience the built environment, we can design urban spaces that prioritize human well-being, reduce our reliance on cars, and promote a more harmonious relationship between people and their city.

## 5. BENEFITS OF WALKABLE CITIES: A SUSTAINABLE FUTURE ON FOOT

The pursuit of walkable cities represents a strategic and vital investment in a more sustainable, equitable, and prosperous future. Walkable cities offer a multitude of advantages that extend beyond transportation, positively impacting the environment, the social fabric of communities, and the economic vitality of urban areas. By designing cities that prioritize people rather than cars, we can unlock a cascade of positive transformations that reverberate throughout urban life.

### 5.1. Environmental Benefits: A Lighter Footprint on the Planet

Walkable cities are inherently more environmentally responsible. By encouraging and facilitating walking as a primary mode of transportation, we can dramatically reduce our reliance on cars, leading to a series of positive environmental outcomes. One of the most significant of these is the reduction of carbon emissions. Cars, heavily reliant on fossil fuels, are a major contributor to greenhouse gas emissions. Even a modest shift toward walking, however, can generate a substantial reduction in a city's overall carbon footprint.

Research suggests that if just 10% of car trips under one mile were replaced with walking trips, we could witness a measurable decrease in carbon emissions [5]. This reduction contributes to a cleaner atmosphere, a healthier planet, and a brighter future for generations to come. Beyond mitigating climate change, walkability also leads to tangible improvements in air quality. Decreased car traffic translates to lower concentrations of harmful air pollutants, such as nitrogen oxides, particulate matter, and ozone. These pollutants are known to trigger a range of respiratory and cardiovascular health problems, particularly for vulnerable populations like children, the elderly, and those with pre-existing conditions. In a city designed for walking, the air is noticeably cleaner, residents can enjoy outdoor activities without the fear of pollution-related health issues, and the overall burden of respiratory illnesses is reduced.

Walkable cities offer the additional benefit of reduced noise pollution. By diminishing the constant din of car engines, we can cultivate a more tranquil and serene urban environment. This sonic shift not only improves mental well-being and reduces stress but also makes walking a more pleasant and enjoyable experience.

### 5.2. Social Benefits: Fostering Healthy and Connected Communities

The positive impacts of walkable cities extend far beyond environmental sustainability, profoundly influencing the social fabric of our communities. Promoting walking not only fosters healthier lifestyles but also strengthens community bonds and enhances the overall quality of life. Walking, being both readily accessible and inherently enjoyable, can be seamlessly woven into daily life. By designing cities that prioritize and encourage walking, we can effectively combat the pervasive trend of sedentary lifestyles and contribute to a healthier, more active population.

Cities that prioritize walkability can see a rise in active transportation, where children walk or bike to school, adults incorporate walking into their commutes or errands, and public spaces become vibrant hubs of physical activity. This shift towards active living has the potential to lead to lower rates of obesity, diabetes, heart disease, and a multitude of other chronic illnesses, fostering a healthier, more energetic, and more resilient population.

Walkable cities also serve as catalysts for social connection. When people walk more, they naturally encounter their neighbors more frequently, creating opportunities for spontaneous conversations, friendly greetings, and a stronger sense of shared community. Sidewalks transform into social spaces, parks and plazas become hubs of activity and connection, and local businesses thrive as residents stroll through their neighborhoods, fostering a sense of belonging and shared ownership. This increased social interaction cultivates a greater sense of community, strengthens neighborhood networks, increases social capital, and encourages a collective responsibility for the well-being of the urban environment.

### 5.3. Economic Benefits: Investing in a Walkable Future

Walkable cities are not only healthier and more socially connected; they are also demonstrably more economically vibrant. Investing in walkability is a direct investment in a more prosperous and resilient future for urban areas. One of the most evident economic benefits is the increase in property values frequently observed in walkable neighborhoods. People are often willing to pay a premium for the convenience, livability, and lifestyle advantages associated with walkable environments, driving up demand and subsequently, property values. This, in turn, translates to increased tax revenues for cities, empowering them to reinvest in further improvements and create a positive cycle of urban development.
Beyond boosting property values, promoting walkability can also lead to substantial reductions in transportation costs for residents. When individuals and families rely less on cars, they save money on fuel, car maintenance, parking fees, and insurance. These savings can be significant, especially for those who live in urban areas where car ownership can be a considerable financial burden. In a city designed for walking, some households may even be able to transition to a car-free lifestyle altogether, eliminating the financial strain of car ownership and redirecting those resources to other essential needs or desired leisure activities.

Walkable cities also create a fertile environment for local businesses to flourish. Pedestrian-friendly streetscapes, characterized by their inviting storefronts and bustling sidewalks, naturally draw in foot traffic. This makes it easier for people to discover and patronize local shops, restaurants, and services as they walk through their neighborhoods. These thriving local businesses, in turn, contribute to a stronger and more diverse local economy, creating jobs, fostering entrepreneurship, and adding to the unique character and charm that make a city truly special.

In conclusion, investing in walkable cities is an investment in a healthier, more sustainable, and more equitable future. It's not just about building better sidewalks and public spaces; it's about creating a fundamental shift in how we design and experience our urban environments. By prioritizing the needs of pedestrians, we can unlock a cascade of positive impacts that extend far beyond transportation, creating cities that are more livable, enjoyable, and prosperous for everyone.

## 6. THE ROLE OF SUSTAINABLE URBAN DESIGN: SHAPING THE PEDESTRIAN REALM

Sustainable urban design goes beyond mere acknowledgment of walkability; it proactively weaves pedestrian-centric principles into the fabric of the built environment. By understanding the intricate web of factors influencing walking speed and pedestrian behavior, urban designers can employ a diverse range of strategies to create cities that are not only more walkable but also more sustainable, livable, and equitable for all. This requires a fundamental shift in perspective, viewing streets not as mere conduits for motorized traffic, but as vibrant public spaces that prioritize human movement, social interaction, and a harmonious connection with nature [1].

### 6.1. Transforming Streets into Walkable Spaces

The transformation of streets from car-dominated thoroughfares into inviting, pedestrian-friendly spaces is at the heart of this paradigm shift. Recognizing streets as vital public realms that contribute to the social, environmental, and economic well-being of a city is key.

#### *Rethinking Streetscapes: Inviting Exploration and Interaction*

Streetscape design plays a critical role in shaping the pedestrian experience. Streets that are visually appealing, comfortable, and stimulating naturally encourage walking, inviting exploration, and fostering a sense of delight in the urban environment. A street lined with trees offering shade during hot summer months, with benches inviting people to pause and enjoy their surroundings, fosters a sense of calm and respite. Colorful storefronts with inviting window displays add visual interest to the streetscape, encouraging exploration of local businesses. Street murals and public art installations transform mundane walks into engaging journeys of discovery, adding pops of color and sparking conversations, reflection,

and a sense of wonder in the everyday urban experience. By appealing to the human senses and fostering a spirit of curiosity and interaction, sustainable urban design can transform walking from a mere necessity into a source of joy and connection [37].

***Prioritizing Pedestrian Safety: A Sense of Security and Ease***

Safety is paramount in walkable environments. Pedestrians must feel secure from traffic and crime to comfortably navigate the city on foot, confident in their ability to move freely without fear or anxiety. A holistic approach to street design considers both physical and social dimensions of safety.

Neighborhoods where streets prioritize pedestrians with traffic calming measures like speed bumps, narrowed lanes, raised crosswalks, and curb extensions can cultivate a sense of safety and encourage a more natural flow of pedestrian movement. Well-marked and brightly lit crosswalks with countdown timers provide clear and predictable information, reducing pedestrian uncertainty and the need to rush across the street [38]. A bustling street with a diverse mix of pedestrians, cyclists, and transit users creates a sense of collective presence and natural surveillance, deterring crime and fostering a sense of shared ownership and responsibility for public spaces [39]. Prioritizing safety in every aspect of street design transforms walking from a potential risk into a genuinely enjoyable and stress-free experience.

### 6.2. Designing for Human Scale: A City for People

Sustainable urban design embraces the concept of human scale, shifting away from car-centric planning towards creating spaces that are comfortable, accessible, and inviting for people walking. This involves considering the natural rhythm of human movement, the diverse needs of pedestrians, and fostering a sense of connection between people and their environment.

Buildings that interact with the street, with active ground floors featuring shops, restaurants, and public spaces, blur the lines between indoor and outdoor life and create a vibrant street-level experience. A cityscape where building heights are carefully considered to maintain a human scale allows pedestrians to feel connected to their surroundings rather than dwarfed by imposing structures that can induce anonymity and detachment [40]. Streets punctuated with frequent crosswalks, comfortable benches for rest and observation, and public art installations that spark conversation and add beauty to the everyday urban fabric make the city more intimate, engaging, and conducive to walking.

### 6.3. Sustainable Materials and Technologies: Building a Walkable Future

The choices we make regarding materials and technologies have a profound impact on the walkability and sustainability of our cities. Sustainable urban design embraces innovative solutions that enhance the pedestrian experience, minimize environmental impact, and contribute to a more resilient urban fabric.

***Permeable Pavements: Alleviating Flooding and Cooling City Streets***

Traditional impervious pavements contribute to urban flooding, exacerbate the urban heat island effect, and create harsh, uninviting walking environments. Permeable pavements offer a sustainable alternative by allowing rainwater to infiltrate the ground, reducing runoff and mitigating flood risk. They also help to reduce surface temperatures, creating a more comfortable walking environment, especially during warmer months [41].

***Green Infrastructure: Weaving Nature into the Urban Fabric***

Integrating green infrastructure elements, such as green roofs, bioswales, and rain gardens, into pedestrian areas enhances aesthetics and provides a multitude of environmental and social benefits. Green roofs insulate buildings, reduce energy consumption, and mitigate the urban heat island effect, creating a more comfortable microclimate for pedestrians [42]. Bioswales and rain gardens serve as natural filters for stormwater runoff, reducing pollution, improving water quality, and adding pockets of natural beauty to

the urban landscape. Walking paths shaded by lush greenery, green roofs transforming rooftops into vibrant gardens, and bioswales meandering through urban spaces contribute to a city where nature and built environment coexist harmoniously.

***Smart City Technologies: Optimizing Pedestrian Flow and Safety***

Smart city technologies present exciting opportunities to optimize pedestrian flow, enhance safety, and create a more responsive urban environment. Strategically placed pedestrian sensors can provide real-time data on pedestrian volumes and walking speeds, allowing for dynamic traffic signal adjustments, personalized pedestrian information through mobile apps or digital signage, and proactive identification of infrastructure maintenance needs. Adaptive traffic signals, responding to pedestrian presence, can minimize wait times at intersections, making walking a more efficient choice.

By integrating walking speed considerations into every facet of urban design and harnessing the power of sustainable materials and technologies, we can prioritize people over cars, creating more walkable, sustainable, livable, and equitable cities that enhance the quality of life for all residents.

## 7. DISCUSSION

This thematic review has illuminated the multifaceted nature of walking speed and its profound implications for creating sustainable, walkable, and livable urban environments. We've traversed a rich landscape of research, uncovering how walking speed is not merely a measure of individual pace but a dynamic variable shaped by a complex interplay of individual attributes, environmental conditions, psychological factors, and cultural dimensions. From the physiological changes that accompany aging to the subtle influence of weather and the nuanced impact of social norms, understanding the determinants of walking speed is essential for creating cities that truly prioritize the pedestrian experience.

Our exploration of the literature has revealed that walking speed is a tangible reflection of the intricate relationship between the human body and the built environment. Factors such as age, fitness level, and body size influence our inherent capacity for movement [10, 14]. The terrain we encounter, the weather conditions we face, and the density of crowds we navigate all contribute to shaping our pace [22, 23, 25]. Our mental and emotional state, our motivation for walking, and our level of attention can subtly yet significantly affect how we move through the city [29, 30]. Cultural norms and even clothing choices add further layers of complexity, demonstrating that walking speed is not a universal constant, but a variable intricately intertwined with the fabric of our societies [33, 34].

This knowledge empowers us to move beyond generic assumptions about pedestrian behavior and adopt a more nuanced, data-driven approach to urban design. By meticulously collecting and analyzing data on actual walking speeds across diverse demographics, terrains, and urban contexts, we can tailor infrastructure, streetscapes, and traffic management strategies to more effectively meet the needs of local communities. This data-driven approach might involve adjusting traffic signal timing to accommodate the slower walking speeds often associated with older adults, designing wider sidewalks in areas with high pedestrian density to alleviate congestion, or incorporating covered walkways to provide shelter from inclement weather, encouraging pedestrian activity regardless of rain or shine.

This review has underscored the critical role of sustainable urban design in creating genuinely walkable cities, demonstrating that walkability is not just about providing infrastructure; it's about crafting a holistic pedestrian experience. By prioritizing pedestrian-oriented design principles, we can create urban spaces that are not only functional but also inviting, comfortable, and safe for people on foot.

Reimagining streetscapes, as discussed earlier, plays a vital role. Incorporating elements like trees, benches, and public art can transform mundane walkways into vibrant public spaces, enhancing the aesthetic appeal and social vibrancy of walking environments [37]. Designing for human scale is equally crucial, creating a sense of intimacy and connection between people and their surroundings [40]. This

might involve limiting the height of buildings to maintain a pedestrian-friendly scale, designing streets with a rhythm of pauses and destinations, and prioritizing pedestrians' needs over cars' dominance.

Moreover, the strategic integration of green infrastructure, such as permeable pavements, green roofs, and bioswales, can enhance the aesthetics and comfort of walking environments and contribute to a more sustainable and resilient urban ecosystem [42]. These green elements provide visual appeal and practical benefits, such as reducing stormwater runoff, mitigating the urban heat island effect, and improving air quality, making walking a more pleasant and healthy experience.

Furthermore, the rapidly evolving field of smart city technologies presents exciting opportunities for optimizing pedestrian flow and safety. Pedestrian sensors, adaptive traffic signals, and personalized pedestrian information systems can all contribute to creating a more responsive and adaptable urban environment, making walking a more efficient, safe, and enjoyable experience for all [43]. To illustrate, a city where crosswalks intuitively adjust their timing based on pedestrian presence, where real-time information about walking routes and crowd density is readily available through mobile apps, and where city officials can proactively address infrastructure maintenance needs based on data from pedestrian sensors.

The benefits of creating walkable cities are far-reaching and transformative, extending far beyond the realm of transportation. By encouraging walking as a primary mode of transportation, we contribute to a healthier planet, foster stronger and more connected communities, and stimulate economic vitality. Walkable cities have the potential to significantly reduce carbon emissions, improve air quality, and create quieter, more serene urban environments [5], contributing to a more sustainable future.

They also encourage physical activity, combating sedentary lifestyles and promoting a healthier population [44]. The social fabric of walkable neighborhoods is stronger, as increased pedestrian activity enhances social interaction, fosters a sense of community, and promotes a greater sense of belonging [39]. Furthermore, walkable cities often experience economic benefits through increased property values, reduced transportation costs for residents, and a thriving local business environment [45].

Looking ahead, the quest to fully understand walking speed and its implications for sustainable urban design is an ongoing journey. Future research can delve deeper into the complex interplay of factors influencing walking speed, exploring new dimensions and refining our existing knowledge. Longitudinal studies can track how walking speeds evolve over time within individuals and populations, providing valuable insights into the long-term effects of urban design interventions and demographic shifts. Further research can also explore the impact of specific urban design features, such as the presence of greenery, street furniture, or public art, on walking speed and pedestrian behavior. The rapidly evolving field of smart city technologies presents a fertile ground for future research, as we seek to optimize their use to create more responsive and adaptable urban environments that cater to the nuanced needs of pedestrians.

Creating truly walkable cities demands a collaborative effort that transcends disciplinary boundaries. Urban designers, planners, engineers, policymakers, and community members must work together to champion a pedestrian-centric approach, placing the needs and experiences of people walking at the forefront of all urban planning and design decisions. By integrating the insights from this review and continuing to explore the dynamic relationship between walking speed and the built environment, we can create cities that are more walkable, sustainable, livable, equitable, and ultimately, more human.

Individuals with physical or mobility impairments, such as those who use wheelchairs, walkers, or other mobility aids, experience significant challenges in urban environments. Reduced walking speeds and the need for additional space are common, and urban design must account for these factors to ensure inclusivity. Research from cities worldwide demonstrates that poorly designed sidewalks and infrastructure can lead to unsafe and inaccessible conditions for these individuals [46]. Sidewalks must be wide enough to accommodate individuals using wheelchairs or other mobility devices, ideally adhering to international guidelines like the ADA or the European EN 301 standards, which recommend widths of at least 1.5 meters [47, 48]. The use of ramps instead of stairs is critical for improving accessibility.

Research has shown that appropriate ramp gradients, as recommended by global standards, should be 1:12 or gentler [47, 48].

In conclusion, walking speed is a multifaceted variable shaped by a complex interplay of individual attributes, environmental conditions, psychological states, and cultural influences. Decoding these determinants is essential for designing urban environments that are truly conducive to walking, promoting active transportation, and creating more sustainable, livable, and inclusive cities for all.

## 8. CONCLUSION

This scoping review provides a comprehensive examination of the existing literature on Active Shooter Incidents (ASIs), highlighting critical themes, response strategies, and gaps in current research. The use of the PRISMA-ScR framework allowed for a systematic and transparent analysis of relevant studies, ensuring the inclusion of diverse perspectives on active shooter preparedness, response, and prevention strategies across various settings, including schools, workplaces, and public spaces.

The findings reveal that while significant progress has been made in understanding ASIs, there is still a need for more detailed, evidence-based strategies that address not only the immediate response but also long-term preventative measures. Key themes that emerged include the importance of preparedness drills, architectural and design interventions, and the role of law enforcement coordination in minimizing casualties during such events.

Furthermore, this review underscores the role of environmental design and behavioral analysis in mitigating the impact of ASIs. Future research should focus on refining the integration of these strategies, considering both technological advancements and community engagement to create safer environments.

Overall, this study contributes to the growing body of knowledge on ASIs by providing a broad overview of the existing research landscape and identifying areas where further investigation is needed. The findings emphasize the need for continued research to develop more robust frameworks that can effectively reduce the occurrence and impact of active shooter incidents in various settings.

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PART B: ART, HUMANITIES, DESIGN AND PLANNING

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# Architectural Images and Values in Banknote Design: Turkish Republic E1. Emission Group[1]

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**Abstract**

Banknotes are more than just a tool for economic exchange; they also represent the identity and shared ideals of the country they belong to. The elements used in banknote designs are a part of social values rather than aesthetic or visual features. The main design elements are images, color tones, flags, signatures, and various security codes. The designs symbolize the common values shared by societies and also their future goals. From ancient times to the present, banknotes featuring images of architectural structures have been popular. The images used are either pictures or abstractions of architectural structures. Abstractions often have broader meanings and symbolic connotations.

Including the E9 emission group that is still used today, a total of 9 emission groups have been printed since the date of the Republic of Türkiye. The study focuses on the E1 Emission Group, the first banknotes of the Republic. It uses the descriptive analysis method to investigate the architectural, social, and cultural meanings of the architectural images on these banknotes. In addition to the functional and spatial characteristics of the architectural structures, their social, cultural, and historical meanings were evaluated with their periods' political and social atmosphere. The study reveals that banknotes are not only an economic tool but also a reflection of spatial and cultural values. The architectural images used on banknotes in the examined period emphasize common values, ideals and reflect the Republic's ideology and the period's spirit.

## 1. INTRODUCTION

The use of physical money has a long history that dates back thousands of years. The predictions that the use of cash and paper money would decline have not yet materialized, despite a significant reduction in usage. States have minted and disseminated money as a symbol of sovereignty since the first coins were produced by the Lydian monarchy, which ruled over Anatolia in the sixth century BC. "Commodity currencies," which are essentially gold and silver coins with a circulation value equal to the metal from which they are made, have been supplanted by "banknotes" as a result of governmental funding requirements [1].

Hobsbawm defined money as the ‘most universal form of public imagery’ [2]. Depending on the symbolic meanings its design features hold, money conveys various messages [3]. The use of money to produce social identity and nation-state ideology has been the subject of several studies across various academic fields. Pointon focused on the relation between the money and nationalism [4]. Hewitt, V. H., & Keyworth, J. M. examined the British banknote design [5]. Penrose, J., & Cumming, C. researched on the banknote iconography [6].

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Since the foundation of the Turkish Republic, banknotes of 24 different denominations in nine emission groups have been put into circulation. All of the banknotes in the first six emission groups and some of the Seventh Emission Group were removed from circulation at different dates and lost their value at the end of the ten-year statute of limitations. There are different studies in the literature about banknotes printed in the Republic of Türkiye. Demir, T. worked on political and ideological analyses of the currencies of the Republic Period[7]. Pekşen, A. examined the visual structure of banknotes graphically and ideologically [8]. Yılmaz, M. and Temizkan, M. evaluated the banknotes using the semiotic analysis method [9]. Altun, E. researched the political and ideological features of the banknotes of the Republic Period [10]. Karlı, İ., & Dondurucu, Z. examined the relationship between money and the process of nation identity construction in the early period [11]. Öksüz M., examined the reflection to the press of printing the first banknotes [12]. This study focuses on the E1 Emission Group, the first banknotes of the Republic of Türkiye. It analyzes the architectural, social, and cultural meanings of the architectural images on banknotes using the descriptive analysis method. In addition to the functional and structural meanings, their social, cultural, and historical meanings were evaluated together with the political and social atmosphere of their periods.

The design features of a banknote are determined by its graphical language, layout, size, color, pattern, signature, security, and printing techniques. The selected images stand for both the societies' shared ideals and aspirations for the future. The use of architectural structures as images on banknotes has been widely preferred from historical times to the present day. In addition to the images of monumental buildings, which are symbols of the cultural values that form the society, some architectural images are also preferred due to their abstract meanings.

This study, which deals with architectural images on banknotes, emphasizes that spatial representations are not limited to architecture or design disciplines, but are also related to different academic fields such as cultural studies, history, and sociology.

## 2. THE 1. EMISSION GROUPS OF THE REPUBLIC OF TÜRKİYE

After more than 600 hundred years-old Ottoman dynasty lost its power, the country was occupied and the establishment of a new regime based on the concept of national sovereignty took place in 1923, at the end of a heavy and difficult four-year War of Independence. Between 1923 and 1938, several decisions were made to achieve complete independence and progress in all spheres, which altered the military, political, and social structure, amid economic conditions that wars and losses had damaged. The primary objectives included swift economic development, accelerated dissemination of beneficial knowledge and technology, and consequently, the attainment of parity with developed nations. The foundation for the Turkish Republic was laid by the profound shift in the concept of sovereignty that occurred with the beginning of the War of Independence resistance movement in Anatolia, namely the recognition that sovereignty is a national asset. The Turkish Grand National Assembly decided, that Ankara would serve as the capital and epicenter of the War of Independence since it was where the assembly was founded. When the Republic was declared, maintaining a stable monetary policy was seen as a prerequisite for independence and was associated with the printing of banknotes; however, this process required time [13].

During the Ottoman Empire, "Kaime-i Nakdiye-i Mutebere", which means "Paper Substitute for Money", was put into circulation by Sultan Abdülmecit in 1840. Rather than being "banknotes", these are "interest-bearing debt securities" or "treasury bills". Kaimes were made by hand in the early periods and each one was stamped with an official seal. But since paper money was so easily counterfeited, kaimes started to be printed in the printing house in 1842 as a result of the decline in public confidence in it [1].

In 1863, the Ottoman Empire gave the privilege of issuing paper money to the Ottoman Bank, which was established with joint British and French capital, for 30 years. However, after the Ottoman Bank rejected the government's request for advance payments and printing banknotes during the First World War, the

Ottoman Empire issued a different banknote under the name of "Evrak-ı Nakdiye" in return for the gold and German Treasury bills in its treasury, starting from 1915. These banknotes remained in circulation until the end of 1927, as money could not be printed in the first years of the Republic. The New Republic, which continued to use the coins and paper money of the Ottoman Empire, first printed and put into circulation its coins and then its own paper money. The currencies used in the empire were gradually removed from the market [13].

Printing of First Emission (E1) Group paper money, the first banknotes of the Republic of Türkiye was realized by the decision of a commission chaired by the then Minister of Finance Abdülhalik Renda. As a result of a 9-month study; This banknote group, consisting of denominations of 1, 5, 10, 50, 100, 500, and 1,000 lira, was printed in relief on watermarked papers by the British company Thomas De La Rue in 1927 [1].

Ölçer classified the paper money of the Republican Era into four important groups;
1. Paper money with Arabic script,
2. Paper money with Atatürk's picture and new Turkish letters (Latin alphabet) printed during Atatürk's lifetime,
3. Paper money with İnönü picture printed during İsmet İnönü's Presidency,
4. Paper money with Atatürk picture issued after 1951, after the transition to multi-party political life [14].
The main texts of these banknotes, which were printed before the Alphabet Revolution, were written in Arabic script and the denomination values were written in French.

## 3.PRINTING PROCESS AND DESIGN FEATURES OF THE 1. EMISSION GROUPS

The printing, design, and exchange of new paper money were carried out by The Cash Documents Commission consisting of bank representatives under the chairmanship of a person appointed by the Ministry of Finance. Çankırı deputy Mustafa Abdülhalik Renda was appointed as the chairman of the commission. During the commission sessions, decisions were made regarding the size, value, and quantity of money to be printed. The images that will be printed on banknotes as well as the printing plant have been selected. The procedures for printing and exchanging banknotes were then finished [1,12].

In the first statements made by the commission, it was decided that the images and frames of the banknotes would be determined through a competition, but subsequently, the construction of the pictures and frames was carried out without opening a competition. It was given to the painter Ali Sami Boyar, who also illustrated the first stamps of the Republic. Ali Sami Bey depicted a portrait of Mustafa Kemal Pasha and the Sakarya River as a landscape and arrangement around it. After examining Ali Sami Bey's paintings and frames, the commission chose to use Mustafa Kemal Pasha's image on banknotes valued at 100, 500, and 1000 liras; a symbol representing the Republic will be used on banknotes valued at 1, 5, and 500 liras [12, 15].

The examined banknotes possess consistent and balanced color tones on both their front and back sides. French and Arabic scripts, numbers, motifs, and ornaments were used as a common feature. According to Keş and Turgut, the calligraphy and motifs of the banknotes are a continuation of the traditional Ottoman period kaimes [16]. The meanings of the architectural images used in the banknote shed light on the spirit and ideals of the period. The architectural images used in these banknotes, which were produced after difficult processes, emphasize the common past and cultural values in a social sense (Figure 1).


| BANKNOTE UNIT | OBVERSE SIDE | REVERSE SIDE |
|---|---|---|
| Emission Group, In 1 Series, One Turkish Lira (90x166 mm) | **House of Parliament, Citadel of Ankara,** a ploughing farmer | **Former Building of Prime Ministry** |
| Emission Group, In 1 Series, Five Turkish Lira (94x170 mm) | **The Citadel of Ankara,** a grey-wolf and the House of Parliament | A bridge in Ankara |
| Emission Group, In 1 Series, Ten Turkish Lira (99x175 mm) | **The Citadel of Ankara** and a grey-wolf | **The Citadel of Ankara** |
| Emission Group, In 1 Series, Fifty Turkish Lira (98x185 mm) | A portrait of Atatürk on the right, and a pattern on the center | A view from Afyon |
| Emission Group, In 1 Series, One Hundred Turkish Lira (112 x 189 mm) | A portrait of Atatürk on the right, and a pattern on the left | A view of a village |
| Emission Group, In 1 Series, Five Hundred Turkish Lira (120 x 194 mm) | A portrait of Atatürk on the right, **the picture of Gökmedrese in Sivas on the left** | A view from Sivas |
| Emission Group, In 1 Series, One Thousand Turkish Lira (124 x 201 mm) | A portrait of Atatürk | A view from the railroad to Sakarya |

***Figure 1.*** *Design Features of the 1. Emission Group*

## 4.EVALUATION OF THE IMAGES USED ON THE BANKNOTES

### 4.1. 1. Emission 1. Series 1 Turkish Lira

On the front of the banknote (Figure 2), the Parliament Building, Ankara Castle, and a peasant plowing with a plow and a picture of Ankara's former Prime Ministry building at the back.


***Figure 2.*** *1. Emission 1. Series 1 Turkish Lira banknote front and back*

Declaring Ankara as the capital instead of Istanbul, which has served as the seat of empires for ages, is seen as a bold and revolutionary move that reflects the desire to build a solid ideological foundation for the nation-state. As soon as it was designated as the capital city, the required development work was initiated to make room for all governmental agencies, general directorates, and embassies.

Perched on a rocky hill above Bent Creek (also known as Hatip Stream), Ankara Castle is ideally situated for defense (Figure 3). The castle's initial construction, which is believed to have taken place during the Galatians' period in the second century BC, is unknown. Ankara stone and various materials were used in its construction. With 42 towers, the inner castle was constructed in the seventh century by the Byzantines. Alaaddin Keykubad, the Seljuk Sultan, restored the castle in 1227. Later, under the reign of Sultan II Keykavus, further improvements were constructed in 1249. The Hisar Gate bears an inscription from the Ilkhanids, dating back to 1330.

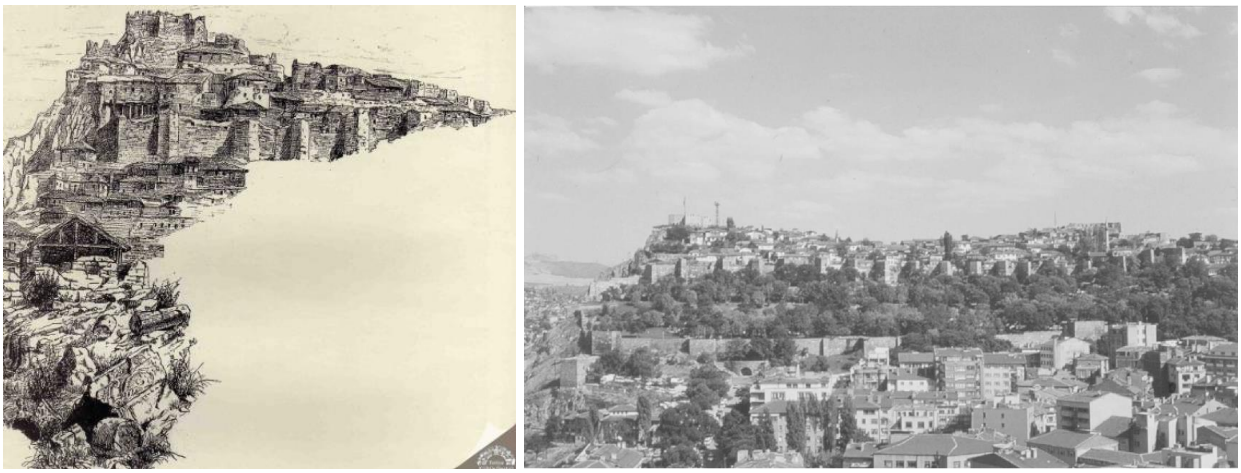

***Figure 3.*** *Ankara Castle, (Edmund Naumann. Von Goldnen Horn zu den Quellen des Euphrat.München, Leipzig, 1893 (On the Left, Türkiye Kültür Portalı). View of Ankara Castle with city silhouette, Erendil & Ulusoy, 2002 (On the Right)[17].*

During the Ottoman period, the walls were repaired again in 1832. Inside the castle, which is inhabited today, there are old Ankara houses built after the 17th century, the Alaaddin Mosque dating back to the 12th century, and historical fountains and shops [18].

The image of the old prime ministry building in Ankara (the first prime ministerial building, the Ministry of Finance) is a part of the process of legitimizing Ankara as the new capital. Turkish Republic's centralism, power, and national identity are reflected [8]. In the image of the building used on the back of the banknote, the building form is perceived together with its exterior spaces from a certain distance. First Prime Ministry Building - It is one of the first buildings of the Early Republic Period. The Old Ministry of Finance Building is located in Ulus, in Vilâyet Square. The Redif Barracks, built during the Ottoman period, was located on the site of the building. The unusable barracks were demolished and the Ministry of Finance Building was built in its place. The Provincial Park and the Governorship Building are located east of the building, and İş Bank is in the south. The Ministry of Finance Building, built in 1925, is the first ministry building of the Republic period. The Architect of the building is Yahya Ahmet and the Engineer is İrfan. The building, which was also used as the Prime Ministry for a period, has survived to the present day with additions made in 1927 and after the 1950s. The work, which was built during the First National Architecture Period, is considered a living witness and one of the symbolic structures of the period. Until recently, no mass intervention was made, and largely preserved its originality. The restoration of the building was completed in 2017 and is currently used as the Rectorate Building by Ankara Social Sciences University (Figure 4) [19].

***Figure 4.*** *The Old Prime Ministry Building in Ankara, Salt Research, Ülgen Family Archive (on the left); https://www.asbu.edu.tr/tr/genel-bilgi (on the right)[19]*

### 4.2. 1. Emission 1. Series 5 Turkish Liras

Ankara Castle, a gray wolf, and the parliament building are depicted on the front and a picture of a bridge from Ankara is at the back (Figure 5).


***Figure 5.*** *1. Emission 1. Series 5 Turkish Lira banknote front and back*

The first meeting of the Grand National Assembly of Turkey (TBMM) on April 23, 1920, was held in the building located in Ulus Square. It was originally erected in 1915 for the Committee of Union and Progress. Up until October 18, 1924, the building—which is regarded as one of the early examples of the "First National Architecture" style in the capital—served as a parliament (Figure 6).

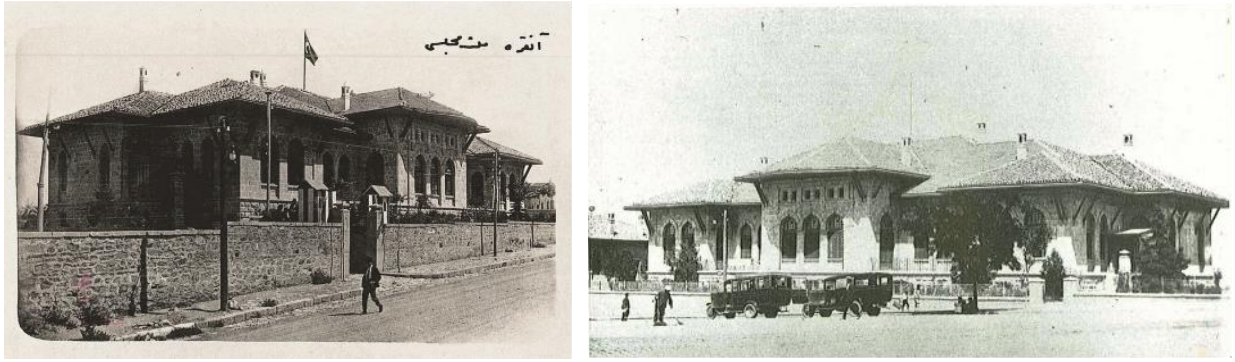

***Figure 6.*** *Turkish Grand National Assembly 1st Parliament Building. (In the image on the left, "Ankara National Assembly" is written in Ottoman Turkish. https://www.kulturportali.gov.tr/)[20]*

In 1961, it was converted into a museum and opened as the "Turkish Grand National Assembly Museum" to the public. It was reopened as the War of Independence Museum on April 23, 1981, following

renovations to the collection and exhibition halls. The museum features artifacts from the years of the Republic's proclamation and the War of Independence.

The building was designed in 1916 by the Evkaf (Foundations Administration) architect Salim Bey, upon the order of Enver Pasha, to be used as a club building by the Party of Union and Progress. Mahmut Şevket (Esendal) Bey, the Party of Union and Progress's representative in Ankara at the time, was tasked with carrying out the project. Military architect Hasip Bey was assigned the project construction work when he was serving in the Corps. Hasip Bey successfully completed the masonry part of the building, but the roof and other sections were left unfinished due to the ongoing war and material shortage. When it was decided to open the Grand National Assembly of Turkey on April 23, 1920, it was seen that there was no building in Ankara with the necessary size and equipment to hold the Assembly. It was therefore decided to use the Union and Progress Party Club Building, whose construction was incomplete, as the Parliament Building, and to entrust the task of repairing and finishing the building to Necati Bey (who was later elected Bursa Deputy for the 1st Term). The building was constructed from pink-purple dyed local andesite stone, known as Ankara stone, and is among the first examples of the First National Architectural Period Style in Ankara. It was completed with tiles brought from the homes of the citizens of Ankara, as well as the Numune School in Ulucanlar (now Cumhuriyet Primary School). The building housed the Turkish Grand National Assembly from 23 April 1920 until 15 October 1924. Later, during the same period, it served as the Republican People's Party headquarters and briefly hosted the Law School. After being moved to the Ministry of Education (formerly the Ministry of National Education) in 1952, work on converting it into a museum started in 1957, and on April 23, 1961, it was opened to the public under the name "Grand National Assembly Museum" (Figure 7) [20].


***Figure 7.*** *Grand National Assembly (T.R. Ministry of Culture and Tourism).*

### 4.3. 1. Emission 1. Series 500 Turkish Liras

There is an image of Sivas Gök Medrese and Atatürk on the front and a view of the city of Sivas is on the back (Figure 8).


***Figure 8.*** *1. Emission 1. Series 500 Turkish Liras front and back*

Gök Medrese in Sivas is one of the most important buildings where Turkish architecture and decorative art can be seen together and was built during the Anatolian Seljuk period (Figure 9). From the inscriptions in various parts of the building, it is understood that it was built in 1271, during the reign of III.Gıyaseddin Keyhüsrev. The marble stone gate of Gök Medrese has a rich appearance that allows the play of light and shadow to be experienced. The building has a two-story plan with an open courtyard and four iwans. The building, which is known to have served as a madrasah where religious sciences were studied since the date it was built, was converted into a museum in 1926 [21].

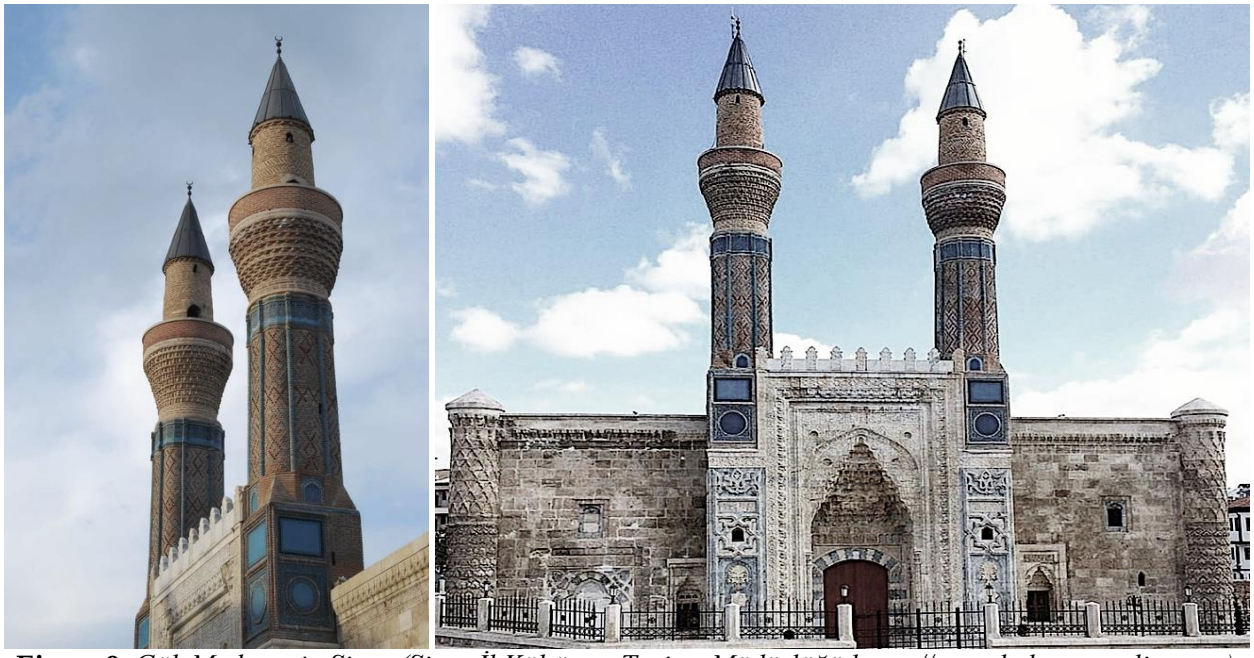

***Figure 9.*** *Gök Medrese in Sivas (Sivas İl Kültür ve Turizm Müdürlüğü https://www.kulturportali.gov.tr).*

## 5. CONCLUSION

The Cash Documents Commission carried out 9 months of meticulous work to print, design, and exchange the First Emission (E1) Group paper money. This banknote group, consisting of denominations of 1, 5, 10, 50, 100, 500, and 1,000 lira, was printed in 1927. Portraits, paintings, engravings, and calligraphy were employed in addition to illumination motifs. The design is dominated by the representation language created with the era's technological capabilities. The same colors were used on the front and back of all banknotes. As the value of the banknotes increased, so did their size in millimeters, the ornamentation and motifs were Islamic and Ottoman. The desire to launch a competition for 1st Emission group banknote designs was expressed but did not materialize. This quest can be interpreted as a signal of the goal of democratization.

The banknotes' emphasis on Ankara as the capital was accomplished by incorporating Ankara Castle which defined the city. Ankara Castle, in addition to its context of being in the new capital of the Republic, can be interpreted as a reference to the historical layers, roots, and experiences of the city by surviving throughout the ages. Since cities are defined by their built and natural environments, the castle silhouette that symbolizes the city is a symbol of the intertwined cultural richness that has lived in these lands for hundreds of years. The representation of the resistance in the center of Anatolia, the image of the peasant as the hero of the struggle and the master of the nation, underlines the importance given to the people. The images of the cities of Afyon and Sivas chosen outside Ankara are symbols of their importance in the War of Independence and the importance given to Anatolia. The Sakarya railway line was assessed as a sign of progress toward development. The buildings used on a single building scale stand out as the Parliament Building and the former Prime Ministry - Ministry of Finance building, which reflects the ideology of the Republic and the spirit of the period. The use of the Parliament building is because it is functionally a symbol of national sovereignty. Both buildings are considered as the 1st National Architectural movement and although they lost their original functions, they have been re-functioned and survived until today. The facade image of Sivas Gökmedrese is represented as both the symbol of the city and an important historical and cultural heritage element of the Seljuk period. It was determined that the architectural images used on banknotes during the examined period, while conveying social memory and history, emphasized common values and ideals and reflected the ideology of the republic and the spirit of the period.

From history to the present, architecture symbolizes different values with its physical features, function, proportion, and location. Architecture, beyond just meeting spatial needs, consists of layers that contain different social, political, cultural, and historical meanings. This study, which deals with the architectural images on the Republic of Turkey 1st Emission banknotes, emphasizes that spatial representations are not limited to only architecture or design disciplines, but are also related to different academic fields such as cultural studies, history, and sociology.

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# Architect or Director? Wes Anderson with His Cinematic Spaces

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**Abstract**

Since the beginning of cinema, space has not only been the protagonist of architecture, but has also played an important role in films. In cinema, space serves to establish historical context, deepen character development and add psychological and cultural layers to the story. The relationship between architecture and cinema is symbiotic; cinema provides an experimental platform for architecture, while architecture determines the direction of cinema. Both disciplines are initially imagined in the mind, go through planning and produce products with similar production techniques. Known for his meticulous attention to detail, Wes Anderson became a master of both disciplines by overseeing every aspect of film productions. The aim of this study is to reveal the design approach of Wes Anderson, who has brought new life to the intersection of architecture and cinema with the cinematic spaces he created with the combination of pastel colors and natural light, and to discuss whether he thinks like an architect. This study focuses on five of Anderson's films - The Royal Tenenbaums, The Life Aquatic with Steve Zissou, The Grand Budapest Hotel, Isle of Dogs and The French Dispatch - and analyzes how space is used in each film. In Anderson's cinema, space is not only a backdrop but also a character that influences the narrative and reinforces the mood and characteristics of the protagonists. The study aims to discuss whether Wes Anderson whom has a deliberate approach to design with diverse cinematic spaces can be recognized as an honorary architect or not.

## 1. INTRODUCTION

While reorienting the popular culture, cinema is also affected by the popular culture. As a record of historical, political, social, economic, and cultural situations, cinema reflects social changes more than any other art. This situation allows cinema to act as a bridge between the past and past of art also with the present [1]. As an art born out of culture and society, individual and aesthetics, creating environments where the individual and society live and carry out different activities, architecture is the most crossing art with cinema. These two disciplines shaped by the society and culture, use space as a common language element in the contexts of designing, reproducing, and representing space. While architecture is the art of constructing space, cinema creates a world through space and supports its narrative [2]. Both disciplines go through similar stages of production; conceiving design in the mind first and materialize it into a work of art. Filmic tools such as script, character, set, light, color, frame, camera etc. affect the production of cinematic space and constitute the common point of architecture and cinema together with architectural design components, physical and psychological factors affecting spatial perception.

Cinema functions as a laboratory of architecture with its fictional space design. While the construction of architectural space differs according to the purpose, cinematic space exists according to the narrative in films and a new architecture is produced according to the story in each film. Cinematic space is a representation even though they are constructed with the exact use of the existing spaces unlike real space. According to this case, directors reflect the spatial images created in our memories and this must be considered as a new space different from its real image even though its filmed in an existing space. Cinematic space is also familiar to Henri Lefebvre's (1991) concept of conceived space and Christian

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Norberg-Schulz's (1971) concept of perceptual space [3,4]. At this point, it is possible to say that directors construct the existential space by reflecting the representation of real space in their own minds.

In the production of architectural space, an architect dreams and plans the design in his/her mind and implements it with the help of a team. In the production of cinematic space, all these stages are carried out by art teams and set crews. However, auteur directors, who become independent in film creation, who dominate everything from the content to the editing of the films, carry out the production of their cinematic spaces by directing the art team in line with the images they visualize in their minds. Director Wes Anderson has proven to be an auteur director by introducing a new approach to the intersection of architecture and cinema with the cinematic spaces he created by combining pastel colours with natural light and the way he created these spaces. His planned work like an architect while producing his cinematic spaces and the conscious design approach he created, raised the question of whether the director is also an architect and this formed the starting point of the study. To answer that, the concepts of space, cinema and cinematic space, which constitute the main theme of the study, were subjected to a comprehensive literature review with an interdisciplinary approach, and readings were made through the works of researchers from different disciplines. The concepts of space, cinema and cinematic space, which constitute the main theme of the study, were subjected to a comprehensive literature review with an interdisciplinary approach, and readings were made through the works of researchers from different disciplines. In the form of the data obtained from all these, the films were analyzed from an architect's point of view and the tables leading to the conclusion of the study were created.

## 2. INTERSECTION OF ARCHITECTURE AND CINEMA

While architecture and cinema use space as a common element in their experience-oriented collaboration beginning from the late 19th century, the design components in the construction of space and the psychological and physical factors affecting spatial perception have constituted the intersection. Both disciplines are made by human, for human. The design of the cinematic space is a process that requires different teams to work together, design, implementation, and output stages just like the architecture. Filmic tools form the building blocks of cinema during affecting the production of cinematic space. When the mise-en-scene and cinematography that constitute the visual language of cinema are considered, it is clear that elements such as scenario, set, character, perspective, light, color, camera angles, framing and editing-montage come forward and most of them are also used in architecture. While spaces are designed with the combination of color and light in architecture, filmmakers basically reflect their visual expressions with the harmony of these two elements. With framing, directors restrict the area to be filmed in order not to show unwanted elements or emphasize the elements they want to draw attention in the frame [5]. In architecture, framing is provided by elements such as doors and windows but in cinema, the questions of how and when to move from one scene to another, how to sequence the scenes, and how to ensure the continuity are discussed. Architecture questions these problems in a similar way. The set-up phase for editing in cinema is similar to the organization between spaces in architectural design. To understand the space with all its tangible and abstract layers, it must be analyzed by reading the space with its physical and social dimensions. If the language of space is considered in its functional or physical dimensions; the cultural, racial, or social messages and indicators that it contains cannot be fully understood [6,7]. In this study, spaces are analyzed not only with their architectural features but also with their psychological meanings such as home, place and cell and with the feelings of homelessness, alienation, eeriness, loneliness, burnout and belonging. The atmosphere which gives information about the user and designer's understanding depends on the principles of space arrangement as well as architectural and decorative elements such as light, color, equipment, material, and texture. From this point of view, elements such as balance, rhythm and axis also have been considered in the study, to see what cannot be noticed at first glance.

## 3. STUDY METHODOLOGY

Cinema and architecture are discursive arts; While cinema mostly prioritizes visuals to convey its messages; Architecture, on the other hand, uses spaces and the messages they carry. Based on this, it was decided that the primary common unit of cinema and architecture was space, and semiotics was used to

reveal the meanings. The concepts of space, cinema and cinematic space, which constitute the main theme of the study, were subjected to a comprehensive literature review with an interdisciplinary approach, and readings were made through the works of researchers from different disciplines. Therefore, the data collection methods of the study consist of master's and doctoral theses, books and articles at the intersection of cinema and space; qualitative content analysis and psychological and physiological studies on space, perception of space and representation of space in cinema, as well as Anderson's films and behind-the-scenes documentaries of these films, which are examined based on film analysis methods in the light of James Monaco's book "How to Read a Film: Movies, Media and Beyond" [8]. During the study, workshops on film analysis were attended, and the film culture developed through previously watched films and what was learned from the workshops formed the basis and method of the study. In the period preceding the study, a series of films were watched to facilitate the final decision on the director whose work would be analysed. This decision was based on auteur directing and continuity, as well as the use of cinematographic elements and the structuring of space. When the literature studies on the intersection of cinema and architecture were examined, and although there were studies on directors and their filmologies, it was seen that there were no studies on Wes Anderson.

In this study, auteur director Wes Anderson's films are examined together with their characters, scenario, cinematographic elements and mise-en-scène. Five films, The Royal Tenenbaums, The Life Aquatic with Steve Zissou, The Grand Budapest Hotel, Isle of Dogs and The French Dispatch, were identified as particularly suitable for the study due to their architectural features and use of space. In the analysis of the films, the preferences of the directors regarding the production and representation of space were examined. During the analysis of the films, to support the director's closeness to architecture, the similarities of the methods used by the architecture and cinema disciplines and the director's preferences in space production and representation were examined, and the importance of architectural components and use of space in these works was discussed in the light of Anderson's design approach and methods working on the cinema discipline.

## 4. ANALYZING SPACE FICTION THROUGH WES ANDERSON FILMS

Director Wes Anderson's well planned and accurate stages of design and practice behavior is similar to the meticulousness of an architect during the production of space. Anderson's fairytale look-like worlds are created by transforming the existing space in line with his own design approach; his conscious use of the design components by playing with the psychology of the space like an architect is a proof of this similarity. Anderson dreamed of becoming an architect when he was a child, so that designing a real architectural space in the real world (Bar Luce, Milano) also formalized an intersection between his unique aesthetic approach and architecture.

The Royal Tenenbaums (2001) is about the Tenenbaum family, children's neuroses and disappointments that define their lives as adults [9]. Royal is a successful lawyer and due to disagreements, he and his wife Etheline separate, and he leaves the house. Children, each intelligent and talented, think that their father's leaving is their own fault. The film tells the reunion of the family 20 years later and their relationship with each other. Wes Anderson started his unique pastel-colored fairytale style with this film. Symmetrical balance and one-point perspective has been used while the props are positioned on a symmetrical axis in some scenes. Sunless and grey toned exterior spaces are preferred, warm tones and soft lighting that will emphasize the colors with the three-point lighting technique are used while artificial light is not highly chosen in the interior spaces. The film was shot after making some arrangements in an existing house in Archer Avenue New York. Anderson searched for the "perfect" house in every corner of NYC and finally came across to an old house in the historic part of Harlem. Each room was redesigned with the sketches based on his ideas. Each child had rooms according to their interests. When the audience enters Chas's room, there is a desk with a computer and two telephones on it. While the general color of the room is white, his clothes and the Forbes magazines in the archive cabinets are grey. Looking at the side wall, it is seen that there are metal archive shelves on both sides and a metal bunk bed in the middle. Chas wants to be approved by his father and wears a suit since his childhood and behaves like a white-collar worker, the interior looks like just an office as his wish. Margot's room emphasizes her rebelliousness even before entering the room with the warnings on the door: "Do not disturb", "Do not enter". The walls are covered

with red colored wallpapers with zebra drawings. While Chas's room has more modern style; Margot's room looks like an old period ornate stage decor. The bookcase and models of theatre sets on the wall show the character's interest in playwriting. There is a table with a nostalgic typewriter on it and ethnic masks given from her mother on the walls. Unlike the other children, Richie looks and behaves as the age he is, his room has colorful and childish objects. His only memories of getting appreciated by his father are related to tennis, so he built his life around this sport. The walls are blue with the sense of hope and filled with illustrations Richie drew himself. These drawings reflect the important moments in his life and serve as a kind of diary. Rest of the room is filled with warm wood and pastel blue-green tones. The characters' clothes and their own spaces have a meaningful unity in the combination of costume and decor. (Figure 1)

***Figure 1.*** *Color Palettes of the Children's Rooms in The Royal Tenenbaums*

Coming together after 20 years, the lives of the Tenenbaum children have changed, but their rooms have remained the same and became a memory space. At this point, the spatial memory of the characters comes into play. Various shades of pink and red colors are used in the house while wooden furniture's are in harmony with wooden doors and windowsills. These colors and the preference of dark wood are especially used to give the house a feeling of home and to provide a warm atmosphere to the film. Crystal chandeliers, candlesticks, and stained glass on the walls with antique Turkish carpets in almost every room are used to express wealth. The sofas are in ecru and red colors with floral and forest patterns. All details shape the house with characteristics of 1970's colonial style and reflect Anderson's eclectic design aesthetics. From the outside, the house resembles a small castle in the city with its high-rise tower-like circular section. The red colored bricks on the facade are left bare. Thus, the historical appearance of the house is supported. Between the windows there are decorations that look like a modified version of Corinthian columns. There are also floral decorations and moldings on the edges of the concrete sill. (Figure 2)

***Figure 2.*** *Symmetrical Balance in The Royal Tenenbaums*

In The Royal Tenenbaums film, the themes of loneliness, burnout and belonging are emphasized and family problems, distorted relationships are discussed. In the scene where Richie attempts suicide, cold colors and white lightings are used in contrast to the warm color palette and yellow lighting of the film. Thus, the space has the feeling of a morgue, which is the place of death in line with the character's action. In the bathroom where the scene is shot, the walls and the space are empty. By emphasizing the burnout state of the character; the feeling of emptiness is tried to be created in the audience. The scenes are constructed in a symmetrical and asymmetrical balance; the symmetrical axis is not prioritized when organizing the space. The theatre-like narration that dominates this melancholic family story reinforces the coldness and distance between the characters.

The Life Aquatic with Steve Zissou (2004) is about a depressed character and the people around him, whose life and fame decline after a certain point inspired from Jacques Cousteau [10]. The famous oceanographer Steve Zissou and his crew travels on expeditions and shoots documentary series with World War II ship Belafonte which was purchased from the US Navy. Wes Anderson shows the audience a single frame cut in order to impress the interior of the ship with details. In the scene where the characters argue, the camera moves the audience around the ship by passing through the sauna, science room, assembly room, kitchen, dining hall and deck respectively. This shows that space is not used just as a background in the film. The interiors are mostly made of wood and iron; the predominant colors of beige, ecru and grey creates a nostalgic atmosphere and the ecru and white toned narrow cabins where the characters live are generally simple. The symmetrical compositions and vivid colors in each frame are as engaging as the story itself. (Figure 3)

***Figure 3.*** *Belafonte Ship and Interiors in The Life Aquatic with Steve Zissou*

The film was shot in Naples and Rome but through the framing and plans, the Zissou crew is perceived as if they were on a world tour. When the character steps into an island and sees the hotel where he stayed with his ex-wife years ago, he feels a nostalgia. This shows that a spatial memory has already been formed for the character with an architectural structure, hotel. The film is dominated by the concepts of burnout, loneliness and belonging. The ship helps to feel like a home when yellow lighting is used but arouses a feeling of eeriness in the audience with white light when pirates suddenly arrive. The scrupulous about the ship's decoration and the introduction of each space in the scenes draw attention to the importance of the architecture. Symmetrical balance figures prominently while radial balance and asymmetrical balance can also be seen. However, there is nothing placed on a symmetrical axis in any case. Time is only recognizable at the beginning of the episodes when mentioning how many days have passed. Symmetrical balance and one-point perspective are mostly preferred in stable framing and symmetrical balance is occasionally disrupted in scenes with tracking camera movement. While the crew is inside the submarine the windows act as a screen which radial balance is prominent and there is a frame within a frame.

The Grand Budapest Hotel (2014) is like a story in a book just as shown at the beginning of the film [11]. Behind the heartwarming colors and strange but peaceful mood there lies a hazy atmosphere because a devastating war is taking place in the story during the 1930s. The fictional country of the Republic of Zubrowka and the scenes of escaping, chasing, and hiding are a representation of a real-life 20th century of Europe, caught between World War I and II. In the background of the charming pastel-colored images, the story of Zero lies; after losing his family and displaced by the war, finding a new place and a new family in the Grand Budapest Hotel thanks to M. Gustave.

In the film, the movements of the characters and events are seen in a symmetrical balance and on the central axis. It is positioned in a balanced way in the center of the frame; thus, we see the frames formed with one-point perspective. Transitions between scenes are made in such a way that the character remains in the center of the frame. Asymmetrical balance is rarely preferred; the films symmetrical attitude is mostly dominant. Radial balance was used in the view from above scenes, which is one of the most important technical features of the film. Thereby, the composition was crowded, and the images were made more noteworthy. The presence of balance, symmetry, axis, and order makes the scenes of the film look like a selection of photographs in an exhibition. Light is in harmony with colors. While looking for an appropriate place, Anderson thought that the team would not be able to shoot in an existing hotel

because of the guests, so he started to search Europe. Interior designs were created for different periods in a five-story department store called Görlitz Warenhaus, which had been empty for years in East Germany [12]. Periodical spaces such as the hotel lobby, cloakroom, lobby bar and barber shop were designed in pastel tones such as soft pink, dusty rose, gold, and cream, considering that they are located in a come-hither hotel. For film set of 1932, handmade fabrics were prepared, and antique furniture was preferred. The hotel was designed in Art Nouveau style for this period with curved forms, arches, arched windows, iron railings, elegant decorative elements, and floral decorations, mainly in red, brown and pink colours. (Figure 4)

***Figure 4.*** *The Görlitz Warenhaus Department Store [12] [Left] and Fictional Interior in The Grand Budapest Hotel [Right]*

The concept of time is very prominent in the film. Depending on the fact that the story takes place in three different time periods, the period in which the narrative unfolds is emphasized with colors, fittings, materials and textures in the interiors and facades of the hotel for each different timeline. 1930s' interior was decorated with red carpets, bright colors, and marbles; 1960's lobby was dominated by faded greens and oranges, wood-covered walls, cheap-looking metal legged orange fabric-brown leather mixture armchairs, dirty beige carpets. The monotonous appearance of the hotel with these colors and soulless furniture is a symbol of feeling burnout syndrome. At 1968 set, the hotel is quite different from before. We see that it has been revised to keep up with the aesthetics that have changed over the years; modern, clear, and sharp lines. This new design, with a more rational style, has also been worn out and neglected over time. In the dining room, tables and chairs are placed rhythmically in a symmetrical axis. The same place was the ballroom / conference hall of the hotel in 1932. After falling into disfavor, the ballroom turns into a dining room and the indication Anderson shows is the overwhelming power of architecture to emphasize the feeling of loneliness. When we have a look at the dimensions of the rooms and dining areas of the employees in the service section of the hotel, we see a disproportion compared to the rest of the hotel. These spaces are almost like cells with their pale colors, aspect disproportion and narrow corridors. The reflection of the underestimating workers as a human being and the hierarchy on the architectural design is revealed in a way. For the hotel's exterior sequences, a three-meter mockup was prepared in front of a green screen and props were positioned in front of the shop facade for exterior action sequences. For the sets of 1932 and 1968, the facade of the hotel was designed according to a symmetrical axis. However, unlike the cheerful and inviting hotel of the past, 1968 set of the hotel was depicted in a cold and brutal Soviet-era style and had lost its former colorful, elegant and aesthetic state just like the tired Soviet architecture, a world mired in war affected by Stalin's fascist regime. (Figure 5)

***Figure 5.*** *Hotel Facade and Funicular in 1932 [Left] and in 1968 [Right] in The Grand Budapest Hotel*

In this film, the spaces are introduced with general plans and included into the film as if they are characters. The light and color tones change according to the mood of the characters and the general atmosphere of the scene; the components that make up the space design and spatial elements also vary in line with the concept of time. This emphasizes the importance of space for the continuity and coherence of the story and proves the magnitude of its role in cinema. The film is dominated by an air of melancholy in line with the concepts of burnout, loneliness, and eeriness. The director has created changes in the space through psychology, with the help of colors and empty compositions appeared in the frames. The feeling of belonging prevailed in 1932 set, but blanked out in time until 1968 set by being trapped in the spatial memory. An easy transition from the perception of home to the perception of cell was achieved by playing with the dimensions of the architectural space. The components that create space were associated with the fourth dimension of space (time) so transitions between time zones were made easily recognizable.

In the Isle of Dogs (2018), a dog flu breaks out in the city of Megasaki in Japan and all dogs are exiled to Trash Island by the order of the governor [13]. While symmetrical balance and one-point perspective are mostly used in the film, radial balance is used in bird's eye view scenes. Symmetrical balance can be seen in both vertical and horizontal axis. Red-black Japanese lanterns with very small incandescents are used as the main light source in the film [14]. A fairytale-like world is created with pastel colors in the city texture and the color of red which is used in the flag of Japan was used to emphasize the architectural elements and landmarks of the city.

As in all of Wes Anderson's films, colors mean. While sterility is conveyed with the color white in the laboratory, there is also a reference to Prof. Watanabe doing good for the dogs. The healing serum is blue which is the symbol of hope. In the stage where the group defending dog rights gathers, the walls are completely designed in yellow, which signifies decay, indicating that they do not like the current government. The Brick Mansion draws attention to Edo period (1603-1868) with its roof lines, masonry building system and red bricks [15]. The color of red makes the building recognizable. It was inspired by Frank Lloyd Wright's design for the Imperial Hotel in Tokyo (1923). (Figure 6)

***Figure 6.*** *The Brick Mansion in Isle of Dogs [Left] and Imperial Hotel by Frank Lloyd Wright in Tokyo [15] [Right]*

The year of 1963 is a basis for Megasaki's urban image and architecture. While pre-war images were included in the scene where the city was introduced; behind the old city of the early 20th century, the new one rises with skyscrapers. There is both the chaos of modernism and traditional Japanese architecture here. The production designers of the film were inspired by the Metabolism movement that emerged in Japan during the 1960s for the architectural aesthetics of the city [16]. Although the idea of Metabolism did not change the built environment in Japan, it is the basis of the design phase of the city of Megasaki, which is part of a dystopian Japanese city. (Figure 7)

***Figure 7.*** *Megasaki City from Isle of Dogs*

Isle of Dogs is Anderson's second stop-motion animation film. While symmetrical and radial balance is being used, there are no scenes in which particular attention is marked to the placement of props on a symmetrical axis. There is no use of natural light in the space consisting of models. Also, pastel colors are preferred with warm-toned lighting. The structures to be emphasized in the scene are shown in red. Although there are emphases such as cage, exile, cell, displacement, eeriness; the sense of belonging also points to the space here.

In The French Dispatch (2021), an insert of an American-based magazine is published in an imaginary French town in the 20th century [17]. The film is composed of the stories in the magazine, and the director's layered storytelling is also presented. In this case, the role of a reader is also defined for the audience. We may say that the flow of the film is a demonstration of the director's mind mapping. As expected from Anderson, the spaces are bright but in pastel tones. Unlike his other films, the use of black and white in the images is very frequent. The transition from colors to black and white represents both the past and imprisonment. Color is the key component for the director in this film. To maximize the use of daylight, he converted an old factory which has a large light opening into a studio. At the beginning of the film, office spaces giving clues about the characters are shown in sequence. Arthur Howitzer Jr.'s room is a place equipped with wooden furniture inside yellow walls. The color of yellow indicates that the character will die, even though he is cheerful and lively. Turquoise details are used to create contrast and retro atmosphere of the 1970s. The room with its windows facing the corridor shows that Arthur is always an accessible boss. In Herbsaint Sazerac's office, lighting differences are utilized to draw attention to the bicycle standing upside down in the background. As a travel guide, he has a city map hanging on the dirty beige wall and a bookcase in the room. In Berensen's room, the typewriter and telephone draw attention to the space where the lighting is intense. The two bird figurines on her desk shows that the character feels that she belongs to the place and sees it as home. Another journalist Lucinda Krementz's office contains almost no furniture. The fact that there is only one chair other than the one she sits is the proof of her loneliness. The character's journalistic neutrality is reflected into the room and caused the space to remain depersonalized. The arch in Roebuck Wright's office is placed in the center of the frame to indicate its position in the middle of the room. Floral patterns, pink pastel colors, ordered layout, wooden furniture and collection of French antiques and modern art reflect his intellectual personality. (Figure 8)

***Figure 8.*** *Color Palettes and Interiors from The French Dispatch*

During designing the magazine's office building, Anderson was inspired by the Parisian residential building seen in Jacques Tati's Mon Oncle film which dates back 1958 [18]. Designed in a parking lot, the building looks like a combination of several different structures joined together. (Figure 9)

***Figure 9.*** *The Office Building from The French Dispatch [Left] The Building from Mon Oncle Film [18] [Right]*

In The French Dispatch, Anderson reflected his unique cinematographic style as much as possible and ensured a fast flow in the story. Symmetrical balance still exists however, there are no interiors organized with it. When artificial lighting is rarely used, cold tones are preferred. Looking at the color palettes, the interior spaces are mostly decorated with warm tones, while the exteriors are dominated by cold colors. The concepts of home, place and cell are mentioned in the perception of space. The theme of loneliness continues in this film too and the contribution of loneliness to creativity is emphasized. In addition, the themes of freedom and belonging are repeatedly addressed in the stories of the film.

In 2015, Anderson was asked by the Prada Foundation to design a catering space within the OMA designed Fondazione Prada building [19]. A distillery dating back to 1910 in South Milan was converted into an art center where Anderson designed the interior of a café. He was inspired by the city itself and iconic buildings of architecture to capture the atmosphere of a typical Milanese café [20]. The café is decorated in the classic style of Prada and Anderson's signature like soft pastel tones, half covered with wooden panels and other half with Trompe-l'œil wallpapers. Decorated ornaments and patterned wallpapers reminding Neoclassicism refer to Galleria Vittorio Emanuele (1877), the oldest shopping center in Italy. The space reflects the Italian culture of 1950-60 by its nostalgic decoration from pink

terrazzo floor, walls coated with wooden paneling, the leather-furnished Formica furniture, orbicular pendant lamps [21]. (Figure 10)

***Figure 10.*** *Bar Luce, Milano [21]*

Anderson assumed the role of an architect / interior architect while realizing his dreams with Bar Luce and he did not refrain from using his film aesthetics, which is a result of his directing profession and created a dynamic space that behaves as a cinematic set which had become an intersection of cinema and architecture.

## 5. FINDINGS AND EVALUATION

The results obtained from the studies have concluded that in Anderson's cinema, space is not just in the background, it is a character that is included in the story, sometimes the main theme of the films, and is a phenomenon that strengthens/reflects the emotional states and personal characteristics of the film protagonists.

In Anderson's films, various locations, sometimes a ship from World War II, sometimes a hotel that has witnessed time and changes, are as important as the main character of the film. We can say that in films of auteur director Anderson, space either contributes to the narrative or is the root of the story. The production, usage pattern and representation of cinematic space differ in the selected films. In the study, different results were obtained in terms of the forms of using space. In The Royal Tenenbaums, the personalities of the characters are conveyed to the audience through the spatial arrangements, so the architecture supports the story. In The Life Aquatic with Steve Zissou, the ship serves as a home and vehicle. The director emphasizes the importance of dramatic setup space by taking the audience around the interior places of the ship one by one. The Grand Budapest Hotel is a film that Anderson organized and redesigned an existing space from the beginning as a physical fictional space. The hotel itself is like a bridge between the past and the present, and the synopsis of the story is just in the middle of time. In Isle of Dogs, the unreal cities of Megasaki and Trash Island are not just backgrounds; they complete and support the story by informing the culture of the society and reflect the mood of the characters as a virtual fictional space. In The French Dispatch, while the urban space gives awareness about the city and the society, the offices of the characters carry out clues about their personalities on due to the story.

In the selected films of Wes Anderson, space was used as a complementary element in three out of five films and as a main element in two films. While there is no usage of space as a background, we may say that space is never used only as a background but consisted as a complementary or main element in order to strengthen the narrative and the story. In terms of the production of space, it is seen that the director uses existing spaces for strengthening the story and creates physical or virtual fictional spaces by reorganizing the main existing spaces. In none of the examples, a single setting is found, but the stop-motion animation film Isle of Dogs is the only one that an existing space is not used. Accordingly, four out of five films consist existing spaces and all of them have physical fictional space. One of the sets was

arranged with a ship, one with models, one with a residential building, one with an old store and one with a warehouse. In the productions where fictional space is preferred, virtual space fiction ratio is preferred only in one of them. According to Uğur Tanyeli's (2001) classification of the relationship between cinema and architecture based on film spaces and subjects, it is not observed that an architectural activity is being the main subject in Wes Anderson's films [22]. According to the data obtained, in two films, cinema creates a virtual space while in other two of them, the reproduction of the existing space is observed and both situations are seen together in one film. Barbara Bowman (1992) classifies the film spaces based on perception and definition of space; according to her, although habitual spaces that do not contribute to the story are almost being used in every film but the main spaces where the stories take place are colorful, aesthetic, extraordinary and standing out spaces [23]. Charles and Mirella Jona Affron (1995) classify the cinematic space in five ways; set as denotation, set as punctuation, set as embellishment, set as artifice, and set as narrative [24]. According to that scheme, it is seen that all set designs are created with details, create realistic images and emphasized to attract the attention of the audience in Anderson's films. In The Royal Tenenbaums, the family house hosts the story, is the central structure and acts as a memory space. In The Life Aquatic with Steve Zissou, the ship is a big part of the main character's life and the narrative of the film. In The Grand Budapest Hotel, the set is a narrative itself. In this case, "set as narrative" condition seems to be there in three films. In each film, set as denotation, set as embellishment, and set as punctuation principles were preferred, and in three of the films, set as narrative has been formed depending on space but set as artifice principle which is designed with computer effects was never used. (Figure 11)

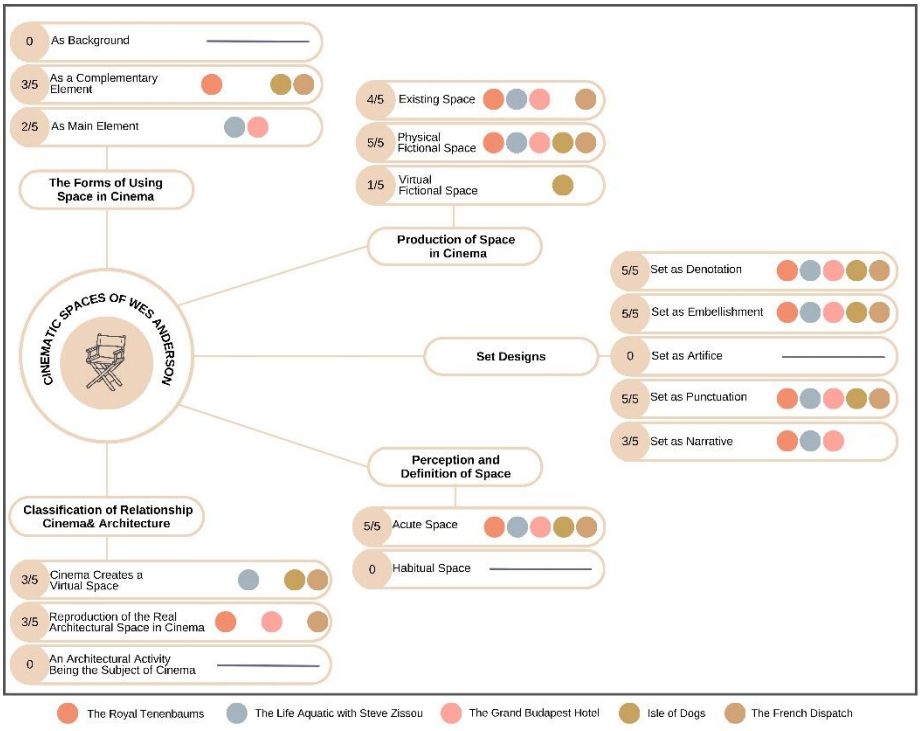


***Figure 11.*** *Analysis of Wes Anderson's Cinematic Spaces*

While the usage of natural light only can be seen in The Royal Tenenbaums, in Isle of Dogs we can see the usage of artificial light only. And in the other three films we see both natural and artificial lighting. It is obvious that Anderson's sine qua non is his way of combining pastel colors. In all the films it is seen that texture and materials are considered meticulously. Symmetry is an important element in Anderson's films. Symmetrical balance is the most common principle of his spatial organization while asymmetrical balance and radial balance, rhythm, symmetrical and asymmetrical axis are also in use. While The French Dispatch has only symmetrical balance, The Royal Tenenbaums has both symmetrical and asymmetrical balance, and Isle of Dogs has both symmetrical and radial balance. In Life Aquatic with Zissou and The Grand Budapest Hotel, all the balancing methods in cinema are encountered.

While symmetrical axis, another element of symmetry is seen in Life Aquatic with Zissou, The Grand Budapest Hotel and Isle of Dogs; asymmetrical axis is used in all of them except The Grand Budapest Hotel. Cinematic and spatial rhythm can be seen in only of the two the films if analyzed through the architectural facade. Perspective seems to be the representation of architectural space as a result of the combination of symmetrical balance and symmetrical axis and all the selected films in the study have frames formed with one-point perspective. (Figure 12)

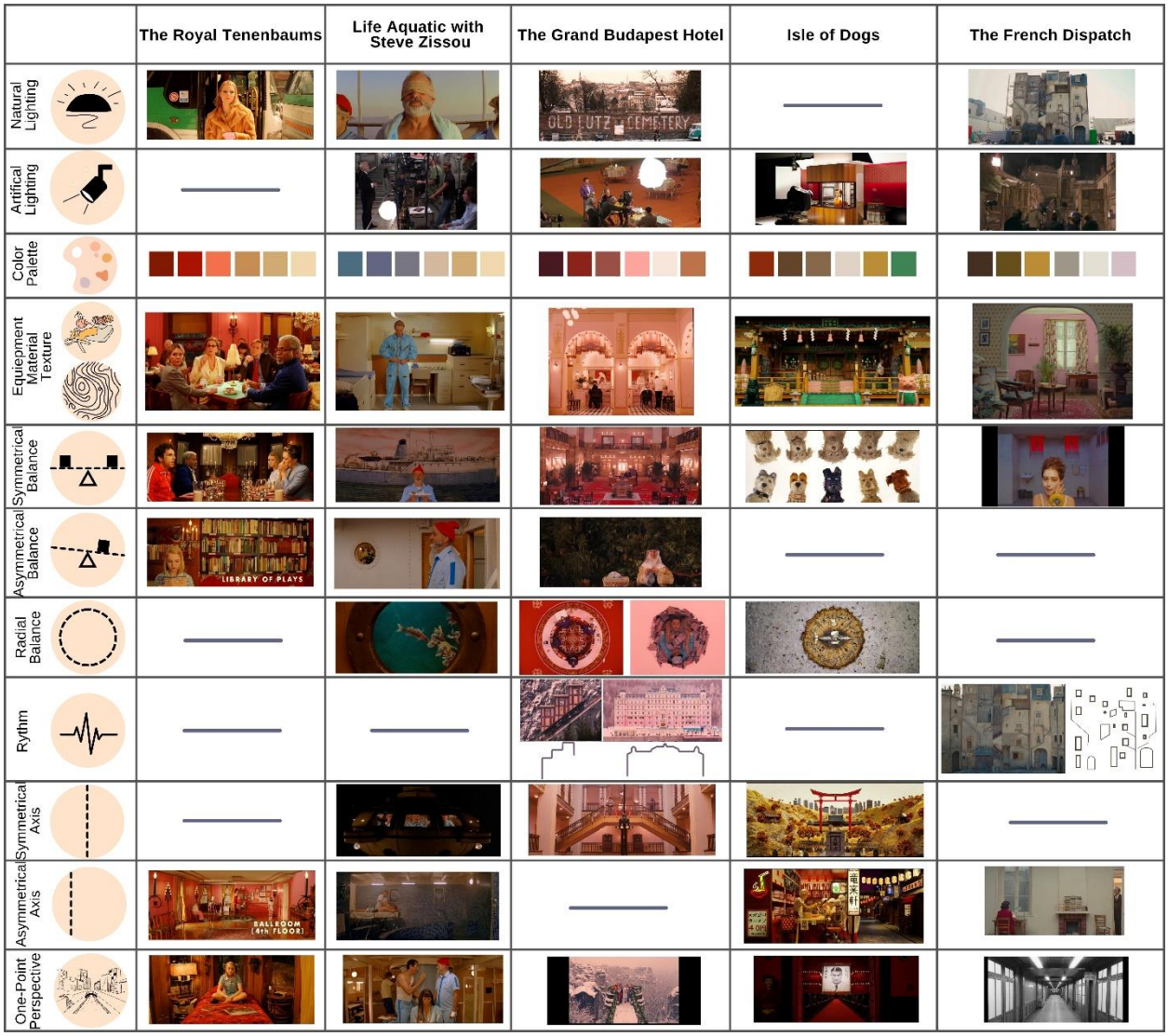


***Figure 12.*** *Analysis of Spaces in Wes Anderson Films Through Light, Balance, Symmetry and Perspective*

In Wes Anderson's films, space is often perceived as home by the characters. They sometimes feel trapped in a space or like inside a cell. Of the five films in this study, two have a sense of home, two have a sense of both home and cell, and only one has spaces perceived as both home, cell and place. The concept of spatial memory, which plays a role in the perception of space, is transferred to the audience through past or flashback scenes in the three of the films. Feelings of loneliness and belonging are the most common psychological effects of space on the individual by being seen in all films. Homelessness seems to be in two films. And the feeling of alienation is seen only in Life Aquatich with Zissou. Feelings of burnout and of eeriness can be seen in three of the films. (Figure 13)

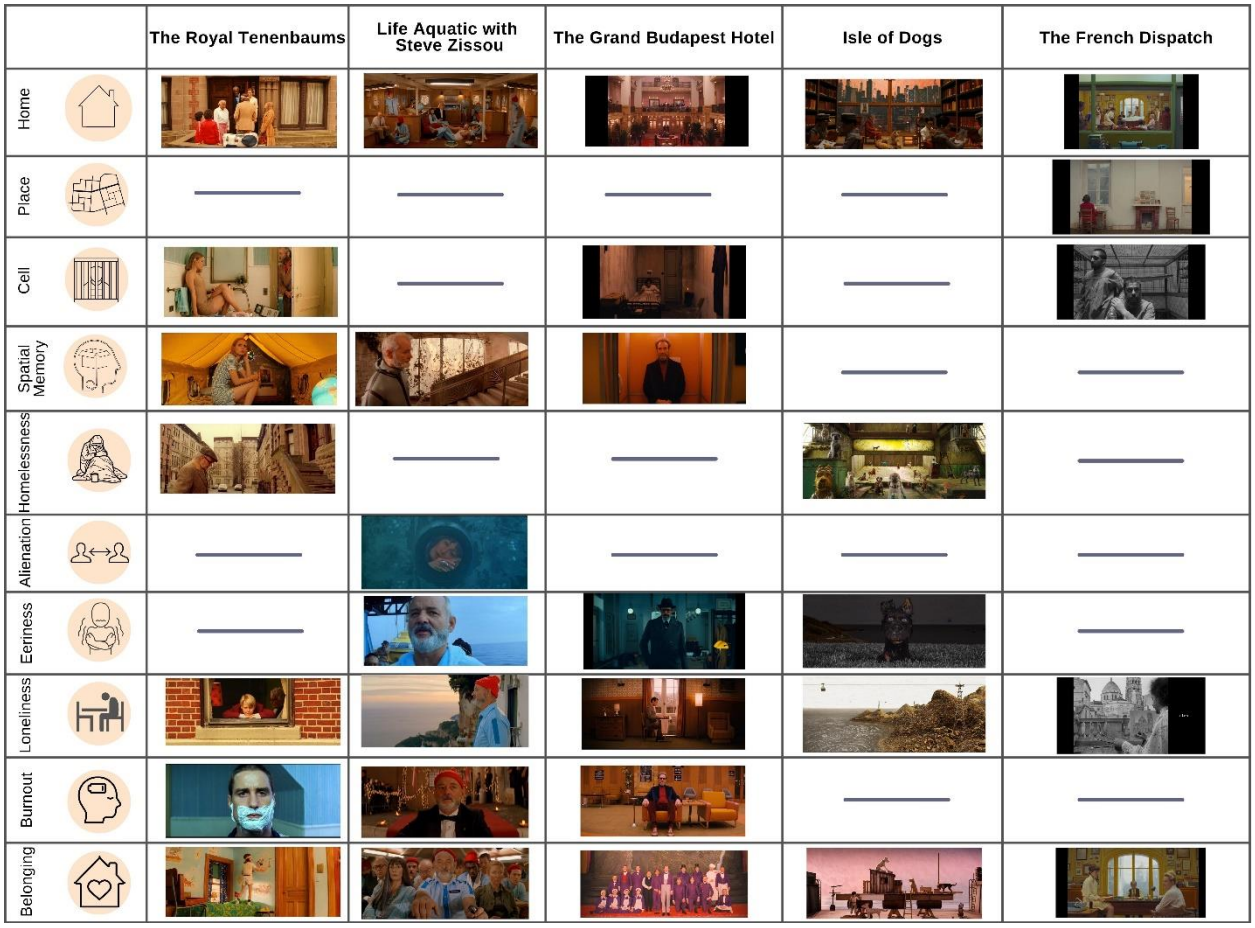


***Figure 13.*** *Analysis of Spaces in Wes Anderson Films Through Feelings*

## 5. CONCLUSION AND DISCUSSION

Despite how Wes Anderson's cinematic spaces are produced and represented emphasize that he is an auteur director due to his conscious design attitude, it should also be considered that not every auteur director stands between the cross section of cinema and architecture. Most of the directors choose existing places to create a world in harmony with their scripts but Anderson transforms the existing spaces and turns them into new structures to be felt as created for the film. He creates warm atmospheres with his unique cinematography, shapes a sense of belonging with symmetry and directs everything from the script to the sets.

During trying to convey his own world to the audience through fictional spaces, Anderson creates the cognitive space mentioned by Schulz that an individual can construct a space through thought, in his films. He writes the script as he pleases and finds solutions to turn it into reality. In this way, he eliminates the biggest obstacle that may arise in the creation of space in cinema, namely the budget. Location, color, material, texture, even light takes place in his mind long before the shooting starts so he knows how the scene will look. This is so similar to the architectural design methods. Modelling the cinematic space / set approach is also related to architecture as a representation of cinema. The influence of architectural movements such as Metabolism or Art Nouveau indicates that Wes Anderson is directly inspired by architecture and creates his own architectural style by synthesizing the existing and the imaginary. Combining the real and surreal; using symmetry and perspective as a signature he aims to greet the negative psychological effects of space with positive emotions by occurring dramatic realities.

It can be said that he uses radial balance to ensure and strengthen the symmetry from four directions and perspective for the representation of architectural space plays an important role in framing to support his preference of symmetry in cinema. Oppositely, asymmetry is applied to reflect the feelings of restlessness, negative atmosphere, eeriness and alienation from the space. At the same time, places like

home can suddenly turn into cells for the characters. This finding must be considered as a case that Wes Anderson can consciously play a role like an architect by organizing the psychological effects of space. He uses the powerful meanings and representation of colors in a dominant way in his cinematic spaces and raises the color element - which has a leading role in the perception of architectural space and supports dynamism, harmony and contrast - to a very successful point in the intersection of cinema and architecture. His conscious preference for material and texture which are among the physical factors affecting spatial perception is also in line with his architectural design approach. As he transforms non-existent spaces into real with his detailed portrayal, he has also shown how close he stands to the career or identity of an architect by designing Bar Luce.

In this study, it has been established that cinema and architecture strongly guide an advising interaction to each other which cannot be ignored, and various architectural design parameters are used in the production of space in cinema and serve as a reference for answering analysis of cinematic space. Wes Anderson's sets embody as a behavior of a naive individualism; architecture plays a central role in his approach to cinema, and he serves his audience just as an architect treating to his customers. The structures play starring roles in his films and his team carefully renovates to capture the spirit of space in each work. Even though Anderson just designs fictional spaces in his films, he has succedeed as an architect because his audience thinks that those fictional places are real and they want to visit.
It is possible to say that Wes Anderson undertakes the role of an architect in the world of cinema by transforming existing spaces. He is an artist who enables us to see the similarities of professional generating between architecture and cinema, he proves that directors may think and design just like architects, and most of the time they can create much more stylistic spaces with an understanding of art and aesthetics above most architects produce. He has a great influence on the consolidation of architecture and cinema, so it is more accurate and appropriate to consider / portray him as a director and architect.

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# Identification and Typological Analysis of Ancient Theatres in Anatolia; Assessment of Their Protection Status

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**Abstract**

Anatolia has hosted various civilizations from the beginning of history to the present. Some of the architectural works left by these civilizations have been preserved and survived until today. Among the works from the Classical, Hellenistic, and Roman periods, theatres stand out with their artistic and technical features and magnificence. Studies on the subject are related to partial or single structures. It has been determined that comprehensive research has yet to be conducted. This study, which used fieldwork and literature review as methods, has been aimed to examine the theatres from a comprehensive perspective, determine their levels of preservation, and contribute to the field of preservation. Within the scope of the study, Anatolian theatres have been identified and analyzed in terms of their construction periods, levels of preservation, excavation-restoration status, orientations, and plan typologies. The findings have been presented through graphical data.

## 1. INTRODUCTION

Even when considered in its literal sense, 'conservation' is a complex action that includes activities such as preservation, protection, stewardship, and taking preventive measures. Asatekin [1] has asserted that the first stage of conservation begins with determining what is worth preserving. Binan [2] has stated that "conservation" encompasses all limited resources with irreplaceable natural or cultural qualities. Tapan [3] has regarded conservation as an economic, physical, social, and scientific effort aimed at transferring natural or cultural assets to future generations. According to Erder [16], at the stage when humans established settlements, they developed a system for the protection of monuments.

Ahunbay [4] has noted that while the history of restoration can be traced back to the beginnings of architectural art, the intellectual origins of restoration based on scientific methods began in the 19th century. The scientifically oriented approach to conservation and restoration has been shaped by the principles outlined in the Venice Charter. Although the Venice Charter has published as a result statement, it has not served merely as a conclusion but rather as the beginning of accelerating and intensifying conservation efforts on an international scale [2].

In addition to the Venice Charter, major international regulations have been established such as the European Convention on the Protection of Archaeological Heritage, the European Convention on the Protection of the Architectural Heritage, and the UNESCO World Heritage Convention. In Turkey has been designed to align conservation legislation with international standards with Law No. 2863, along with its associated regulations, principle decisions, and guidelines. Alongside these, regulations, agreements, and foundational texts addressing current themes and issues arising during the process have also been published. An example of a thematic regulation is the 'European Council Regulation on the Use

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of Ancient Performance Areas' (1997), which addresses the sensitivity of ancient theatres and the balance between conservation and visitor expectations.

As a reflection of international developments, conservation legislation in Turkey has been designed to align with international standards through Law No. 2863, along with its associated regulations, principle decisions, and guidelines. These regulations, briefly discussed in relation to conservation, have shaped the present and future of cultural assets in the Anatolian region.

Since Anatolia hosts excellent civilizations that have left significant impacts on history, such as the Hittites, Urartians, Lydians, and Phrygians since ancient times, as well as communities whose names are unknown outside the scientific circles, it has been the subject of numerous studies. The artistic and technical value of the structures unearthed during the excavations further increased the interest in Anatolia. Settlements unearthed through archaeological excavations and containing movable cultural assets and data on past life have become important data sources for architectural research. With the period of the Greeks, who were a high-level civilization, especially in terms of the artistic and technical value their civilization reached. The city-states that grew and increased in number during the Hellenistic Period and the Roman Period had a particular importance with the diversity and number of public buildings they contained. Buildings such as agora, temples, gymnasiums, theatres, and baths in these cities have become a subject of research due to their features such as form, use of materials, and construction techniques.

"Theatres," which were placed using topography, unlike other structures that make up the city, are the most striking structures of ancient cities. The theatres' circular and gradual seating rows were positioned by carving and shaping the slopes, taking advantage of the natural slope. Acoustic reasons largely shaped the form of theatres. They consist of a circular platform, arc-shaped rows of seats directed towards this platform, and a rectangular-shaped closed space behind this platform. According to popular opinion, the foundation of ancient theatre dates back to the festivities held for Dionysus, the ancient Greek god of wine. Over time, actors were added to the artists who sang and danced in these festivals, and theatre art and architecture developed. Theatre architecture, which started with the Greek civilization, developed in the Hellenistic period and reached the highest technical and artistic level with the Roman rule. However, this specific form of theatre is not only in shows; It was also used in other places within the scope of parliamentary meetings, music concerts, and religious rituals. Functional differences also contributed to the development of theatre typology.

When scientific studies on theatres in Anatolia are examined, it is seen that they are generally evaluated in excavation results meetings because they are part of a whole. However, very few studies focus on specific periods and types of theatre. Theatres in Western Anatolia were examined by Ferrero [14], and in the catalog created by Sear, ancient theatres from all over the Roman world, including Anatolia, were included [17]. Frederiksen made a typology study for late Classical and early Hellenistic theatres [18], while Sear tried to reveal the geometry of Roman theatres in another work [23]. Yaşar examined and photographed theatre structures in Anatolia [32] and Özdilek published publications about Lykian theatres [19-33]. However, documentation studies regarding theatres have generally been found within the scope of excavation research. Although theatre structures were also included in the declarations regarding the results of excavations and research, it was also observed that there were studies directly related to theatres. The main ones of these studies include the analysis of the restoration of the Rhodiapolis Theatre and the theatres of Lycia by Özdilek [34], the documentation and damage analysis of the Arykanda Odeion by Kalfa [35], the documentation of the Teos Bouleuterion by Çalışkan [37], the documentation of the architecture of the bouleuterions in the Ancient City of Smyrna by Göncü [36], Kahraman and Acun Özgünler on the conservation problems of the Aizonai Odeion [5], Zoroğlu on the architecture of the Kelenderis Odeion [6], and Say Özer & Özer on the analysis of the architecture of the Kaunos Theatre [7]. However, none of these publications identify and document the state of preservation of theatre structures in Anatolia from a holistic perspective, and a comprehensive typological analysis has not been made.

The study, that main aim is to contribute to the preservation of ancient theaters, was initiated under the assumption that effective and high-quality preservation can only be achieved through the production of detailed and comprehensive information from various professional disciplines. As the initial step of this holistic perspective, this article has aimed to identify Anatolian ancient theatre, to make a typological analysis that includes the period to which they belong materials, location, and orientation, and determine their status as subjects for scientific research and preservation. Within the scope of the study, field studies, comprehensive literature research, photographs, and written and vectorized data were compiled, and the data of 229 theatre buildings were accessed. In the research carried out, it was seen that in the structures unearthed during the excavations, the distinction between small theatre-odeion and odeion-bouleuterion was not always clear, and double names referred to them, and bouleuterions were transformed into odeions in the process. For this reason, the "Theatre buildings" evaluated in the study were limited to having a monumental cavea and the analyses were made to include these structures.

The theatre structures identified within the scope of the study were analyzed on visual and literary data in terms of construction period, plan type, cavea orientation, excavation-restoration status and level of preservation, and a result chart was created with the data obtained and evaluated.

## 2. THEATRES IN ANCIENT ANATOLIA

Ancient Age, Anatolia B.C. It is a period that started in 3000 BC and includes four sub-periods: Archaic, Classical, Hellenistic, and Roman. At the end of the Dark Age in 800 BC, new settlements were established in Anatolia by the Greeks [8]. These settlements, called "city-states" [9], are political formations that develop around a religious center and are located in an area that includes rural areas, urban areas, border areas, and non-urban sacred areas [10]. Theatres, associated with religious structures in the Greek civilization, also began to take a permanent place in city plans in this period, and theatre architecture became clear [11].

The Hellenistic period began in Anatolia in 334 BC with the rule of Alexander the Great, king of Macedonia [12]. During this period, Hellenistic Kingdoms were established in Anatolia, and the cities previously established also developed [13]. With the beginning of Hellenism, "theatres" continued to be built in all important cities as a part of the democratic structure [14].

The inheritance of Pergamon, one of the Hellenistic kingdoms, to Rome in 133 BC enabled Rome to enter the Anatolian lands [15]. Rome annexed this region to its territory as the "Asia" province and, in the process, annexed other Anatolian lands as provinces [15]. When the Romans began to dominate the Hellenic geography, they continued the Hellenic traditions and emphasized urbanization and city planning [16]. As the Romans expanded the cities, the theatres of the cities also grew, and from the end of the 1st century to the 3rd century A.D., the theatres of the big cities reached dimensions never seen before [14]. Justinianus, who ultimately aimed to end Paganism with the acceptance of Christianity in the Roman period, made regulations regarding theatres, and over time, theatres lost their reason for existence [14].

Although the theatres of the Classical, Hellenistic, and Roman Periods differed, theatre architecture developed through three main unchanging elements defined by Frederiksen: cavea, orchestra, and scene [18]. In theatre buildings, the inclined section where the gradually arranged seating rows (auditorium) are located is called "cavea"[18]. Cavea was used as a semi-circle in the theatres of the classical period and transformed into a horseshoe form in the Hellenistic period [19]. "Orchestra" is the name given to the platform surrounded by cavea. In the archaic period, before the stage and seating area were built, the orchestra, which is the part where the choir was located, and games were performed, was built, and over time, the orchestra took the form of a full circle [19]. The "scene", used as a stage building, reached its traditional form in the

Late Classical Period and continued its development in the Hellenistic Period [19]. In the 2nd and 3rd centuries A.D., with the influence of gladiator games, amphitheater structures were needed in cities [17]. For this purpose, elliptical or circular planned amphitheaters were built instead of theatres, or existing theatres were converted into amphitheaters [17].

**Table 1.** *The differences between Roman period theatres and Greek-type theatres built in the Classical and Hellenistic periods [21]*

| Greek Theatre | Roman Theatre |
|---|---|
| The orchestra is full circle. The stage house and the orchestra are separate from each other. | The orchestra is semicircular. The stage house and the orchestra have become a whole. |
| The stage is high and shallow. The proscenium is decorated with columns and painted. | The stage is low and deep. The proscenium has a facade with ornaments, niches, and sometimes half-columns adjacent to the wall. |
| The back of the stage has large openings with views. | The background is a magnificent architecture |
| Entrances are open. For priests, there are seats of honour at the bottom. | There are vaulted entrances and areas reserved for game providers on these entrances. |
| There is no class distinction in the seating areas. All audience members enter from the same area leading to the orchestra. | Rich and distinguished people sit in the orchestra. The people sit in areas separated by parapets according to their classes. The public enters through different vaulted entrances. |
| Since the seating areas are built on a hillside, they have no facade and no colonnade system. | Although the seating rows are sometimes built on the hillside, they are mostly built on flat ground, on an infrastructure with a rich façade and galleries with columns. |
| Theatres were built in sacred areas. | A theatre could be built wherever the ground was solid. Sometimes there could be a mausoleum above the cavea. |
| Greek theatre is a religious and democratic theatre. There are equally good seating chairs for everyone. The plays staged are mostly literary works. | The Roman theatre had a class order. There are different seats for different classes in society. Special seats were made for elite classes, leaving less space for performances. Roman performances are products for the tastes of the public. |

### 2.1. Past Studies on Typological Analysis of Theatres

The first information about the plans of the theatres can be found in Vitruvius' 5th Book called "De Architectura." Vitruvius, who distinguished theatres as Greek and Roman theatres, gave information about the three-centered plan design of Greek theatres. He described the design of Roman and Greek theatres. [22]. However, Frederiksen is the first to classify theatres typologically [18](Fig.1). He typologically classified 98 Classical and early Hellenistic Greek theatres in terms of their plan features, and also included examples from Anatolia in this classification. Frederiksen determined that there are 7 types of theatre in total.

The buildings designated as Type A have seating areas carved into the rocks in the classical period and were built after the 5th century B.C. However, Frederiksen determined that these structures as not suitable for typology [18]. Buildings designated as type D are defined as buildings built with a rectangular plan and without a monumental seating area. However, it was excluded from the evaluation because it had no continuity after the classical period [18].

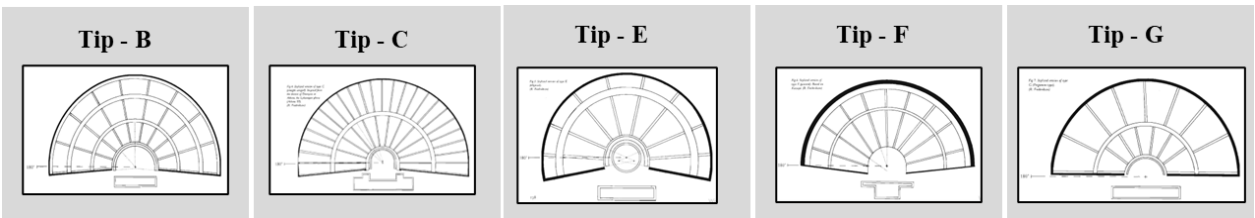



**Figure 1.** *The typology according to the plan types of the theatres by Frederiksen [18]*

The cavea and orchestra of the B-type theatres are larger than a semi-circle and concentric. This type, in which the cavea is mostly finished with a kerkides design, constitutes the simplest plan type[18]. Although it belongs to the early Classical period, it was found to be widespread at the beginning of the Hellenistic period [18].

The theatres called C type were defined by Frederiksen as having straight wings, it was determined that the cavea wing was parallel to the kerkides above in the lower cavea, the orchestra and the cavea were concentric in the semicircular section, and they were mostly seen in the late Classical period in the second century BC [18].

Theatres called E type are defined as having an elliptical plan. Frederiksen determined that these theatres had three circular centers, which was the example most similar to Vitruvius' Greek theatre plan[18]. He explained that it was mostly applied in Asia Minor, that there were examples of all sizes, and that examples of this plan type were mostly dated to the second and third centuries BC [18].

Frederiksen stated that type F was seen in very few examples and that in these examples, the cavea was reduced backward to indicate the stage [18].

He stated that in the so-called G-type theatres, the cavea walls formed an angle of 180° or close to 180°, and although he had reservations about whether it was a separate plan type from the B type theatres, these types of theatres had a common characteristic that was set to a standard and continued in the Roman period [18].

Vitruvius' Roman theatre plan, similar to Frederiksen's G type, was designed by placing four equilateral triangles at equal distances inside the circle designed as an orchestra. In this setup, the side of the triangle in front of the scene was determined as the front line, and other architectural elements were placed to meet the corners of the triangles[ 22]. However, researchers have stated that they could not find any examples of theatres that fit Vitruvius' plan scheme in the theatre buildings they examined [23-25]. Fuchs stated that Vitruvius explained the general framework of Roman theatres and probably presented his favorite theatre designs [25]. Sear also analyzed the plans of Roman theatres, based on Vitruvius' method, and produced schemes based on the geometric relationships between the elements of the theatres [23](Fig 2). In addition to examples based on four equilateral triangles placed inside the Vitruvian orchestra circle, Sear also identified examples based on two pentagons and two squares. In these models, the points where geometric shapes intersect with the circle are formed as axis. Architectural elements such as the cavea wall, skene, and stairs between the rows of seats were placed on these axes.

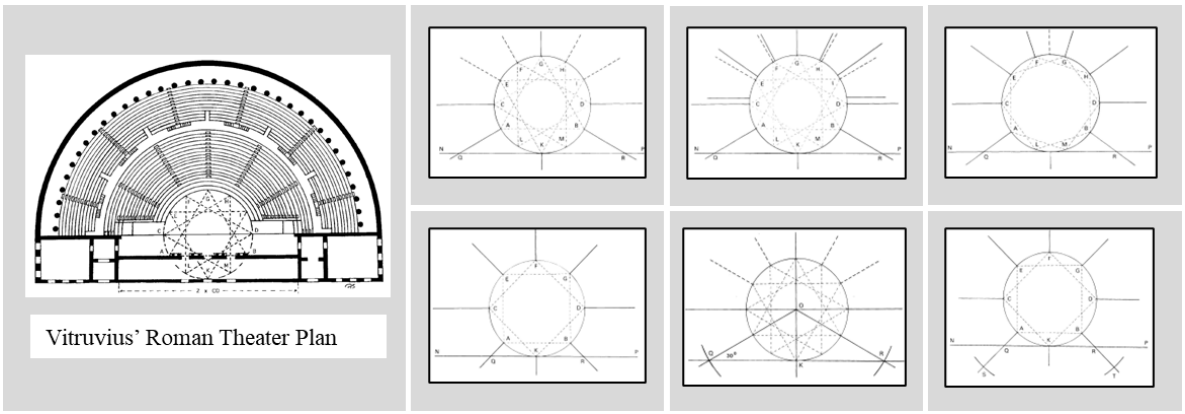



**Figure 2.** *Vitruvius' Roman theatre plan and plan types drawn by Sear[23]*

Small, on the other hand, examined theatres regarding the suitability of the colonnaded facades of the stage structures to the Vitruvian model and classified them into 3 groups [24]. 1st group; These are examples where the front of the scene forms a straight line. Vitruvius' model is also classified in this group. He classified the second group as those with a recessed front façade and semi-circular niches surrounding the protocol doors. He defined the third group as semi-circular niches surrounding the stage doors [24].

### 2.2. Past studies about The Typological analysis of the theatres of Anatolia

Ancient theatres spread over a wide geography in Anatolia and are generally defined as Hellenistic, Roman, or Greco-Roman in the literature. Although Ferrero, who examined theatre structures in Western Anatolia, stated that he could not detect any pre-Hellenistic theatre in Anatolia [14], Özdilek stated that she identified 32 theatre structures in the Lykia Region and that they date back to the Classical Period [19]. She stated that there are examples consisting of almost rectangular seating areas carved into the bedrock, dating back to. She cited the theatrical areas in the acropolis of Mnara and Myra as examples of this [19]. The Kıran Lake sacred area theatre was dated to the classical period by researchers [26], and the excavation results revealed that there was a classical period stage building in the Kaunos theatre [27].

In addition to all these, there are theatres in Anatolia such as Telmessos Acropolis Theatre, Kandyba Theatre, Simena Theatre, whose entire cavea was carved into the primary rock, and it is difficult to determine the exact construction dates of the rock-carved theatres [34]. For this reason, these structures are dated with approximate time intervals in the literature.

Theatres in Anatolia are mostly described as Greco-Roman in the literature. Greco-Roman theatres were obtained by enlarging Hellenistic theatres with Roman construction techniques or by leaning a part of the cavea on the hillside and continuing the Hellenistic tradition to save labor in theatres built during the Roman period [34]. Tek stated that most of the theatres in Anatolia were changed during the Roman Period and gained Greco-Roman features [13]. Özdilek, according to its inscription, was built by the architect Zenon in A.D. He stated that even the Aspendos theatre, built in the 2nd century, leaned on the hillside by the Hellenistic tradition and thus had Greco-Roman characteristics [34].

According to Ferrero, the Roman theatre scheme, which is solid, practical, and can be built immediately anywhere, was applied all over the empire, while the Anatolian peoples and the Hellenes did not use this vaulted scheme directly but made some improvements in their traditional arrangements [14]. This is how Greco-Roman-style theatres in Anatolia emerged. Özdilek stated that Greco-Roman theatres, which are accepted as a form specific to Anatolia, are also found in Greece outside Anatolia [34]. According to Sear, during the Roman period in Asia Minor and Greece, theatres developed adhering to the Hellenistic tradition, the cavea exceeded the semi-circle, and the Hellenistic character was preserved in the stonework and carved details [17].

Hellenistic period theatres and Roman theatres in Anatolia are partially different in terms of building materials. Hellenistic Period theatres were generally built with local materials such as limestone, travertine, and granite [14]. However, marble was also used in places where the local stone was marble or in cities such as Miletus and Priene, where marble could be easily transported by sea [14]. In the Hellenistic period, skene and cavea were generally built from the same material, and stone or marble was used for the decorated sections [14]. Covering boards and knitted blocks were usually used in the seating rows. Limestone was mostly preferred as the cladding/block material in theatres, and marble was preferred in Ionia [14]. Although local stone material was used in the infrastructure in Roman period theatres, marble material was used in the seating rows and decorations [14].

The plan types of some theatres dating back to the Hellenistic period were examined by Fredersiksen, Balabaura, Iassos, Antiphellos, Kaunos, Kibyra, Knidos-1, Letoon, Termessos, Stratonikeia, Sikyon, Rhodiapolis and Pinara theatres are classified as type B, Assos theatre was as type C, Ephesus, Magnesia am Meander, Kadyanda, Oinoanda, Priene theatres are classified as type E, and Pergamon and Perperene theatres are classified as G type [18]. In his study, Small classified the Daphne, Aspendos, and Pergamon theatres dating back to the Roman period as the first group [24].

In addition to these, there are examples in Anatolia that have a closed plan type, as in the Side Theatre (Fig.3a), but whose orchestra is more than a semi-circle and whose cavea exceeds 180°, as well as examples that have a closed plan type, a semi-circular structure, as in the Aspendos Theatre (Fig. 3b). There are also examples of a shaped orchestra and a 180° cavea. Another plan type is mostly seen in

small theatres and odeions or bouleuterions, such as the Kibyra Odeion (Fig. 3c). This plan type has a semi-circular orchestra, a 180° cavea, and a corridor separating the cavea and the scene.

Other plan types seen in odeions and bouleuterions consist of examples surrounded by rectangular walls. Types with caveas exceeding 180°, as in the Smyrna Early Roman Bouleuterion (Fig. 3d), and examples with caveas of 180°, as in the Troy Bouleuterion (Fig. 3e), were identified. Additionally, plan types with angular U-shaped caveas have only been encountered in bouleuterions. There are examples with angled cavea corners, as in the Priene Bouleuterion (Fig. 3f), and examples with straight corners, as in the Notion Bouleuterion (Fig. 3g).

In addition to all these theatre structures, amphitheater structures were built in Anatolia, as in other Roman lands. It is thought that a part of the cavea of the Mastaura Amphitheatre, whose excavations have just begun, leans on the hillside and in this respect it may have been built on a Hellenistic theatre [28] In the Pergamon Amphitheatre, the cavea and its relationship with the slope were investigated, and according to the first results, it was understood that the cavea was built with a more cost-effective method than a vaulted infrastructure [29].

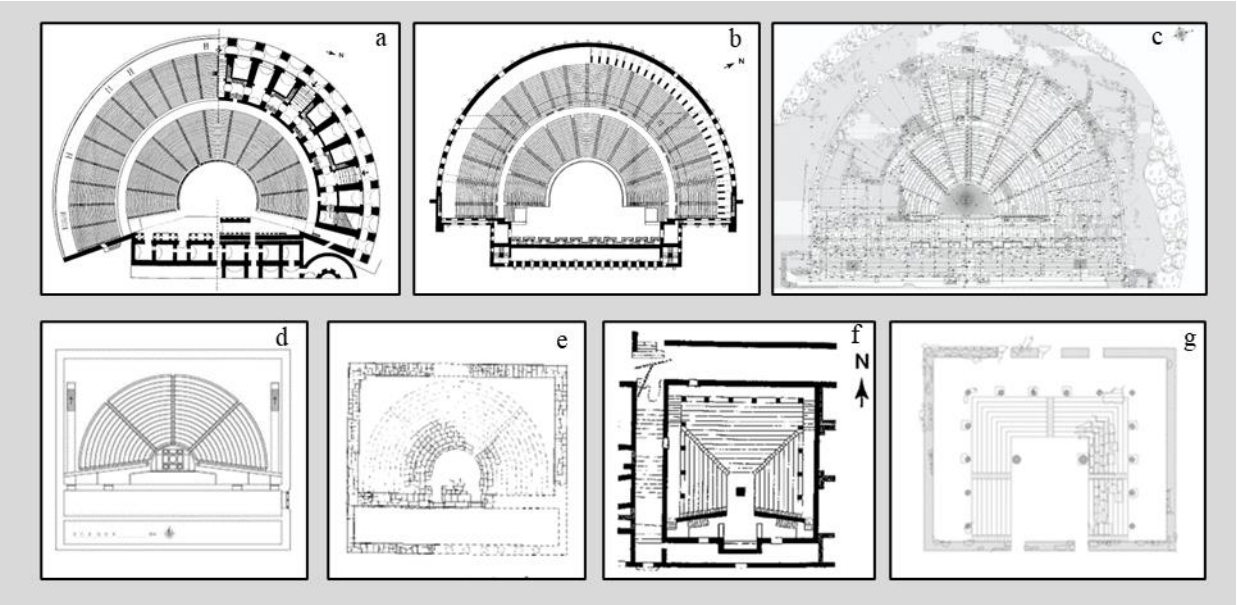



**Figure-3.** *a.Side Ancient Theatre Plan[17], b. Aspendos Ancient City Theatre[17], c. Kibyra Odeion[30], d. Smyrna Early Roman Bouleuterion[36], e. Troy Bouleuterion[17], f. Priene Bouleuterion[17], g. Notion Bouleuterion[31]*

## 3. CURRENT FINDINGS REGARDING THE IDENTIFICATION AND TYPOLOGICAL ANALYSIS OF ANATOLIAN THEATRES

Within the scope of the study, as a result of data scanning on ancient theatre structures in Anatolia - including odeions and bouleuterions - a total of 229 theatre-shaped structures were identified. First, the identified theatres were listed, and then individual research was conducted on the listed theatres. By determining the locations (city/district) of the theatres, photographs of their general appearance, site plans that will help understand their relationship with the city, plans sufficient to give an idea about their architectural features, literary data including their dating, and information on whether excavations and restoration work have been carried out have been tried to be obtained. The data about the theatres where excavations were carried out have been obtained largely, but only some of the desired data about many theatre structures could be obtained. The theatre buildings were analyzed regarding the first construction period, plan type, cavea orientation, excavation, and restoration status in light of the data obtained. In addition, the preservation levels of the theatres were determined as a percentage based on the visual and literary data in previous publications.

It was seen that interventions were made in various periods in the theatre buildings identified within the scope of the study. Therefore, the first construction periods were taken as a basis, and it was determined that they were theatre buildings dating back to the Classical, Hellenistic, and Roman periods. It was understood that the theatres built in the Classical and Hellenistic periods were of the Greek type, and differences between these theatres and Roman theatres were identified. Greek-type theatres have an open plan type, while Roman theatres have a closed plan type; The orchestra elevation was lower in Roman theatres than in Greek-type theatres, and there were mostly water channels in the orchestra. In Roman theatres, the scenery became more ornate and flamboyant and formed the background, while in Greek-type theatres, the background was the landscape. In Roman theatres, it was observed that the stage was lower and deeper than the Greek type theatres, due to the lower orchestra level and the plays being played on the stage. The most distinctive feature of Roman theatres is the arch-vault system used; larger theatres could be built in this way. Vaulted passages are opening to different parts of the cavea; It was understood that the seating rows were mostly decorated, and seating was allocated to different groups.

However, it has been observed that in Roman theatres in Anatolia, there were frequent examples where the orchestra exceeded the semi-circle, and the number of theatre structures rising on their structure was very few, mostly caveas leaning on the hillside. It has been observed that especially the Late Hellenistic Period theatres and the Early Roman theatres are mainly similar, and this makes the dating of theatre structures difficult. It was understood that the fact that the theatres that were reshaped with the additions made during the Roman period and the theatres built according to the Greek plan type during the Roman period were called Greco-Roman in the literature caused a conceptual confusion, and instead of classifying the theatres in terms of style, theatre structures were classified according to their first construction periods.

| Plan Type | | Plan Characteristics | Plan Type | | Plan Characteristics |
|---|---|---|---|---|---|
| Type – A | Carved From main rock | Cavea is entirely carved from main rock | Type R1 |  | Dating mostly to the Early Roman Period, it has a closed plan type, an orchestra of more than a semicircle, and a cavea of more than 180°. |
| Type – B |  | cavea larger than a semicircle, seen since the classical period. | Type R2 |  | Dated to the Roman Period, it has a closed plan type, a semicircular orchestra and a 180° cavea. |
| Type – C |  | Mostly dated to the Late Classic period, the cavea is larger than 180° and U-shaped. | Type – O1 |  | It has a cavea of approximately 180° and a corridor separating the cavea and the skene, mostly seen in small theatres, odeions or bouleuterions. |
| Type – D | Without Typology | Unique examples that do not directly match any theater type | Type O2 |  | It has a 180° cavea surrounded by a rectangular wall, seen in odeions or bouleuterions. |
| Type – E |  | It was built mostly in the second and third centuries BC, and its cavea was larger than 180° and had an elliptical plan. | Type– O3 |  | Surrounded by a rectangular wall, seen in odeion or bouleuterion, cavea exceeding 180° |
| Type – F |  | *Cavea* is smaller than180° | Type B1 |  | It has a cornered U-shaped cavea, seen in Hellenistic bouleuterions, with angled corners of the cavea. |
| Type – G |  | Seen in the Hellenistic and Roman periods, the cavea is 180° or close to 180° | Type– B2 |  | It has a cornered U-shaped cavea, seen in Hellenistic bouleuterions, with flat corners of the cavea. |

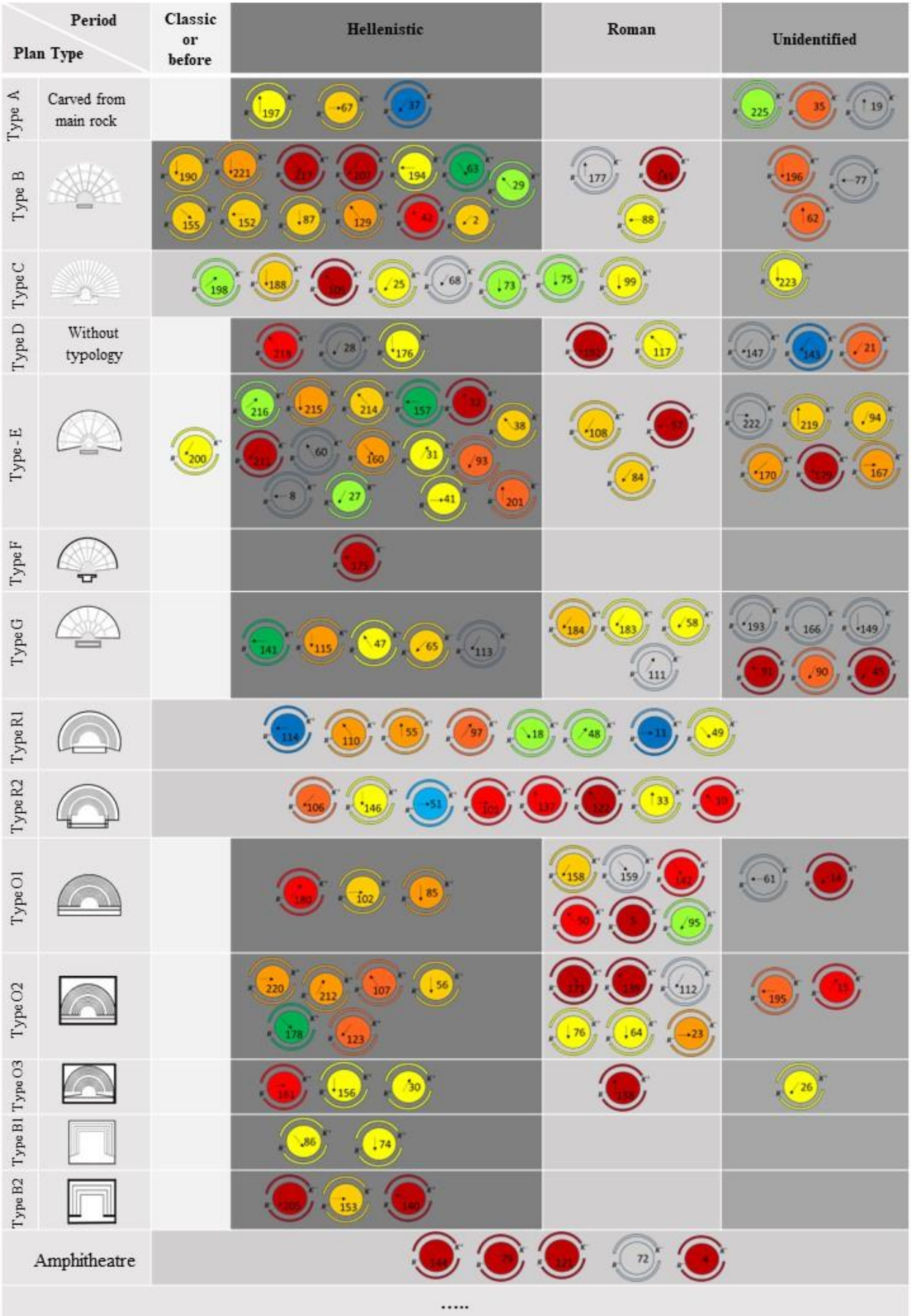
**Figure 4.** *Plan type and the characteristics of the theatres and theatre shaped structures*

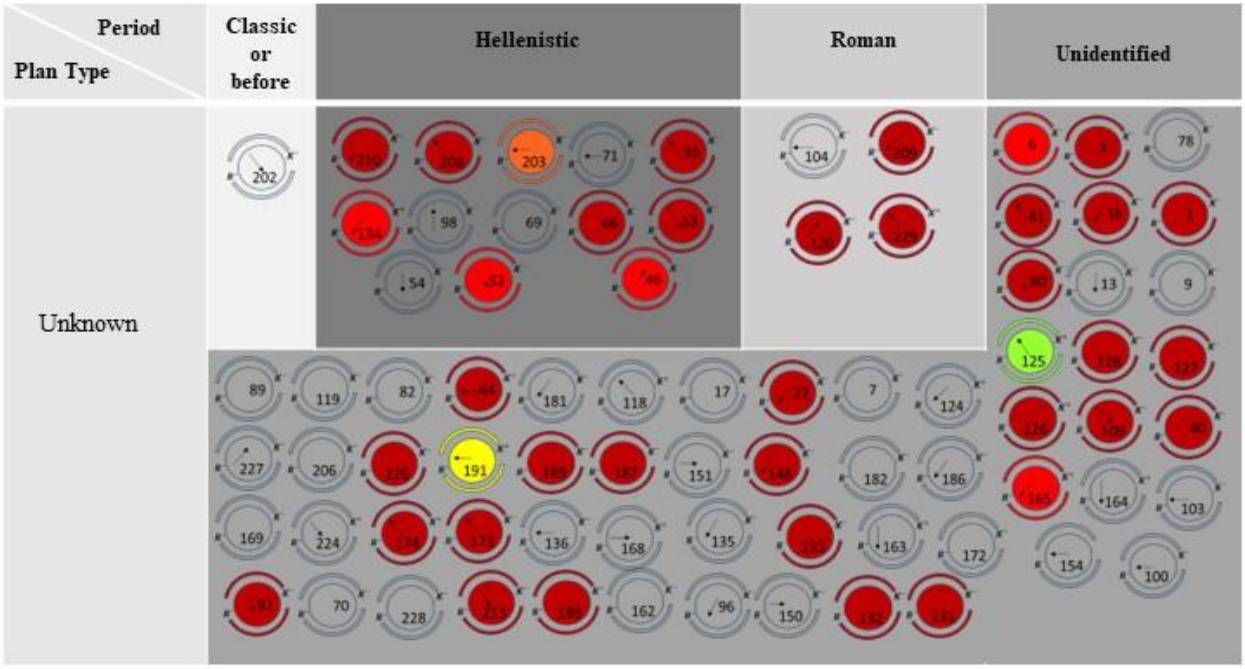
It has been observed that the rock-carved theatres, which were built by carving all or almost all of the cavea into the main rock, did not exactly comply with the Greek or Roman plan types. In rock-carved theatres, unlike other theatres, no stone blocks or covering material were used on the cavea steps; the main rock was carved directly into the seating step. In some rock-carved theatres that were shaped as geographical features allowed, the cavea steps differed within themselves. For this reason, rock-carved theatres are typologically considered as a separate class.

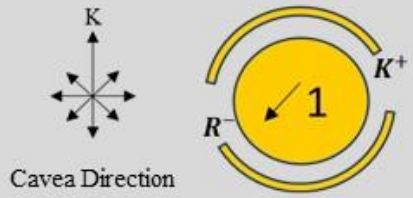
Anatolian amphitheatres are also discussed typologically in a single class. Among the amphitheatre structures, only the plan survey of the Pergamon amphitheatre was available; the plans of the other structures were not available. The research has revealed that the number of studies on amphitheatres is low, the protection level of most of these structures is very low, and excavations still need to be carried out or have not been completed. Since the data obtained were mostly plans processed schematically on site plans, it was seen that it was not possible to analyze the plan type based on the visuals of the ruins. For this reason, no distinction was made in terms of plan type.

In the study, making a typology according to the plan schema was deemed appropriate. The plan types created by Sear for Roman theatres were not evaluated within the scope of the study because they were based on determining the geometric principles that may have been used in theatre design rather than the morphology of the theatre. Since the grouping made by Small was based only on the morphology of the front side of the scene, it did not coincide with the holistic structure of the study and was excluded from the scope. For this reason, Frederiksen's previous classification was deemed appropriate, but additions were made due to the different types of theatres identified over time (Fig 4)

In determining the level of protection of the theatres, their pre-restoration state was considered for those that could be identified; For those who could not be identified, their current situation was considered valid. Protection levels are expressed with color codes; the best protection status (90-100%) is shown using blue, and the worst (0-10%) using dark red.


Period
Plan Type
Classic or before
Hellenistic
Roman
Unidentified
Type A
Carved from main rock
Type B
Type C
Type D
Without typology
Type - E
Type F
Type G
Type R1
Type R2
Type O1
Type O2
Type O3
Type B1
Type B2
Amphitheatre
.....




Cavea Direction

$K^+$:Excavation process continues / finishes
$K^-$ :Excavation process has not started
$R^+$ : Conservation / restoration continues / finishes
$R^-$ : Conservation has not started
**1 … 229 :** Number of theatre


Level of Preservation

1. Adana, Ceyhan, Mapsuestia/ Misis Ancient City Theater
2. Adana, Karataş, Magarsus Ancient City Theater
3. Adana, Kozan, Anavarza Ancient City Theater
4. Adana, Kozan, Anavarza Ancient city Amphitheatre
5. Adana, Seyhan, Augusta Ancient City Theater
6. Adana, Tufanbeyli, Comana (Şar) Ancient City Theater
7. Adana, Yumurtalık, Aigeai/ Ayas Ancient City Theater
8. Afyonkarahisar, Dinar, Apameia Kibotos/ Kelainai Ancient City Theater
9. Afyonkarahisar, Sülün, Prymnesos Ancient City Theater
10. Ankara, Altındağ, Ankyra Ancient City Theater
11. Antalya, Aksu, Perge Ancient City Theater
12. Antalya, Alanya, Antiochia ad Cragum Ancient City Bouleuterion
13. Antalya, Alanya, Colybrassos Ancient City Theater
14. Antalya, Alanya, Syedra Ancient City Theater/ Bouleuterion
15. Antalya, Alanya, Selinus / Trianapolis Ancient City Odeion
16. Antalya, Alanya, Laertes Ancient City Theater
17. Antalya, Akseki, Kotenna (Gödene/Dösene) Ancient City Theater
18. Antalya, Demre, Myra Ancient City Theater
19. Antalya, Demre, Myra Ancient City Acropolis Gathering Area
20. Antalya, Demre, Kyaneai Ancient City Theater
21. Antalya, Döşemealtı, Ariassos City Bouleuterion/Odeion
22. Antalya, Döşemealtı, Ariassos Ancient City Theater
23. Antalya, Döşemealtı, Termessos Ancient City Odeion / Bouleuterion
24. Antalya, Döşemealtı, Sia/Osia Ancient City Theater
25. Antalya, Finike, Limyra Ancient City Theater
26. Antalya, Finike-Elmalı, Arykanda Ancient City Odeion / Bouleuterion
27. Antalya, Finike-Elmalı, Arykanda Ancient City Theater
28. Antalya, Finike-Elmalı, Arykanda Ancient City Bouleuterion
29. Antalya, Kaş, Antiphellos Ancient City Theater
30. Antalya, Kaş, Patara Ancient City Bouleuterion
31. Antalya, Kaş, Patara Ancient City Theater
32. Antalya, Kaş, Xanthos Ancient City Hellenistic Theatre
33. Antalya, Kaş, Xanthos Ancient City Roman Theatre
34. Antalya, Kaş, Nisa/Neiseus Ancient City Theater
35. Antalya, Kaş, Kandyba Ancient City Theater
36. Antalya, Kaş, Phellos Ancient City Theater
37. Antalya, Kaş, Simena Ancient City Theater
38. Antalya, Kaş, Apollonia Ancient City Theater
39. Antalya, Kemer, Mnara Ancient City Theater
40. Antalya, Konyaaltı, Attaleia Ancient City Theater
41. Antalya, Korkuteli, Termessos Ancient City Theater
42. Antalya, Kumluca, İdebessos Ancient City Theater
43. Antalya, Kumluca, Rhodiapolis Ancient City Theater
44. Antalya, Kumluca, Gagai Ancient City Theater
45. Antalya, Kumluca, Korydalla Ancient City Theater
46. Antalya, Kumluca, Olympos Ancient City Theater
47. Antalya, Kumluca, Phaselis Ancient City Theater
48. Antalya, Manavgat, Side Ancient City Theater
49. Antalya, Manavgat, Selge Ancient City Theater
50. Antalya, Serik, Aspendos Ancient City Bouleuterion
51. Antalya, Serik, Aspendos Ancient City Theater
52. Antalya, Serik, Sillyon Ancient City Theater
53. Antalya, Serik, Sillyon Ancient City Odeion/ Bouleuterion
54. Aydın, Bozdoğan, Piginda/Bargasa Ancient City Theater
55. Aydın, Çine, Alabanda Ancient City Theatre
56. Aydın, Çine, Alabanda Ancient City Odeion / Bouleuterion
57. Aydın, Didim, Didyma Ancient City Theater
58. Aydın, Didim, Milet Ancient City Theater

59 Aydın, Didim, Milet Ancient City Bouleuterion
60 Aydın, Germencik, Magnesia Ancient City Theatre
61. Aydın, Germencik, Magnesia Ancient City Odeion
62. Aydın, Germencik, Magnesia Ancient City Theatron
63. Aydın, Karacasu, Aphrodisias Ancient City Theater
64. Aydın, Karacasu, Aphrodisias Ancient City Odeion/ Bouleuterion
65. Aydın, Karpuzlu, Alinda Ancient City Theater
66. Aydın, Koçarlı, Amyzon Ancient City Theater
67. Aydın, Kuşadası, Panionion Ancient Theater
68. Aydın, Merkez, Tralleis Ancient City Theater
69. Aydın, Merkez, Tralleis Ancient City Ecclesiasterion
70. Aydın, Nazilli, Antiochia am Meander Ancient City Theater
71. Aydın, Nazilli, Harpasa Ancient City Theater
72. Aydın, Nazilli, Mastaura Ancient City Amphitheater
73. Aydın, Söke, Priene Ancient City Theater
74. Aydın, Söke, Priene Ancient City Bouleuterion
75. Aydın, Sultanhisar, Nysa Ancient City Theater
76. Aydın, Sultanhisar, Nysa Ancient City Gerontikon/ Bouleuterion/ Odeion
77. Aydın, Yenipazar, Orthosia Ancient City Theater
78. Balıkesir, Bigadiç, Blados Ancient City Theater
79. Balıkesir, Erdek, Kyzikos Ancient City Amphitheatre
80. Balıkesir, Erdek, Kyzikos Ancient City Theater
81. Bartın, Amasra, Amastris Ancient City Theater
82. Bartın, Amasra, Amastris Ancient City Odeion
83. Bolu, Merkez, Claudioplis Ancient City Theater
84. Burdur, Ağlasun, Sagalassos Ancient City Theater
85. Burdur, Ağlasun, Sagalassos Ancient City Odeion
86. Burdur, Ağlasun, Sagalassos Ancient City Bouleuterion
87. Burdur, Altınyayla, Balboura Ancient City Upper Theatre
88. Burdur, Altınyayla, Balboura Ancient City Lower Theatre
89. Burdur, Bucak, Sia / Osia Ancient City Theater
90. Burdur, Bucak, Melli/Milias Ancient City Theater
91. Burdur, Bucak, Cremna / Kremna Ancient City Theater - 1
92. Burdur, Bucak, Cremna / Kremna Ancient City Theater – 2
93. Burdur, Gölhisar, Boubon Ancient City Theater
94. Burdur, Gölhisar, Kibyra Ancient City Theater
95. Burdur, Gölhisar, Kibyra Ancient City Odeion-Bouleuterion
96. Bursa, Gölyazı, Apollonia ad Rhyndacum Ancient City Theater
97. Bursa, İznik, Nicea Ancient City Theater
98. Bursa, Mudanya, Apameia -Myrlea Ancient City Theater
99. Çanakkale, Ayvacık, Assos Ancient City Theater
100. Çanakkale, Bayramiş, Skepsis Ancient City Theater
101. Çanakkale, Biga, Parion Ancient City Theater
102. Çanakkale, Biga, Parion Ancient City Odeion
103. Çanakkale, Ezine, Alexandria Troas Ancient City Theater
104. Çanakkale, Ezine, Alexandra Troas Ancient City Odeion
105. Çanakkale, Merkez, Troya Ancient City Big Theatre–A
106. Çanakkale, Merkez, Troya Ancient City Small Theatre– Odeion -B
107. Çanakkale, Merkez, Troya Ancient City Bouleuterion -C
108. Denizli, Buldan, Tripolis Ancient City Theater
109. Denizli, Honaz, Kolossai Ancient City Theater
110. Denizli, Pamukkale, Laodikeia Ancient City West Theatre
111. Denizli, Pamukkale, Laodikeia Ancient City North Theatre
112. Denizli, Pamukkale, Laodikeia Ancient City Bouleuterion
113. Denizli, Pamukkale, Hierapolis Ancient City Greek Theater
114. Denizli, Pamukkale, Hierapolis Ancient City Roman Theater
115. Düzce, Konuralp, Prusias ad Hypeium Ancient City Theater
116. Eskişehir, Sivrihisar, Pessinus Ancient City Theater
117. Eskişehir, Sivrihisar, Pessinus Ancient City Theatron
118. Gaziantep, Nizip, Zeugma Ancient City Theater
119. Hatay, Antakya, Seleuceia Pieria Ancient City Theater
120. Hatay, Antakya, Antiochia am Orontes Ancient City Theater
121. Hatay, Antakya, Antiochia am Orontes Ancient City Amphitheatre
122. Hatay, Defne, Daphne Ancient City Theater
123. Hatay, Erzin, Epiphaneia Ancient City Odeion
124. Hatay, Erzin, Epiphaneia Ancient City Theater
125. Isparta, Atabey, Adada Ancient City Theater
126. Isparta, Atabey, Seleukeia Sidera Ancient City Theater
127. Isparta, Atabey, Agrae Ancient City Theater
128. Isparta, Uluborlu, Apollonia Ancient City Theater
129. Isparta, Yalvaç, Pisidia Antiokheia Ancient City Theater
130. İstanbul, Beyoğlu, Byzantium/ Constantinople Ancient City Galata Theatre
131. İstanbul, Fatih, Byzantium/ Constantinople Ancient City Small Theatre
132. İstanbul, Fatih, Byzantium/Constantinople Ancient City 14. District Theatre
133. İstanbul, Fatih, Byzantium/ Constantinople Ancient City Big Theatre
134. İzmir, Aliağa, Erytrai Ancient City Theater
135. İzmir, Aliağa, Kyme Ancient City Theater
136. İzmir, Aliağa, Myrina Ancient City Theater
137. İzmir, Bayraklı, Smyrna Ancient City Theater
138. İzmir, Bayraklı, Smyrna Ancient City Early Roman Bouleuterion
139. İzmir, Bayraklı, Smyrna Ancient City Late Roman Bouleuterion
140. Smyrna Ancient City Hellenistic Bouleuterion
141. İzmir, Bergama, Pergamon Ancient City Akropolis Theatre
142. İzmir, Bergama, Pergamon Ancient City Odeion/ Bouleuterion
143. İzmir, Bergama, Pergamon Ancient City Heroon Odeion
144. İzmir, Bergama, Pergamon Amfitheatre
145. İzmir, Bergama, Pergamon Ancient City Roman Theater-Viran Kapı
146. İzmir, Bergama, Pergamon Ancient City Asklepion Theater/Odeion
147. İzmir, Bergama, Pergamon Ancient City Demeter Sacred Area-Aheatral Area
148. İzmir, Bergama, Pergamon Ancient City Odeion
149. İzmir, Bergama, Perperene– Theodosiopolis Ancient City Theater/Odeion
150. İzmir, Dikili, Pitane Ancient City Theater
151. İzmir, Foça, Phokaia Ancient City Theater
152. İzmir, Menderes, Notion Ancient City Theater
153. İzmir, Menderes, Notion Ancient City Bouleuterion
154. İzmir, Ödemiş, Hypaipa Ancient City Theater
155. İzmir, Seferihisar, Teos Ancient City Theater
156. İzmir, Seferihisar, Teos Ancient City Bouleuterion
157. İzmir, Selçuk, Ephesus Ancient City Theater
158. İzmir, Selçuk, Ephesus Ancient City Odeion/Bouleuterion
159. İzmir, Selçuk, Ephesus Ancient City Artemision Odeion
160. İzmir, Torbalı, Metropolis Ancient City Theater
161. İzmir, Selçuk, Metropolis Ancient City Bouleuterion
162. İzmir, Urla, Klazomenai Ancient City Theater
163. Kastamonu, Taşköprü, Pompeipolis Ancient City Theater
164. Kastamonu, Taşköprü, Pompeipolis Ancient City Odeion
165. Kırklareli, Vize, Byzias Ancient City Theater
166. Kocaeli, İzmit, Nicomedia Ancient City Theater
167. Konya, Hadim, Astra Ancient City Auditorium
168. Konya, Karatay, Savatra Ancient City Theater
169. Konya, Sarayönü, Laodikeia Kombusta Ancient City Theater
170. Kütahya, Çavdarhisar, Aizanoi Ancient City Theater ve Stadium
171. Kütahya, Çavdarhisar, Aizanoi Ancient City Bouleuterion/Odeion
172. Malatya, Merkez, Melitene Ancient City Theater
173. Manisa, Alaşehir, Philadelphia Ancient City Theater
174. Manisa, Merkez, Magnesia ad Sipyllum Ancient City Theater
175. Manisa, Merkez, Aigai Ancient City Theater
176. Manisa, Merkez, Aigai Ancient City Bouleuterion
177. Manisa, Salihli, Sardis Ancient City Theater
178. Mersin, Anamur, Anemorium Ancient City Odeion
179. Mersin, Anamur, Anemorium Ancient City Theater
180. Mersin, Aydıncık, Kelenderis Ancient City Odeion
181. Mersin, Mezitli, Soloi Pompeipolis Ancient City Theater
182. Mersin, Mut, Claudiopolis (Mut) Ancient City Theater
183. Mersin, Silifke, Diokaisareia Ancient City Theater
184. Mersin, Silifke, Olba Ancient City Theater
185. Mersin, Silifke, Elaiussa Sebaste Ancient City Theater
186. Mersin, Silifke, Seleucia ad Calycadnum Ancient City Theater
187. Mersin, Tarsus, Tarsos Ancient City Theater
188. Muğla, Bodrum, Halikarnassos Ancient City Theater
189. Muğla, Dalaman, Lydai /Lydae Ancient City Theater
190. Muğla, Datça, Knidos Ancient City Small Harbor- Theater
191. Muğla, Datça, Knidos Ancient City Odeion
192. Muğla, Datça, Knidos Ancient City Bouleuterion
193. Muğla, Datça, Knidos Ancient City Big Theater

194. Muğla, Fethiye, Pinara Ancient City Theater
195. Muğla, Fethiye, Pinara Ancient City Odeion/ Bouleuterion
196. Muğla, Fethiye, Telmessos Ancient City Theater
197. Muğla, Fethiye, Telmessos Ancient City Akropolis Theatre
198. Muğla, Fethiye, Kadyanda Ancient City Theater
199. Muğla, Kavaklıdere, Kyon/Kys Ancient City Theater
200. Muğla, Köyceğiz, Kaunos Ancient City Theater
201. Muğla, Marmaris, Amos Ancient City Theater
202. Muğla, Marmaris, Kıran Lake Sacred Area Theater
203. Muğla, Marmaris, Kastabos sacred area Theater
204. Muğla, Marmaris, Herakleia Latmos Ancient City Theater
205. Muğla, Marmaris, Herakleia Ancient City Bouleuterion
206. Muğla, Milas, Mylasa Ancient City Theater
207. Muğla, Milas, Euromos Ancient City Theater
208. Muğla, Milas, Bargylia Ancient City Theater
209. Muğla, Milas, Bargylia Ancient City Odeion
210. Muğla, Milas, Keramos Ancient City Theater
211. Muğla, Milas, Iassos Ancient City Theater
212. Muğla, Milas, Iassos Ancient City Odeion/ Bouleuterion
213. Muğla, Seydikemer, Sidyma Ancient City Theater
214. Muğla, Seydikemer, Tlos Ancient City Theater
215. Muğla, Seydikemer, Oinoanda Ancient City Theater
216. Muğla, Seydikemer, Letoon Ancient City Theater
217. Muğla, Ula, Thera Ancient City Theater
218. Muğla, Ula, İdyma Ancient City Bouleuterion
219. Muğla, Ula, Kedreai Ancient City Theater
220. Muğla, Yatağan, Stratonikeia Ancient City Bouleuterion
221. Muğla, Yatağan, Stratonikeia Ancient City Theater
222. Muğla, Yatağan, Hyllarima-Ullarima Ancient City Theater
223. Osmaniye, Merkez, Hierapolis-Kastabala Ancient City Theater
224. Tekirdağ, Marmara Ereğlisi, Perinthos-Herakleia Ancient City Theater
225. Tokat, Zile, Zile Ancient Theater
226. Uşak, Banaz, Akmonia Ancient Theater
227. Uşak, Ulubey, Blaundos Ancient Theater
228. Yozgat, Merkez, Tavium Ancient City Theater
229. Zonguldak, Çaycuma, Teios /Tieion Ancient City Theater

**Figure 5.** *Graphical representation of findings related to Anatolian Ancient Theatres*

## 3. EVALUATION AND CONCLUSION

In the Ancient Age, which was associated with developing Greek and Roman culture, many Greek city-states were established in Anatolia. One of the essential structures of city-states governed by democracy was theatres. After Alexander the Great conquered Anatolia, the Greek period, called the Classical period, ended, and the Hellenistic period began. The Hellenistic Kingdoms period, which started with the death of Alexander the Great, ended with the Romans annexing Anatolia to their territory. Like many other things in Anatolia during the Roman period, the theatres, which were developed and given a new dimension by the Hellenes, were shaped with a new form. The orchestra, which changed from a circular form to a horseshoe form in the Hellenistic period, reached a semi-circular form in the Roman period. The transition from open to closed plan type occurred during the Roman period.

In the research conducted within the scope of this study, a total of 229 theatre-shaped buildings were identified in Anatolia. These structures were classified in terms of plan type, cavea direction, and construction period and evaluated within the scope of literature and field study data in terms of their level of preservation. In the research, it has been revealed that some of the newly discovered theatre-shaped buildings over time cannot be evaluated within the scope of the classifications made in the past. For this reason, new classifications have been created within the scope of Plan type and the types previously identified by other researchers. The newly identified types were identified as structures with similar - different functions, both theatre and theatre forms. Within the scope of theatre-shaped structures added to the typology, bouleuterion structures with angular U-shaped cavea dating back to the Hellenistic period, semi-circular and odeion structures with caveas slightly exceeding the semi-circle surrounded by external walls and semi-circular odeion structures found in both the Hellenistic and Roman periods. In addition, examples that do not provide a typology in terms of plan type were also found. There is insufficient data to classify the amphitheatres built during the Roman period. In the closed theatres of the Roman period, examples with semi-circular plans or plans exceeding semi-circles were found; On this occasion, it was understood that the plan forms of the Hellenistic period continued during the Roman period.

It has been determined that there were enlargement works in Hellenistic theatres during the Roman period, and mostly a stage building and/or an upper cavea with a vault system was added. It has been observed that Hellenistic theatres with these features were also defined as Greco-Roman. However, it has been concluded that Romanized Greek/Hellenistic theatres and Roman theatres with Greek influence, which are different from each other in terms of the construction process and final product, should be conceptually separated.

The E-plan type is the most common form in theatres, and it has been determined that B-type theatres follow it. It has been understood that the earliest dated theatre dates back to the classical period and is the E-plan type Kaunos Ancient Theatre and the Kıran Lake Sanctuary Theatre, whose plan type could not be determined since excavations were not carried out. Within the scope of the work, 6 rock-carved theatres, 19 Type-B, 9 Type-C, 25 Type-E, 15 Type-G, 8 Type-R1, 8 Type-R2, 11 Type-O1, 14 Type-O2, 5 Type-O3, 2 Type-B1, 3 Type-B2 were detected. Additionally, 5 amphitheatres were added.

When looked at in terms of cavea directions, it has been seen that geographical conditions are the main factor affecting the cavea direction. 9 theatre buildings are oriented to the north, 19 to the south, 7 to the east and 15 to the west.

In terms of preservation levels, a wide range of preservation was encountered, from completely destroyed to completely preserved. The conservation levels of theatre buildings were determined as a percentage and expressed with color codes, within the scope of the criterion that they can reach the present day originally and holistically, based on literature data, field work, visual data and plan drawings. For example, the Augusta, Tarsos, Phellos, Lydai and Gagai theatres, which were colored in dark red (0-10%), were completely destroyed, and only a small part remained of the Anavarza amphitheatre, Ankyra, Smyrna and Olympos theatres, which were colored in red (10-20%) remained. The Priene and Letoon theatres, colored in light green (60-70%), are well-preserved examples, while the theatres of Assos, Miletus, and Limyra are shown in yellow (50-60%) due to the losses in the parts added during the Roman Period. The Xanthos theatre is a good example in terms of the partial preservation of the Hellenistic theatre under the Roman period theatre. The Xanthos Roman theatre is shown in yellow, and the Xanthos Hellenistic theatre is shown in dark red. Although there were collapses, the Side theatre was well preserved and was colored with light green (60-70%), while the Perge theatre was colored with dark blue (80-90%) due to its great preservation. Ephesus Theatre and Pergamon Acropolis theatres are also dark green (70-80%) in terms of their level of preservation. expressed in color. As mentioned before, the Aspendos Ancient Theatre is colored blue (90-100%), representing the best level of protection, as it has been preserved with almost all its elements. Except for the Mastaura amphitheater, the protection level of the other theatres is very low and is expressed in dark red (0-10%). Since the Mastaura amphitheater is in a landfill, there is no data on its protection level.

It was observed that 70 theatre structures date back to the Hellenistic period, while 58 theatre structures date back to the Roman period. Although there is no direct relationship between the level of preservation and the construction period, it has been understood that the best-preserved theatre examples are those built during the Roman period.

It has been observed that excavations have been carried out in almost all of the well-preserved theatres, and comprehensive restoration works have been carried out in a limited number of excavations. Ankyra, Myra, Arykanda, Antiphellos, Nysa, Ephesus, and Aspendos ancient theatres can be examples of restored theatres.

In this study, which was created as a result of literature review, fieldwork, and analysis of open access visual data, it was understood that the protection level of most of the Anatolian ancient theatres was below 50%, and only 9 theatre structures had a protection level above 70%. It has been seen that new results may emerge with the progress of excavations on theatre buildings and/or the increase in scientific publications about theatre buildings, and as the study continues, questions have arisen as to what the problems are that prevent the preservation of theatres and what distinguishes well-preserved examples from other theatre buildings.

As a result of the findings obtained and not obtained in the study, it has been assessed that making singular data on ancient theatres more accessible will lead to the emergence of more research questions related to these theatres. It has been concluded that creating updated catalogs and/or databases containing comprehensive and scientific data on theatres would facilitate the provision of answers to emerging research questions. This study has brought up the question of what common conservation issues theatres

face. It has been assessed that identifying common issues will enable the development of guidelines for the repair and preservation of theatres. It has been concluded that these guidelines could directly contribute to the effective and high-quality preservation of theatres.

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# Architectural Features of Wooden Domed Semâhanes in Mevlevihanes, Cultural Heritage Sites of Mevlevism

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**Abstract**

*Semâhanes*, the central units of *Mevlevihanes,* cultural heritage sites of Mevlevism, serve as venues for the sacred *semâ* (ritual whirling) ceremony, known as Mevlevi Âyîn-i Şerif. This study focuses on the fundamental architectural characteristics of *semâhanes* constructed with *semâ meydans* (whirling spaces) covered by wooden domes, within the borders of the Ottoman Empire between the 17th and 19th centuries. The selected examples were examined through actual architectural examples, reconstructions, archival records, including engravings, paintings, and drawings created by visiting artists throughout history. First, the architectural elements shaping the *semâhanes* (such as the *semâ meydan, mesnevi* lectern, *mutrib,* and visitor *mahfils*) were expressed. Then, the types of wooden domed *semâhanes,* categorized as single-storied and those with a mezzanine floor were explained. Next the geometric forms of the *semâ meydans* which influence the design of the *semâhane's* roof systems, were assessed as square, rectangular, 8-sided, 9-sided, 16-sided, and circular shapes. This led to an analysis of the types of wooden domes in *semâhanes* and the analysis identified those without drums as well as those supported by circular or octagonal drums. Additionally, the materials, construction techniques and decoration of wooden domes were determined as either plastered and painted over wooden laths or directly painted on wooden veneer, featuring wooden geometric slices or various motifs and calligraphic ornamentations. In conclusion, all the data collected were evaluated together. It is hoped that this study, focused on a limited number of wooden domed *semâhanes*—the heart of the *Mevlevihanes*—will contribute to the literature on *tekke* architecture.

## 1. INTRODUCTION

The Mevlevi Sufi order of dervishes, known in the West as the "Whirling Dervishes" or *Derviches tourneurs,* was founded based on the teachings of Mawlânâ Jalâluddin Rumi (1207–1273) in the late 13th century in the Anatolian city of Konya. The *mevlevihanes* (dervish lodges) and their activities along with those of sufi dervish orders, remained active until 1925, when they were legally prohibited following the founding of the Turkish Republic. By the time they were closed, over 150 *Mevlevihane* architectural complexes—active for over 600 years during the late Seljuk, Emirates, and Ottoman periods of Turkish history—were spread across the geographical areas once occupied by the Ottoman Empire including Middle East cities [1]. Especially during the 19th century, the *mevlevihanes* of Istanbul and cosmopolitan Cairo gained popularity among foreign visitors, who frequently documented them in their travelogues and paintings. Following their prohibition and closure within the borders of the Republic of Turkey, these structures fell into neglect. Maintenance and repair were largely abandoned and many were used for inappropriate functions. However, the declaration of the *Mevlevi Ayin-i Şerifi* (the Ritual Whirling Ceremony of the Mevlevi Dervish Order) with its complex composed music and *sema* (whirling movements) performance, as a Masterpiece of the Intangible Heritage of Humanity in 2005 (accepted in

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2005) by UNESCO[1] and 2007 as the International Year of Mevlâna, started an increase in studies about *mevlevihanes* and a wave of conservations and restorations, especially of their *semahane*s [2][3].

Within the architectural complex of a *mevlevihane,* the *semâhane*—a large assembly whirling hall—served as the venue for the sacred *semâ* (the Mevlevi ritual whirling) ceremony, known as Mevlevi Âyîn-i Şerif, traditionally performed in a designated central space called the *semâ meydan*.
By examining the upper covering systems of *semâhanes*—using literature research, archival documents, and in situ analysis of surviving examples—it was seen that a variety of materials (stone, brick, wood, etc.) and construction techniques (masonry or wooden skeleton systems) were employed. However, there was a specific and unique group of *semâhanes* with wooden hip roofs which shared common architectural characteristics. The *semâ meydans* of these *semâhanes* were covered either by a wooden dome, vaulted ceiling, or caisson ceiling. These unique *semâhanes* were found in major cities such as Istanbul (including the semâhanes of Galata, Beşiktaş, Yenikapı, and Üsküdar *Mevlevihanes*), Cairo, Bursa, Kütahya, Gallipoli (Gelibolu), and Manisa, as well as in Central Anatolian towns like Tokat, Çankırı, Çorum, Samsun, and Ankara (Figure 1) [1].

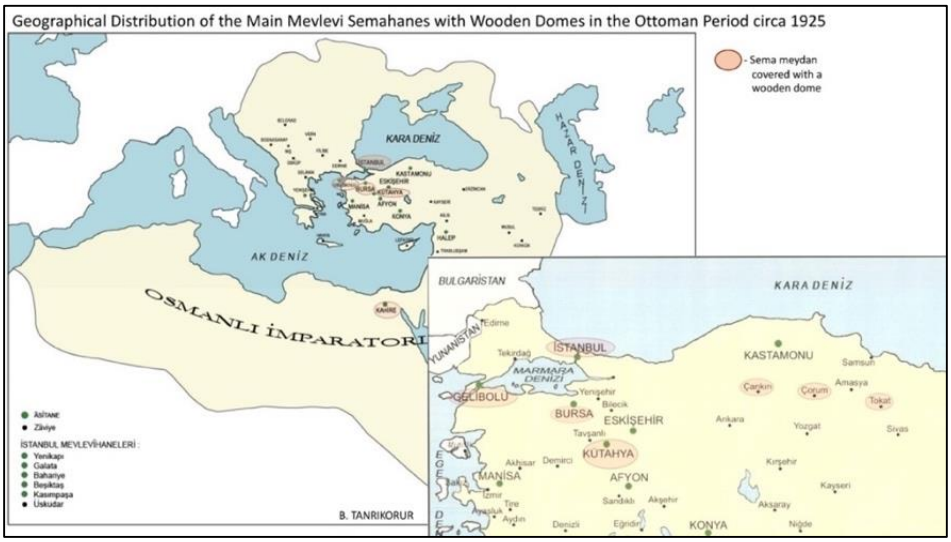


***Figure 1.*** *Geographical Distribution of the Main Mevlevi Semâhanes with Wooden Domes in the Ottoman Period circa 1925 [1]*

Therefore, this study aimed to define the major architectural characteristics of this specific group of wooden domed *semâhanes*—including those in Beşiktaş (1622), Çorum (1896), Tokat (1825–1850), Yenikapı (1815–1816), 4th Galata (1791), Bursa (1820), Gelibolu (rebuilt 1899–1900), 2nd Galata (1608), 3rd Galata (1765), Çankırı (1850), Üsküdar (1912), Kütahya (rebuilt 1887–1889), and Cairo (1850). The methodology of the study was based on existing architectural examples, reconstructions, as well as representations of demolished 17th to 19th century of their predecessors, found in the paintings, engravings, and drawings of visiting artists [4]. As a result, the study identified the different types of *semâhanes* as those with a single-storey or a mezzanine floor or with square, rectangular, 8-sided, 9-sided, 16-sided, and circular geometric shaped *semâ meydans* that influenced the design of their roofs. The different types of their wooden domes were identified as being with or without circular or octagonal drums, as well as by the materials, construction techniques and decoration features used in covering their semâ meydans.

## 2. SEMÂHANES

Following the example of the mother *semâhane* at the Konya Mevlâna Dergâh, a Mevlevi *semâhane* was typically constructed adjacent to, or to incorporate the tomb area of the founding or leading shaykhs of the particular *mevlevihane.* Each *semâhane* contained a *Mathnawi* lectern and a *mihrab,* usually located on the

[1] Ş. B., Tanrıkorur headed the preparation of Turkey's application to UNESCO for the declaration of the Mevlevî Âyin-i Şerif (Holy Ritual Ceremony of the Whirling Dervishes) as a Masterpiece of the Intangible Heritage of Humanity in 2004.

wall opposite the main entrance. This placement was important because the *semâ* ceremony always began with the performance of one of the daily Muslim ritual prayers, followed by a brief lesson from Rumi's *Mathnawi Şerif*. In the center of the *semâhane* was the se*mâ meydan***,** the area designated exclusively to the performance of the ritual whirling *semâ* ceremony. On the wall opposite the *mihrab* was a raised, balcony-like lodge above the main entrance, known as the *mutrib* lodge. This space was reserved for the *mutrib* (dervish singers and instrumentalists) who accompanied the shaykh and the *semâzens* (whirling dervishes) during the ceremony [1].

### 2.1 Types of Semâhanes

In the examination of wooden domed *semâhanes*, it was observed that key architectural elements—such as the *semâ meydan*, audience *mahfil*s, *mutrip maksura* opposite the *mihrab*, and other basic features—were consistently present. The primary difference in wooden domed *semâhanes* lies in the addition of a mezzanine floor in some examples, which included spaces like the foreign visitors' *mahfil*, the *hünkâr* (sultan's) *mahfil* and the women's *mahfil***,** often located behind latticed screens on the mezzanine floor. Within this context, two types of *semâhanes* were identified in the group examined in this study. The first type, **Type 1**, is a single-storied structure with a *semâ* meydan of various geometric shapes, whose floor is lower than its surrounding areas. The *semâ* meydan is enclosed by a wooden railing with supporting rail post columns, which also support the wooden dome over the *meydan*. A raised, balcony-like *mutrib* lodge, typically accessed by a staircase, is usually located above the entrance door, opposite the *mihrab* (Figure 2). Archival documents provide the oldest data we have about single-storied wooden domed *semâhanes*. These include a miniature painting of the Beşiktaş Semâhane from the late 17th to early 18th centuries as well as an engraving of the 2nd Galata Semâhane by Ignace Mouradja d'Ohsson, circa 1787 (Figure 3).

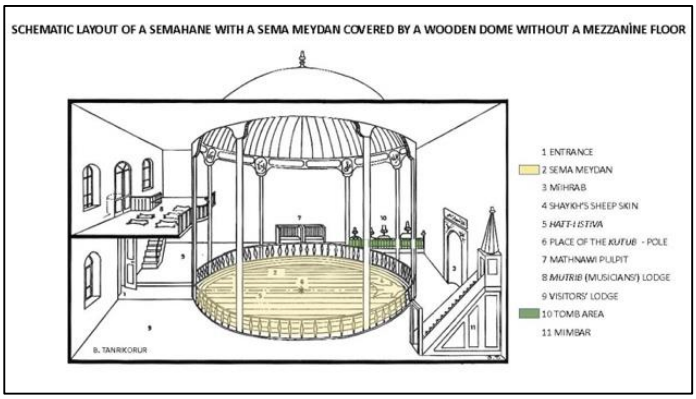


***Figure 2.*** *Schematic Layout of a semâ meydan covered by a wooden dome without a mezzanine floor [1]*

***Figure 3****. (a) Miniature of the Semâ Ceremony in Beşiktaş Semâhane (circa 17th–18th century) in the Freer Gallery of Art, Pennsylvania [5]*
*(b) Engraving of the 2nd Galata Semâhane by Ignace Mouradja d'Ohsson (circa 1787) (published between 1787 and 1820) [6]*

Although **Type 2** has a layout similar to **Type 1**, it features a mezzanine floor which is accessible via various staircases added to one or more sides of the *semâ* meydan. The first floor encircling the *semâ*

*meydan* is located beneath the mezzanine floor and is reserved for male visitors and lacks front lattice screens. It is enclosed by a wooden railing with rail post columns, which support a wooden dome over the *meydan.* The flat ceilinged mezzanine floor, includes a *mutrib* lodge facing the *mihrab,* as well as lattice-screened lodges for specific types of spectator visitors, such as the sultan, women, or foreigners. Almost all of the *semâhanes* examined in this study are variants of **Type 2** with a mezzanine floor (Figure 4).

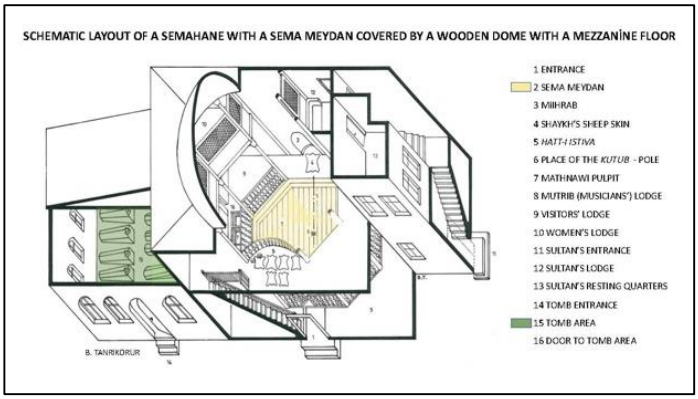


***Figure 4.*** *Schematic layout of a semâ meydan covered by a wooden dome with a mezzanine floor [1]*

When analyzing the wooden domed *semâhanes*, it was observed that the Yenikapı Semâhane**,** 4th Galata Semâhane (in the engraving), Bursa Semâhane, Gelibolu Semâhane, Çankırı Semâhane, and Architect Kemaleddin's Üsküdar Semâhane drawing all featured mezzanine floors. However, their placement around the *semâ meydan* varied. In the Yenikapı Semâhane**,** the mezzanine floor extends around three sides of the *semâ meydan* but does not cover the area over the *mihrab*. In contrast, the mezzanine in the 4th Galata Semâhane is located only on one side of the *semâ meydan*, leaving the *mihrab* area uncovered whereas the mezzanine floor of the Bursa Semâhane surrounds the entire *semâ meydan* except for the *mihrab* (Figure 5 a). In the Gelibolu Semâhane, the mezzanine floor is present only on two sides of the *semâ meydan.* Whereas the octagonal-planned *semâhanes* of Çankırı and Üsküdar feature mezzanine floors surrounding all eight sides of their *semâ meydans*, except over their *mihrabs* (Figure 5 b). Finally, the mezzanine floors of the Kütahya and Cairo Semâhanes, totally encircle their *semâ meydans* (Figure 5 c).

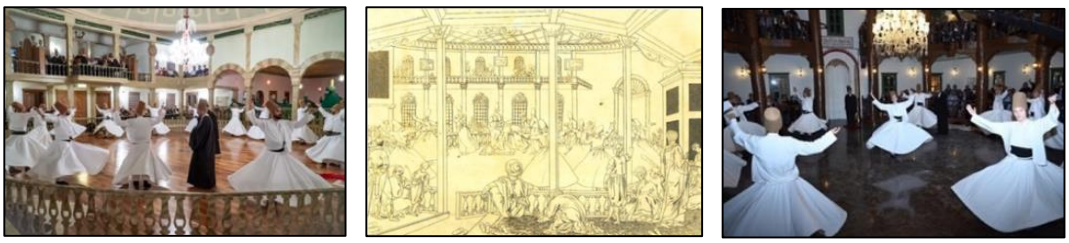

***Figure 5.*** *(a) Yenikapı Semâhane [7] 4th Galata Semâhane [8] and Bursa Semâhane [7]*

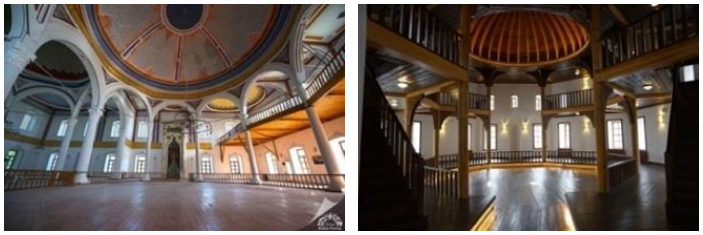

***Figure 5.*** *(b) Mezzanine floor views of Gelibolu Semâhane and Çankırı Semâhane [7]*

***Figure 5.*** *(c) Mezzanine floor views of Kütahya Semâhane [9] and Cairo Semâhane [10]*

### 2.2. Geometric Shapes of Semâ Meydan Floor Plans in Semâhanes

The circular-plans of *semâ meydans* and those with geometric shapes closer to a circle are considered more appropriate for the performance of the *semâ* ceremony because they emphasize the circular movements of the *semâ* ritual. The four circular circumambulations of the *semâ meydan* performed at the beginning of the ceremony by the shaykh and dervishes in the First Selâm, followed by the continuous whirling movements of the *semâzens* throughout the ritual, are more effectively experienced by spectators when performed in a circular-planned *semâ meydan.* This configuration provides a deeper, more uplifting spiritual experience for the audience during the *semâ* ceremony. In the 19th century, this domed circular shape was most commonly used in *semâ meydans.* In Anatolia, other different geometric shapes of *semâ meydans* were to be found, including 4-sided (square and rectangular), 8-sided (octogonal), 9-sided, 16-sided, and circular shapes [1].

The *semâ meydans* studied show noticeable variations in the geometric shapes of their floor plans. These range from square, rectangular plans, as seen in the Beşiktaş and Yenikapı Semâhanes*;* 8-sided or octagonal plans such as those in the 17th to 18th century *semâhanes* of Galata, Çorum, and Çankırı; 9-sided as in the Gelibolu Semâhane*;* 16-sided as seen in the Tokat Semâhane*;* to circular plans, like those seen in the Bursa, Cairo, and Kütahya Semâhanes (Figure 6) [4].

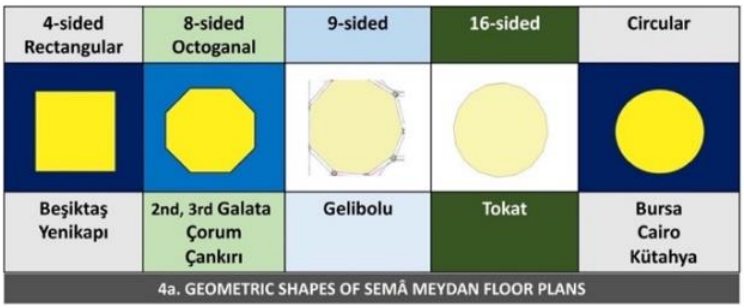


***Figure 6.*** *Geometric Shapes of Semâ Meydan Floor Plans [4]*

### 2.3. Wooden Domes Covering the Semâ Meydans of Semâhanes

On examining the wooden domes covering these *semâhanes* with *semâ meydans* of various geometric shapes, it was observed that some domes were concealed by a hipped roof from the exterior, making them less noticeable from the outside [11], while others openly show a visible dome externally. Except for the lath and plaster, adobe dome of the Cairo Semâhane [10], most of the domes studied are hidden beneath a tiled, hipped roof and are not noticeable from the exterior. The *semâ meydans* examined are all covered by variants of hemispherical wooden domes. These domes are either simple and unelevated or elevated on a drum with windows to allow light into the *semâ meydan* below. It was found that the domes with drums come in two forms: octagonal or round (Figure 7) [4].

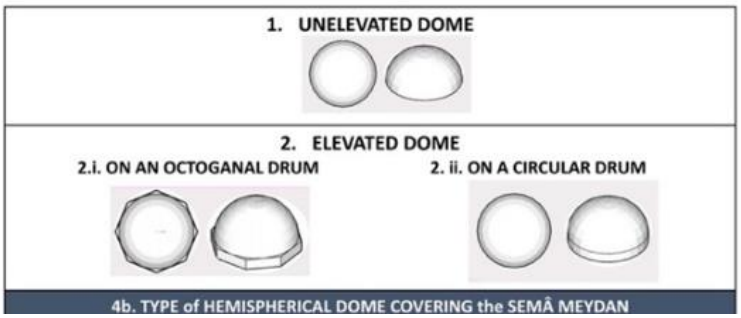


***Figure 7.*** *Type of Hemispherical Dome Covering the Semâ Meydan [4]*

**a) Unelevated, Hemispherical Wooden Dome:**

It was determined that the *semâ meydans* of the Beşiktaş, Çorum, Tokat, Yenikapı, 4th Galata, Bursa, Gelibolu Semâhanes were covered with wooden domes without drums. According to available data, the wooden dome of the Çorum Semâhane supported by 8 wooden columns has a diameter of approximately 5.5 meters and a height of 2.5 meters. The Tokat Semâhane supported by 16 wooden columns features a wooden dome with a diameter of about 7.5 meters and a height of 1.5 meters. The wooden dome of the Yenikapı Semâhane supported by 20 wooden columns, is part of this group and measures approximately 14 meters in diameter and 5 meters in height (Figure 8).

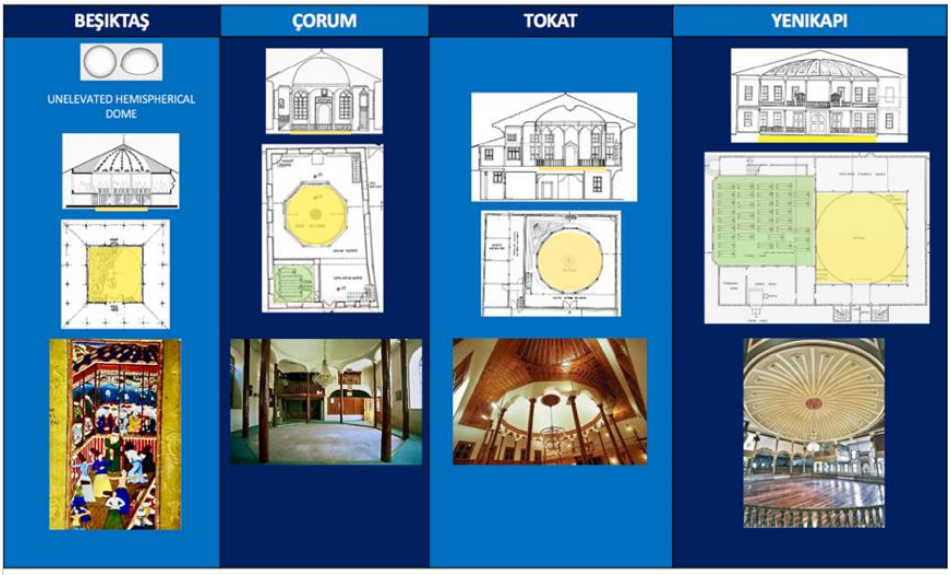


***Figure 8.*** *(a) Beşiktaş- section drawing (Proposed by Gökçen Pala Azsöz) [12], plan drawing (Proposed by Kayahan Türkuazöz) [12], Miniature of Semâ Ceremony in Beşiktaş Semâhane (circa 17th – 18th century) in the Pennsylvania Freer Gallery [5]*
*(b) Çorum- Section and plan drawings [1], Photo [7]*
*(c) Tokat- Section and plan drawings [1], Photo [7]*
*(d) Yenikapı- Section and plan drawings [1], Photo [7]*

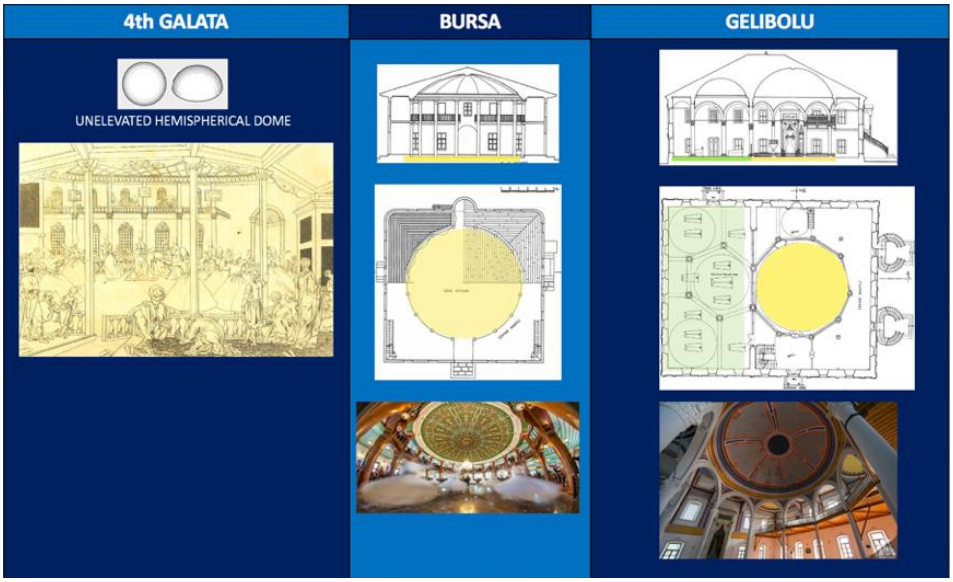


***Figure 9.*** *(a) 4 th Galata-Picture [8]*
*(b) Bursa- Section and plan drawings [1], Photo [7]*
*(c) Gelibolu- Section and plan drawings [1], Photo [7]*

It was observed that wooden-domed *semâhanes* without drums were also present in 19th century examples. A picture drawn by the Russian painter E. Korneef (1774–1825) and engraved by E. Scotnikoff (1782–1842) [13] [8] shows that the dome of the 4th Galata Semâhane was without a drum. In addition, according to available data, the wooden dome of the Bursa Semâhane supported by 16 wooden columns had a diameter of 12.5 meters and a height of 2.5 meters. Whereas the wooden dome of the Gelibolu Semâhane supported by 9 stone columns measured 14 meters in diameter and 2 meters in height (Figure 9).

**b) Elevated, Hemispherical Wooden Dome on a Drum:**

The elevated hemispherical dome raised on an octagonal drum first appeared in the wooden domes of the 2nd and 3rd Galata Semâhanes, built around 1608 and after 1791. This design became popular and continued to be utilized throughout the 19th century, as seen in the Çankırı Semâhane constructed around 1850 and in Architect Kemaleddin's 1912 project design for the unbuilt Üsküdar Semâhane. According to available data, the wooden dome of Çankırı Semâhane was supported by 8 wooden columns and had a diameter of approximately 5.2 meters and a height of 2.5 meters. According to the drawings of Architect Kemaleddin, the wooden dome of the Üsküdar Semâhane supported by 8 wooden columns, was to have a diameter of 6.75 meters and a height of 5 meters (Figure 10).

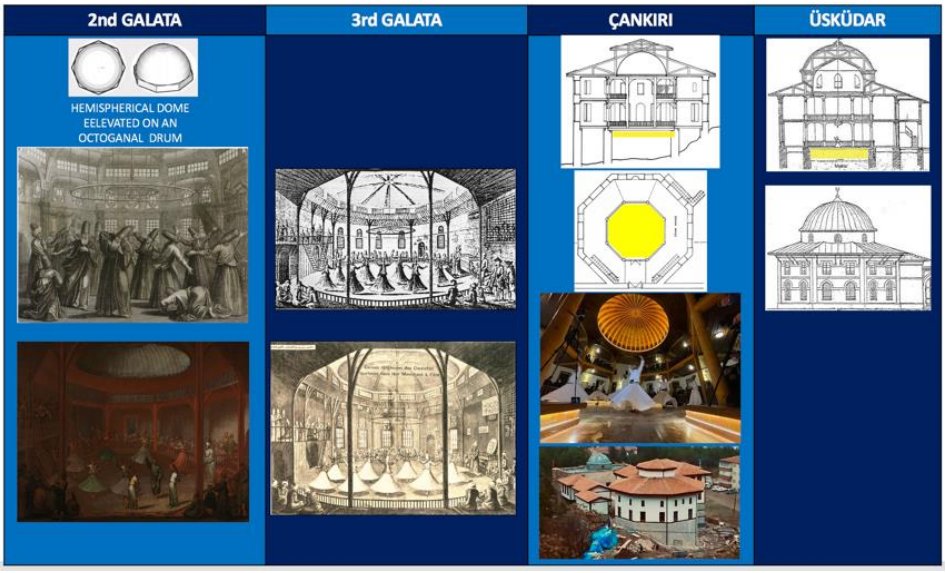


***Figure 10.*** *(a) 2 rd Galata- Engraving by Ignace Mouradja d' Ohsson, circa 1787 [6], 1700-1737 Oil painting by Jean-Baptiste van Mour [14]*
*(b) 3 rd Galata-Engravings by Francis Smith, 1771 [15]*
*(c) Çankırı- Section and plan drawings [1], Photos [16]*
*(d) Üsküdar-Drawings by Architect Kemaleddin [1]*

The most impressive hemispherical dome elevated on an external octagonal drum, was to be found in the Kütahya Semâhane, originally built in 1841–42 and rebuilt in 1887–89. Together with the elevated hemispherical dome on a cylindrical drum of the Cairo Semâhane**,** built around 1850, they represent the experiential climax witnessed in the *semâ* ceremony where spectators experienced the ceremony in a circular *semâ meydan* beneath a beautifully decorated wooden dome. According to available data, the wooden dome of the Kütahya Semâhane supported by 8 wooden columns has a diameter of approximately 9.75 meters and a height of 7.00 meters. In comparison, the wooden dome of the Cairo Semâhane supported by 12 wooden columns has a diameter of 10.65 meters and a height of 13 meters (Figure 11).

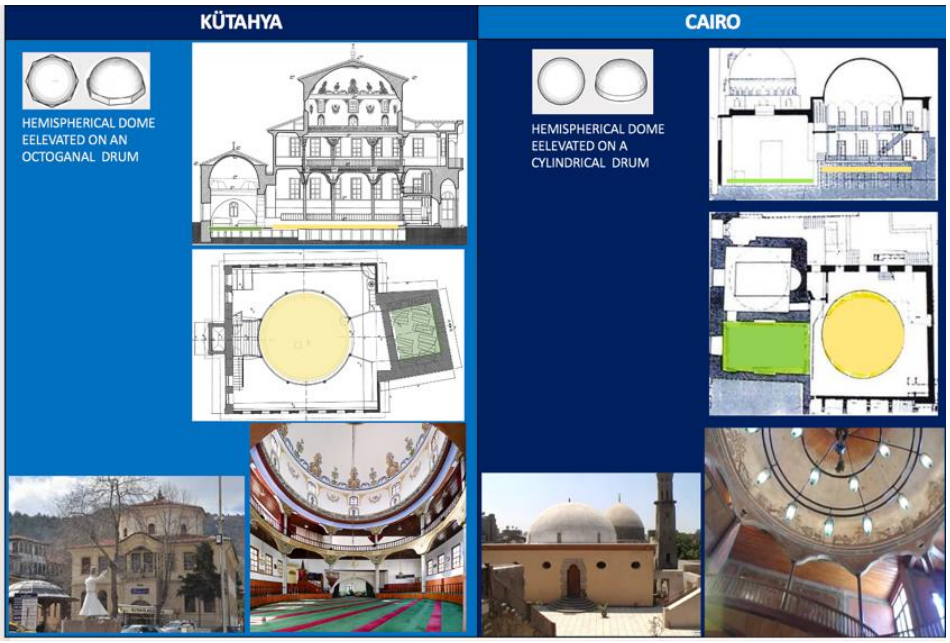


***Figure 11.*** *(a) Kütahya- Section and plan drawings [1] Exterior and interior photos [9]*
*(b) Cairo- Section and plan drawings [17], Exterior and interior photos [10]*

### 2.4. Materials & Techniques used in Wooden Domes Construction and Decoration of Semâhanes

The building materials and construction techniques used in these *semâhanes* directly reflect those employed in the secular architecture of their respective geographical regions [18]. For instance, the Istanbul waterfront *semâhanes* of Beşiktaş and Bahariye are architecturally similar to the *yalı* waterfront mansions of Istanbul [19]. Similarly, the Tokat Semâhane, with its lath-and-plaster construction and carved, hanging centerpiece in the *semâ meydan* dome, resembles the Tokat Latifoğlu mansion, which features an elliptical, hanging, wooden carved centerpiece [20]. The wooden domes of the *semâhanes* supported by columns within the *semâ meydan* are constructed using a wooden rib beam skeletal system (Figure 12). The wooden dome surfaces are crafted by sanding the laths and decorating them with paint. In contrast, the dome and rim surfaces constructed with lath and plaster were primarily decorated using paint (Figure 13).

***Figure 12.*** *The wooden dome restoration of Yenikapı Semâhane [21]*

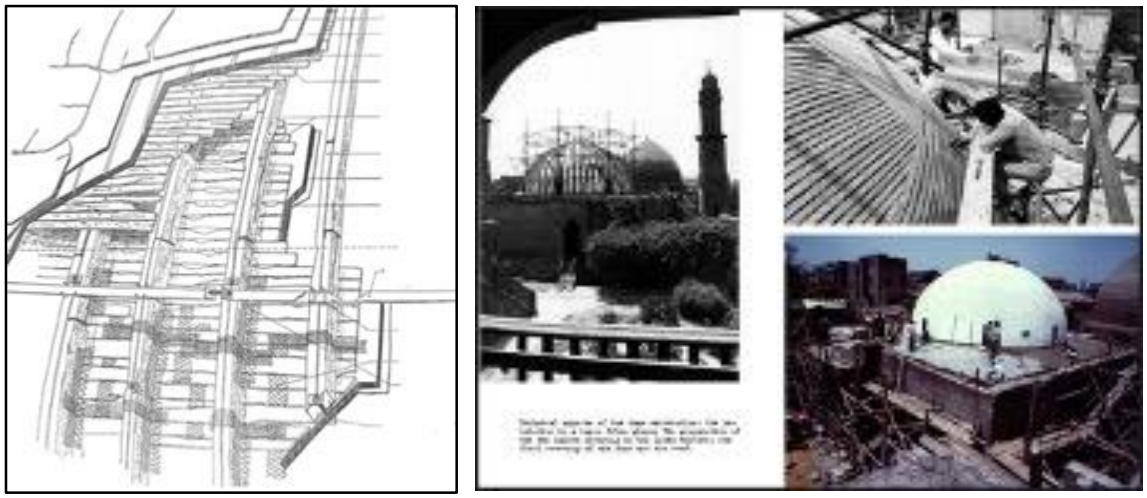

***Figure 13.*** *The wooden dome restoration of Cairo Semâhane [17]*

The wooden domes examined, utilized very colorful decorative schemes to enhance the semâ *meydan* area in order to attract spectators' attention towards this central part of the *semâhane.* Some domes, like those of the Beşiktaş, Gelibolu and Yenikapı *semâ meydans*, were divided simply into geometrical slices radiating from the center towards the rim of the dome [21][22] (Figure 14).

***Figure 14****. The division of the wooden dome into geometric slices starting from the centre towards the rim in Yenikapı and Gelibolu Semâhanes [7]*

Whereas other domes, like those found in Cairo and Kütahya, feature large circular calligraphic compositions of Quranic verses. The Cairo dome's centerpiece contains circular calligraphic compositions with verses from two different chapters of the Quran, written on one smaller circle within a larger circle (Figure 15(a)) [17]. In Kütahya, the wooden dome's centerpiece displays the 112th chapter, Al-Ikhlas, while the verse Al-Kursî (2:255) is inscribed in jali thuluth script around the rim of the dome (Figure 15(b)) [9].

***Figure 15.*** *(a) The circular, calligraphic compositions in centerpieces of Cairo's wooden dome [17] (b) The calligraphic composition in the center and rim of Kütahya's wooden dome [9]*

## 3. RESULTS and DISCUSSION

The analysis of historical data reveals that *semâhanes* with wooden domes, without drums, were notably present in various periods and locations. Specifically, the Beşiktaş Semâhane in the 17th century, the Galata Semâhane in the 18th century, and the *semâhanes* of Çorum, Tokat, Yenikapı, Bursa, and Gelibolu in the 19th century all feature this architectural element. The diameters of these wooden domes range from 5.5 to 14 meters, while their heights vary between 1.5 and 5 meters. The decorative aspects of the domes typically include wooden laths, which were either painted or plastered before being painted, reflecting the preferences of the period and the craftsmanship of local artisans. The structural support for these domes was provided by wooden columns ranging between 8 to 20 columns. This variation in the number of columns is attributed to the different plans of the *semâ meydans* which ranged between rectangular or circular. Furthermore, it was observed that these domes were used to cover *semâ meydans* with both single and mezzanine floors (Table 1) [4].

***Table 1.*** *Unelevated Simple Hemispherical Dome [4]*

| Mevlevihane | BEŞIKTAŞ | ÇORUM | TOKAT | YENIKAPI |
|---|---|---|---|---|
| Date | circa 1622 | circa 1896 | circa 1825-1850 | 1815-16 (Mahmud II) |
| Dome Diameter | ?? | approx. 5.5 m. | approx. 7.5 m. | approx. 14 m. |
| Dome Height | ?? | approx. 2.5 m. | approx. 1.5 m. | approx. 5 m. |
| Dome Surface | Lathed, painted | Lathed, plastered | Lathed, plastered | Lathed, paint + lath decor |

| | | | | |
|---|---|---|---|---|
| Supporting Dome Columns | ?? | 8 | 16-sided | 20 |
| Semâ Meydan Plan | Rectangular | 8-sided | 16-sided | Rectangular |
| Mezzanine Floor | None, lowered semâ meydan | None | None | On 3 sides of semâ meydan, not above mihrab |

***Table 1.*** *Unelevated Simple Hemispherical Dome-continued [4]*

| Mevlevihane | 4th GALATA | BURSA | GELIBOLU |
|---|---|---|---|
| Date | built 1791 (Selim III) | built 1820 | 1899-1900 (Abdülhamid II) |
| Dome Diameter | ?? | approx. 12.5 m. | approx. 14 m. |
| Dome Height | ?? | approx. 2.5 m. | approx. 2 m. |
| Dome Surface | Lathed, painted (?) | Lathed, paint decorated | Lathed, plastered + paint decorated |
| Supporting Dome Columns | ?? | 16 | 9 |
| Semâ Meydan Plan | (?) -gen | Circular | 9-sided |
| Mezzanine Floor | On some sides of semâ meydan, not above mihrab | All around semâ meydan, not above mihrab | On 2 sides of semâ meydan, not above mihrab |

This analysis reveals that wooden domes with 8-sided drums, covering octagonally-planned *semâ meydans*, occured in several historical examples. These include the 2nd Galata Semâhane from the 17th century, the 3rd Galata Semâhane from the 18th century and the Çankırı Semâhane from the 19th century as well as the proposed design by Architect Kemaleddin Bey for the Üsküdar Semâhane in the 20th century which was never constructed. Based on the available data, the diameters of these domes range between 5.2 to 6.75 meters, while their heights range between 2.5 to 5 meters. Note that specific measurements for the engravings of the 2nd and 3rd Galata Semâhane are not available. The decorative elements of these domes vary, reflecting either the period's preferences or the local craftsmen's choice between painting directly on wooden laths or applying plaster before painting. Each of these semâhanes features 8 wooden columns supporting the dome, in line with the octagonal plan of the *semâ meydan.* Additionally, it was noted that these domes were used to cover both single and mezzanine-floor *semâ meydans* (Table 2) [4].

***Table 2.*** *Hemispherical Dome Elevated on an 8-sided Drum over an 8-sided Semâ Meydan [4]*

| Mevlevihane | 2nd GALATA | 3rd GALATA | ÇANKIRI | ÜSKÜDAR |
|---|---|---|---|---|
| Date | circa 1608 | after 1765 | circa 1850 | 1912 (Architect Kemaleddin) |
| Dome Diameter | ?? | ?? | approx. 5.2 m. | 6.75 m. |
| Dome Height | ?? | ?? | approx. 2.5 m. | 5 m. |
| Dome Surface | Lathed | Lathed, painted | ?? | ?? |
| Supporting Dome Columns | 8 | 8 (?) | 8 | 8 |
| Semâ Meydan Plan | 8-sided | 8-sided (?) | 8-sided | 8-sided |
| Mezzanine Floor | None | ?? | On all 8 sides of semâ meydan, | On all 8 sides of semâ meydan, |

| | | | | |
|---|---|---|---|---|
| | | | not above mihrab | not above mihrab |

The most remarkable examples of wooden dome architecture are to be found in the Kütahya and Cairo Semâhanes. These examples showcase the highest standards in terms of diameter, height, construction techniques, and decorative details of the domes. The 19th-century reconstructed wooden domes of the Kütahya Semâhane and Cairo Semâhane exhibit diameters ranging between 9.75 to 10.65 meters and heights between 7.00 to 13 meters. The dome decorations in both cases are characterized by plaster and paint applied over wooden laths. Of these two semâhanes with circular se*mâ meydans,* the Kütahya Semâhane dome is supported by 8 wooden columns, while the Cairo Semâhane dome is supported by 12 wooden columns. Both structures feature mezzanine floors that extend all around their entire *semâ meydâns* (Table 3) [4].

***Table 3.*** *Hemispherical Dome Elevated on a Drum over a Circular Semâ Meydan [4]*

| Mevlevihane | KÜTAHYA | CAIRO |
|---|---|---|
| Date | rebuilt 1887-89 (Abdülhamid II) | circa 1850 |
| Dome Diameter | approx. 9.75 m. | approx. 10.65 m. |
| Dome Height | approx. 7.00 m. | approx. 13 m. |
| Dome Surface | Lathed, plastered+painted decorated | Lathed, plastered + paint decorated |
| Supporting Dome Columns | 8 | 12 |
| Semâ Meydan Plan | Circular | Circular |
| Mezzanine Floor | All around the semâ meydan | All around the semâ meydan |

## 4. CONCLUSION

This study revealed the architectural features of *semâhanes* constructed with *semâ meydans* (whirling areas) covered by wooden domes, within the Ottoman Empire from the 17th to the 19th centuries. It is based on existing architectural examples, reconstructions, and archival resources including paintings, engravings, and drawings created by visiting artists throughout their history. In this context, two primary types of *semâhanes* with wooden domes were identified: those with a single-storey and those with a mezzanine floor. The plan of the mezzanine floor varied, encircling one, two, three or all sides of the semâ meydan area. The *semâ meydans* covered by wooden domes existed in various geometric shapes, including square, rectangular, 8-sided, 9-sided, 16-sided, and circular. Consequently, the number of supporting wooden columns also varied. This study distinguishes between two types of wooden domes based on their height and diameter: those without drums and those elevated on drums. Among the domes with drums, there are two subtypes: those elevated on an octagonal drum or on a circular drum. In terms of materials, construction techniques and decorations, it was found that the wooden domes were either covered with wooden laths and plaster with paint or solely wooden laths and paint. The wooden dome decorations commonly featured geometric slices or various motifs and calligraphic ornamentations. It is anticipated that this study, focusing on a relatively limited number of wooden-domed *semâhanes*—the core of the *mevlevihanes*—will make a significant contribution to the existing literature on tekke architecture.

**Information Note:** Some of the contents of this article was delivered by Ş. B. Tanrıkorur- Z. Tanrıverdi in a presentation entitled “The Development of a Wooden Dome Over the Semâ Meydan in the Architecture of Mevlevi Semâhanes” at the 17th Congress of Turkish Art, September 2023, Warsaw, Poland.

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# Assessing the Architectural Design and Implementation Potential of Local Residential Buildings with Net Zero Energy Approach: Cold Climate Region

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**Abstract**

With the COVID-19 pandemic, residences have taken on a multifaceted function, encompassing activities such as working, producing, and pursuing personal development, in addition to their sheltering function, leading to much longer periods spent indoors. This situation has also caused an increase in the amount of energy needed to maintain the continuity of residential life. This increasing energy consumption creates harmful effects on the environment. Due to the ecosystem starting to suffer damage, and this damage posing a threat to human life, environment-related studies have accelerated worldwide. In this context, the "Energy Performance of Buildings Directive" (EPBD) was enacted in European Union in 2002, and revised directive (EPBD-Recast) in 2010, to assess and certify the energy performance of buildings and thereby increase energy efficiency. The concepts of "nearly zero-energy building" and "net zero-energy building" were introduced within the scope of the revised directive. In this context, the aim of this study is investigating the conditions and methods of using NZEB (Net Zero Energy Building) solutions, developed by considering the parameters affecting energy performance of residences and design variables, in housing production of Turkey for cold climate region, towards solving these problems and developing an optimum housing design approach towards NZEB. Sivas province, located in cold climate region, was chosen as study area. Within the scope of study, design decision steps including passive design criteria, passive systems, active systems, and energy production systems specific to cold climate region were created. A prototype residential building design was made according to design decision steps within the developed guide. The energy efficiency improvement study of obtained housing design was carried out and simulated through the DesignBuilder program, and energy consumption-production analysis results were evaluated. The study demonstrates the potential of residential buildings to reach the NZEB standard, specifically in cold climate regions.

## 1. INTRODUCTION

The development of industry and technology, rapid population growth, and rising living standards have caused an increase in the need for energy. This situation leads to increased use of fossil energy resources and, consequently, energy and environmental problems such as global warming, depletion of fossil resources, increased air pollution, and destruction of the natural environment. Therefore, in the ongoing struggle for the sustainability of life, approaches focused on increasing energy efficiency in built environments come to the forefront. On one hand, strategies are developed to reduce energy needs through energy conservation-based design and construction principles. On the other hand, increasing the share of clean and harmless energy through ongoing research and applications aimed at obtaining the still-needed energy from renewable sources represents a global problem that has occupied countries worldwide for a long time. International meetings are held, laws and regulations are prepared, and binding protocols are signed to achieve global collaborative action in the field of energy efficiency. Within the scope of these problems, energy efficiency studies in buildings have also accelerated.

Buildings, which encompass a significant portion of the built environment, are responsible for a large part of fossil fuel-based energy consumption. When looking at areas of energy use worldwide, it is observed

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that 36% is consumed in buildings, holding the largest share along with other sectors such as industry and transportation. In Europe, this rate is around 40% [1]. According to the Turkey National Energy Report prepared by the Ministry of Energy and Natural Resources, 40.1% of the energy produced in 2020 in Turkey was used in buildings, accounting for the largest share [2]. In this context, the "Energy Performance of Buildings Directive" (EPBD) dated 2002 was published in the European Union (EU) to assess and certify the energy performance of buildings and increase energy efficiency [4]. As part of process harmonization with EU laws, it became mandatory in Turkey in 2008 with "Regulation on Energy Performance in Buildings" to issue energy identity certificates to all buildings using the BEP-TR calculation method [5]. During this process in Turkey, within the framework of new directive (EPBD-Recast), which entered into force in 2010 with the revision of EPBD in EU countries, the concepts of "cost-optimal energy efficiency," "nearly zero-energy building," and "net zero-energy building" were introduced [6]. The revised directive states that cost-optimal energy efficiency calculations in buildings should be made using national methods developed in accordance with framework method found in regulation published by the European Commission in 2012. However, it is stated that since it is not possible to make separate calculations for each building due to the large number of existing buildings, the calculations should be made over reference buildings that can represent existing and new buildings.

According to Turkish Statistical Institute (TUIK) data cited in 2018 National Energy Efficiency Action Plan 2017-2023, there were 9.1 million buildings in Turkey in 2017, approximately 87% of which were residential [7].

In the literature review conducted on doctoral theses related to net-zero energy buildings, it was found that most of the studies were conducted after 2010. In the doctoral thesis prepared by Kapsalaki, M. [36], the author analyzed two sample building groups, a detached house and a high-rise building, for three climate regions by defining fourteen different design variables and determining the impact hierarchies of NZEB solutions through the methodology developed. In the doctoral thesis by Pittakaras, P. [37], the author selected the island of Cyprus as the study area and conducted analyses on different building types, ultimately proposing an NZEB design guide for hot climates. In Turkey, the doctoral thesis by Ganiç Sağlam, N. [38] focused on the potential of nearly zero-energy buildings with optimal cost for hot-humid, temperate-humid, and cold climate regions, using a reference building representing multi-story apartment buildings in Turkey. In the doctoral thesis by Yıldız Ö.F. [39], the author aimed to achieve NZEB standards for the Erzurum Airport Terminal Building in a cold climate region using specific methods. In the doctoral thesis by Diker, B. [40], the author defined 41 scenarios and conducted simulations on an existing residential building in Turkey to achieve NZEB standards.

In this context, this study aims to investigate the applicability conditions and methods of Net Zero Energy Building (NZEB) solutions, considering the parameters and design variables affecting the energy performance of residences in Turkey's cold climate zones, and to create a design guide to inform designers on the most appropriate residential design approach towards the NZEB target.

## 2. THEORETICAL FRAMEWORK

Within the scope of the study, a systematic literature review was conducted, focusing on reducing energy loads (energy conservation) during the operational phase of buildings, which account for a significant portion of energy consumption, and obtaining energy production from renewable/independent energy sources (energy generation) within the scope of net-zero energy buildings. Firstly, within the scope of energy conservation, the physical environmental conditions of the design area, which are the most important determinants of energy needs in buildings, were taken into consideration and the design decision issues and the usage decisions of passive systems were examined, then the usage decisions of active systems and the usage of energy production systems were investigated.

### 2.1. Passive Design Decisions

The physical environmental conditions of design location are among the most critical determinants of a building's energy needs, and decisions made from the initial stages of design process regarding building's

location, orientation, form, relationship with neighboring buildings/inter-building distances, building envelope design, spatial organization, and vegetation, as well as the developed solution strategies, are directly related to the building's energy requirements.

By considering the topography in relation to characteristics of climate zone, it is possible to establish the most appropriate relationship between buildings and the sun and wind. In the cold climate zone discussed in this article, the cold season, during which the heating load increases, is long. Therefore, protecting buildings from the cooling effect of the wind is a primary design approach. The most suitable location for construction is on the lower parts of south and southeast-facing slopes near the wind-protected valley floor, with a maximum slope of 22°. However, achieving this may not be feasible in existing urban areas. A controlled relationship with the sun should be established. Building orientation is also a crucial decision step in the building's relationship with the sun and wind. The optimal solar orientation for a cold climate zone is for the building's wide surface to be positioned 22° southeast from south. The best orientation ranges are between 20° southwest and 45° southeast, while acceptable ranges are between 31° southwest and 86° southeast, with the building's alignment preferably chosen along the east-west axis. Protection against north winds should be provided on the building envelope between northeast and northwest [9,10].

Another prominent parameter in the building's relationship with the sun and wind is the distance between buildings within the built environment. The potential for buildings to obstruct sunlight or create wind shadows on each other are important considerations in design decisions. Figure 1 provides the recommended inter-building distance limits and placement suggestions for cold climate zones.

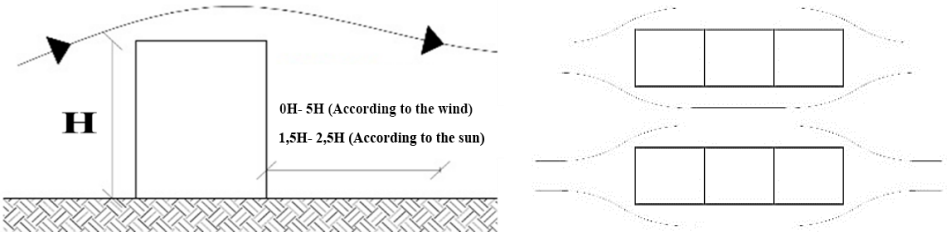



***Figure 1.*** *Inter-Building Distances and Placement Suggestions for Cold Climate Zones, Considering Wind and Solar Conditions [12]*

The building form influences heat loss and gain depending on its geometric shape, volume-to-surface area ratio, and the arrangement of volumes [3]. Therefore, in cold climate zones with high heating loads, compact building forms, such as terraced houses or adjacent configurations, are effective for heat conservation, aiming to minimize the surface area of building envelope exposed to climatic conditions. The optimum ratio for the building form should be 1:1.1, and the maximum ratio should be 1:1.3 [9,10].
The building envelope, acting as a filter between fluctuating external climatic conditions and stable internal comfort conditions, plays the most crucial role in heat loss and gain. In this context, design decisions regarding opaque and transparent surfaces of facades, which constitute the largest surface area, and roof components are most important. For cold climates where heating loads are paramount, Table 1 presents optimal time lag durations, orientations, and color selections for opaque components, and recommended glass and frame types for transparent components.

***Table 1.*** *Optimum time lag duration, orientation, and color selection for opaque components, and recommended frame and glass types for transparent components in cold climates [3,14]*

| Opaque | | | Transparent | |
|---|---|---|---|---|
| Material Selection | Time Delay Duration and Direction | Color | Frame | Glazing |
| High thermal mass | On the west facade, 6 hours | Medium colors on sun-exposed surfaces, dark colors on non-sun-exposed surfaces | PVC, wood, or fiberglass | Double or triple glazing. For double glazing; selective transmission on the outer pane, clear glass on the inner pane, or clear glass on the outer pane and low-e glass on the inner pane. For triple glazing; selective transmission on the outer pane and two layers of low-e glass on the inner panes. The layers are filled with argon gas. |

Roofs, depending on their form (sloped or flat) and the location of insulation (warm or cold roof), can facilitate heating and cooling or serve as a buffer zone. In this context, sloped roofs are suitable for cold climates due to their climatic properties. Considering insulation placement, warm roofs are appropriate [10].

Thermal insulation in buildings aims to minimize heat transfer between external environment and interior, ensuring thermal comfort [32]. This is typically achieved using fibrous (rock wool, glass wool) and foam (XPS, EPS) materials to impede heat transfer through walls, floors, and roof elements. Therefore, in cold climates with high heating loads, high-performance materials with superior insulation values should be used in roofs, floors, and exterior walls to enhance building envelope's thermal resistance. Thermal insulation not only protects building elements from weather due to temperature fluctuations but also significantly improves heat conservation by reducing heat loss. In this context, insulation applications are generally much thicker in Passivhaus, and net-zero energy buildings compared to traditional buildings. According to Passivhaus standards, the thickness of insulation varies depending on the type of material, climate conditions, and the building's design, but it generally ranges from 20 to 40 cm [41]. In net-zero energy buildings, like in Passivhaus standards, the thickness varies according to design, climate, and material factors, typically ranging from 20 to 30 cm. In cold climate regions, the insulation thickness can reach up to 40 cm [42].

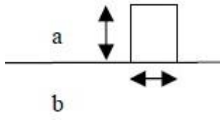
Sealing refers to the capacity of the building envelope to prevent the leakage of air, water, and vapor. A building envelope with high airtightness plays a critical role in energy efficiency. Sealing is particularly effective in reducing heating and cooling costs. To prevent heat loss, the building envelope must be properly sealed. If there are air leaks in the building envelope, cold air from the outside can enter, while warm air from the inside may escape. This leads to increased energy consumption by the heating system and, consequently, higher energy costs. Additionally, it causes ventilation and air conditioning systems to operate more frequently.

Thermal bridges are areas in the building envelope where heat transfer occurs more rapidly, significantly impacting energy efficiency. In these areas, heat loss increases, leading to higher energy consumption by heating and cooling systems. Furthermore, thermal bridges can create temperature differences in indoor spaces, resulting in comfort issues. The moisture that accumulates in these areas can lead to the formation of mold and fungi, deterioration of structural materials, and long-term building damage. Moisture buildup can also cause wear on walls and floors, shortening the lifespan of the structure. Ineffective management of thermal bridges leads to both energy loss and issues with indoor comfort and the integrity of the building.

The climatic conditions of the building's location, its function, and user needs and requirements are fundamental factors in spatial organization. To minimize the impact of climatic conditions, spaces with similar heating requirements should be zoned and interconnected, positioned on appropriate facades, and their form factor (depth/width ratio) determined based on regional climate data. Thus, in residential buildings designed for cold climates, living spaces (with high heating needs) and buffer spaces (bathrooms, toilets, storage, etc.) should be juxtaposed horizontally and stacked vertically for optimal heat

conservation. Positioning living spaces on the south facade and buffer spaces on the north facade or in the direction of prevailing winds offers the most energy-efficient solution. Optimal space dimensions for cold climates are provided in Table 2 [3].

***Table 2.*** *Optimum space dimensions for cold climates [3]*

| Spatial Depth | Formal Expression |
|---|---|
| Optimal depth, similar width and length, spatial depth (a) > facade length (b) |   |

The choice of vegetation is also an important parameter in ensuring the energy efficiency of buildings and in benefiting from or protecting from wind and sunlight. In cold climates, vegetation type and placement should maximize solar heat gain during the coldest periods, provide shelter from prevailing winds, and contribute to heat conservation within the building. Deciduous, low-branched trees are preferred on the east, west, and south facades to provide shade and prevent overheating during the hottest periods. Evergreen, low-branched trees on the north facade and direction of prevailing winds offer protection from cold winds during winter, while during the coldest periods they shield the building from wind and maximize solar gain.

### 2.2. Passive Systems

Passive systems provide thermal comfort without using additional mechanical equipment or consuming extra energy [18]. These systems collect, store, and distribute the necessary heat within the building during the coldest periods using building components or additional systems integrated into them. During the hottest periods, they cool spaces through natural ventilation, radiation, and evaporation to maintain indoor climatic comfort. Passive heating and cooling systems are categorized as direct and indirect. This article focuses specifically on cold climates, and since cooling loads are generally tolerable in these regions, cooling systems are not addressed.

Direct heating systems are categorized into two types: south-facing windows and skylights. In cold climates, windows must be insulated, and their dimensions optimized to balance energy gain and loss effectively. Skylights are unsuitable for cold climates due to high heat loss and low heat gain.

Indirect heating systems operate on the principle of collecting solar radiation on a surface with thermal storage properties, such as water or a wall, or within a buffer zone, before transferring the collected heat to interior space.

Among indirect heating systems, solar walls, Trombe walls, and water walls share similar operating principles. A solar wall comprises a metal surface directly exposed to sunlight and a high thermal capacity wall situated behind it. The stored thermal energy is transferred to the interior space through convection and radiation after a certain time delay. This system is particularly suitable for cold climates with significant diurnal temperature variations [35]. A Trombe wall system incorporates a south-facing glass surface with a high thermal capacity wall placed behind it, and vents positioned on the wall transfer the stored heat energy to the interior. This system can provide both immediate and delayed heat transfer to the interior. Trombe walls operate with lower efficiency in cold climates compared to other climate zones. In a water wall system, containers filled with water or other liquids, instead of an opaque wall, are used as thermal mass, providing continuous and immediate heat transfer to the interior. Due to the risk of liquids freezing in the coldest periods, their use is not recommended in cold climates.

Sunrooms, which utilize glass on the facade and roof to collect solar radiation, aim to enhance the building's heat collection capacity. Sunrooms can be used as living spaces and function as buffer zones, mitigating heat loss due to wind effects and convection. With proper orientation, insulated glazing, and movable insulation, sunrooms become suitable for cold climates.

Roof ponds are heating systems based on radiation. They employ water or water-filled plastic bags as thermal mass. These systems necessitate foldable, movable insulation systems to prevent heat loss. Due to the risk of water freezing during the coldest periods, their use is not recommended in cold climates [3].
Thermosyphon systems utilize a heat-collecting surface separate from the building to gather solar radiation, store it within a thermal mass, and then transfer it to the interior space through convection. This system operates based on convection driven by temperature differences within the environment. It is suitable for cold climates. In the coldest periods, the air passage ducts connecting the collector surface and storage area must be open during the day for airflow and closed at night for heat retention.

Double-skin systems consist of two transparent layers separated by a specific distance. The air cavity between these layers acts as a buffer zone, reducing heat loss [31]. In cold climates, during the coldest periods, closing off the cavity between the two layers to outside air allows the system to function as a thermal insulation element based on the greenhouse effect, reducing the building's heating load. Movable insulation elements are necessary within the glazing to prevent heat loss during nighttime hours.

### 2.3. Active Systems

Active systems encompass a range of technologies that incorporate fans or other mechanical equipment to enhance user comfort and energy efficiency. Active systems offer high performance with minimal energy consumption to maintain comfortable indoor conditions.

Solar collectors convert solar energy into thermal energy, which can then be used for space heating and domestic hot water production by transferring it to space with the aid of storage and distribution systems [24]. A major challenge with this system is the risk of freezing in cold climates during the coldest periods. This issue is addressed with insulated collectors, pipes, and storage units [25].

Heat pump systems, utilizing electricity for heat transfer, can be sourced from air, water, or ground. These systems aim to harness heat from these sources, capitalizing on their existing thermal levels. In cold climates, air-source heat pumps operate at lower efficiencies compared to other climate zones due to the significant temperature fluctuations between day and night, and summer and winter. Water-source heat pumps offer higher efficiency in cold climates because the temperature of groundwater and surface water, used as a source, fluctuates far less than air temperature throughout the year. However, building locations often lack proximity to suitable water sources. Subterranean temperatures remain relatively constant year-round. Therefore, in cold climates, ground-source heat pumps can leverage this stable ground temperature to provide highly efficient heating.

Condensing boilers aim for efficient energy use by employing condensation technology. This technique condenses water vapor within the exhaust gas and transfers it to the heating water. This process allows the system to achieve high heat gains with low energy consumption, operating with high efficiency in cold climates.

HVAC systems are designed to provide all or some of a building's heating, cooling, and ventilation needs in an energy-efficient manner. These systems ensure desired indoor comfort conditions with minimal energy consumption, offering high efficiency in cold climates [33].

### 2.4. Energy Production Systems

Photovoltaic (PV) systems operate on the principle of directly converting sunlight into electricity. These systems aim to generate clean electricity from the sun without harming the environment or human health. PV systems consume no resources, producing electricity virtually free of charge after the initial investment and minimal maintenance costs. System efficiency, however, is dependent on weather conditions. The annual daylight hours and sunshine duration at the PV panel installation location determine the system's overall efficiency. Due to generally sufficient annual daylight and sunshine duration across Turkey, PV systems operate efficiently.

Wind turbines are systems that convert kinetic energy of wind first into mechanical energy and then into electrical energy. The energy obtained is transferred to the generator in the body and stored via batteries or delivered directly to the receivers. Like PV systems, wind turbines consume no resources, producing electricity virtually free of charge after the initial investment and minimal maintenance costs. Medium and small-scale wind turbines are suitable for buildings. These turbines can be placed in a suitable location in the garden or installed on rooftops [26]. Because wind speed, the resource for wind turbines, lacks a consistent standard, system efficiency varies.

Cogeneration and trigeneration systems exhibit higher efficiencies compared to single-purpose production systems because they extract more usable energy from the same fuel source. In addition to their efficiency, they also utilize exhaust gases, thus reducing CO2 emissions [34]. These systems operate with high efficiency in cold climates.

## 3. MATERIALS AND METHOD

This study, aimed at demonstrating applicability of net-zero energy-focused design approaches specifically for cold climates in buildings, which hold the largest share in globally prioritized goal of energy efficiency, has developed guidelines for architectural design processes. The decision-making steps towards achieving net-zero energy in architectural design are examined in four phases: passive design, utilization of passive systems, utilization of active systems, and utilization of energy production systems. In this context, existing theoretical and practical knowledge obtained through a systematic and extensive literature review has been classified, focusing on decision-making stages and their adaptation to design processes (Figure 2).

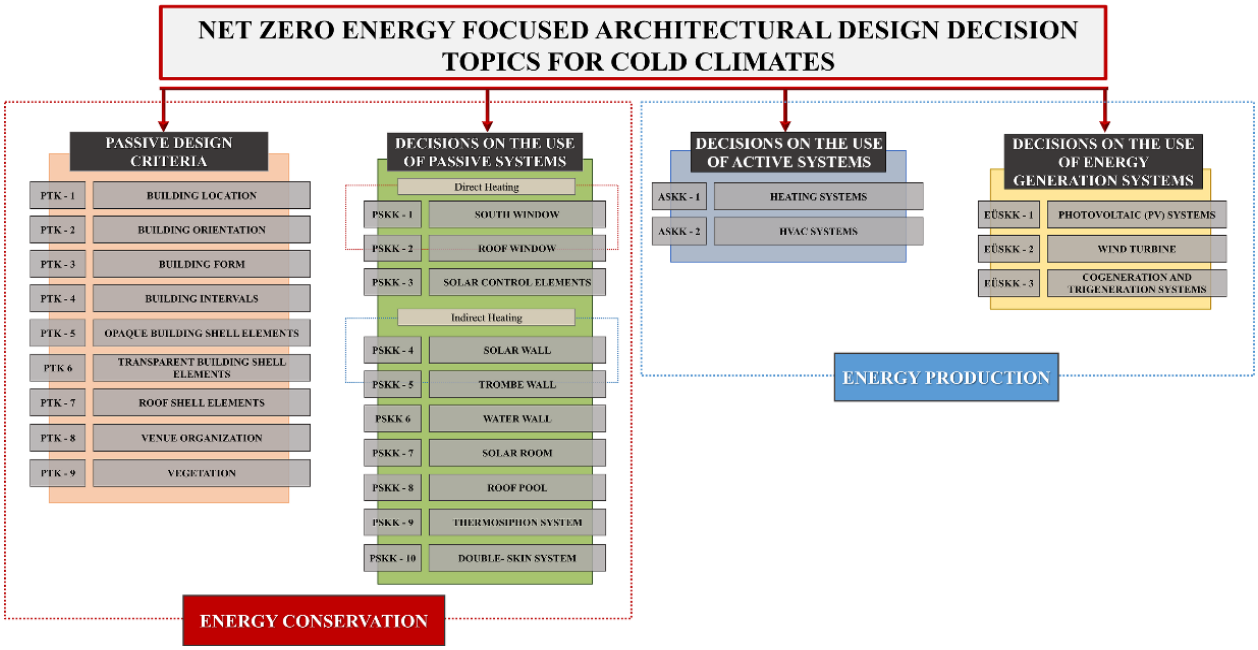



***Figure 2.*** *Flowchart of net-zero energy-focused architectural design decision topics for cold climates*

In net-zero energy-focused architectural design processes, it is an accepted reality that design decisions regarding energy conservation and energy production enable the achievement of the expected performance with the design's inherent capabilities. Based on this fact, the developed design guide is addressed in two parts. Within the scope of performance expectations, which should be focused on energy conservation, it has been determined that passive design decision topics are closely related to building's location on the design site, orientation, form, distance from neighboring buildings, properties of opaque and transparent building elements in building envelopes, roof type and properties, spatial organization, and surrounding vegetation. Considering the climatic elements of the cold climate zone and relationship between the existing built environment and natural environment, the data contextualizing design were determined, and its suitability for the climate zone, along with its advantages and disadvantages regarding

its purpose and application potential, were revealed (Figure 3). The suitability status is given with a confirmation code in the red circle on the far right of the figure. The status indicated by an exclamation mark in a yellow circle shows that the decision made will operate with low efficiency and that the expected efficiency can be increased with additional measures, while the question mark in the green circle indicates that even if it is among the energy-efficient design strategies, it will not be efficient for the cold climate zone.

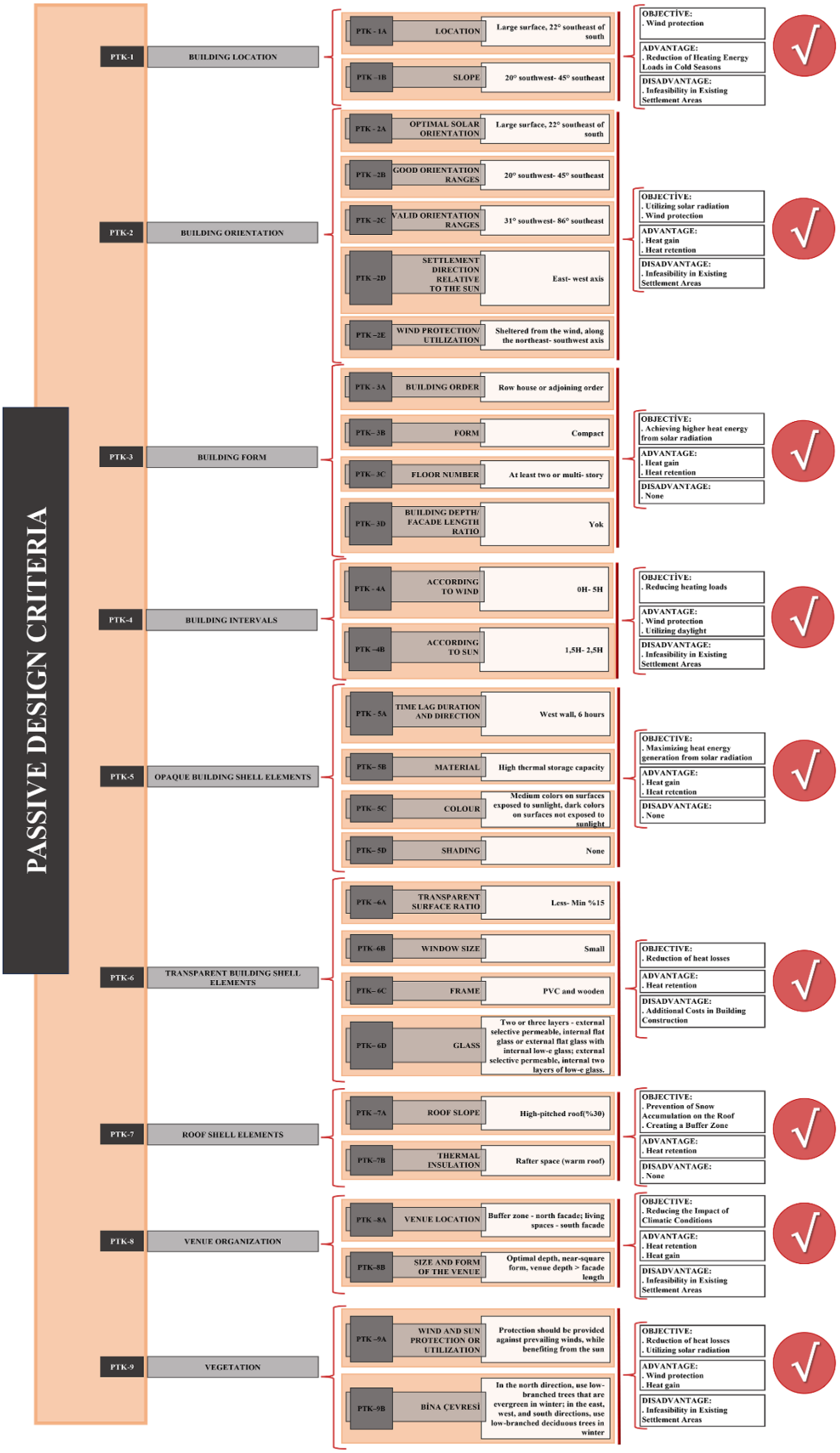



***Figure 3.*** *Net-zero energy-focused passive design decisions for the cold climate zone*

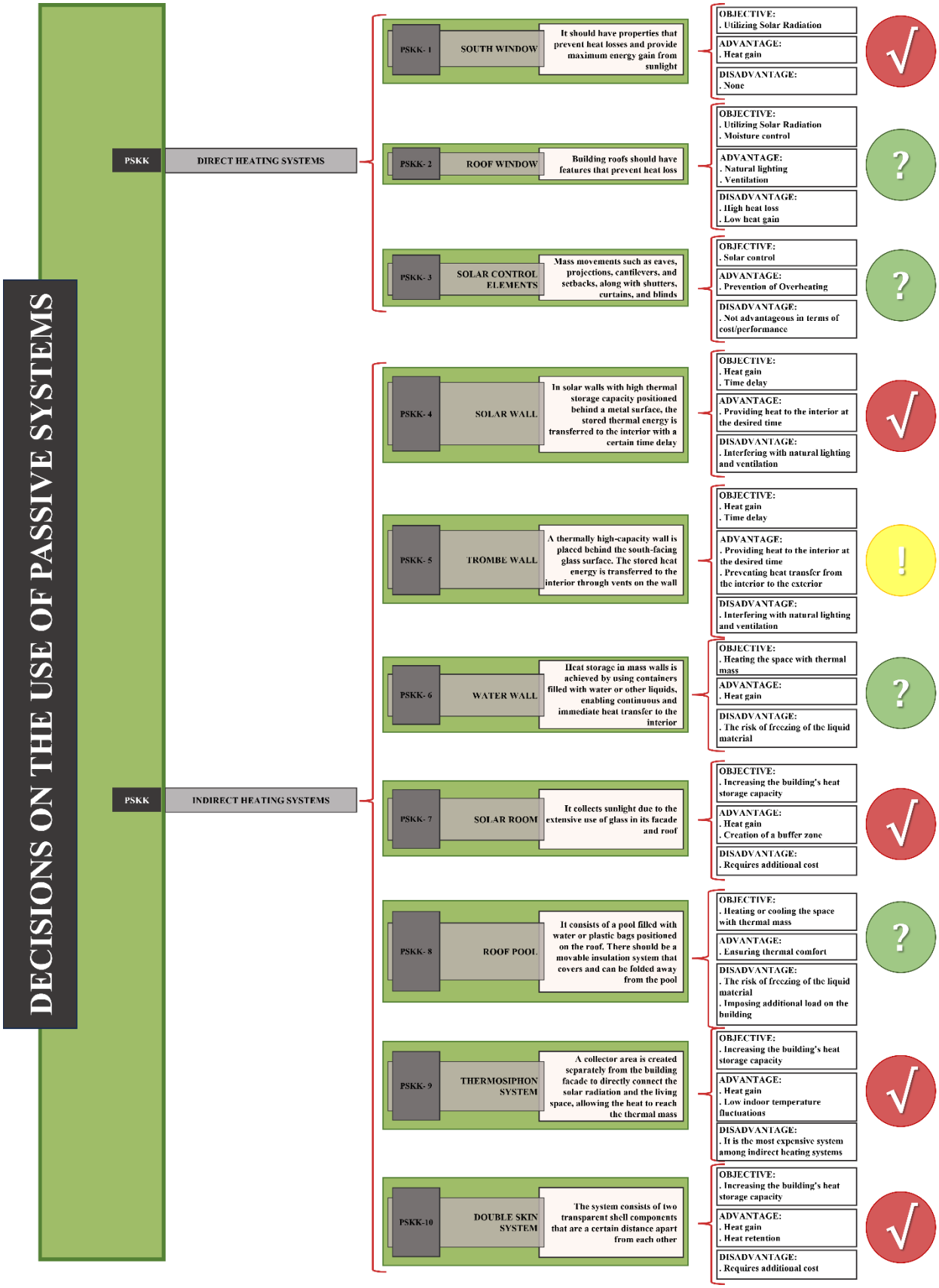



***Figure 4.*** *Net-zero energy-focused passive systems usage decisions for the cold climate zone*

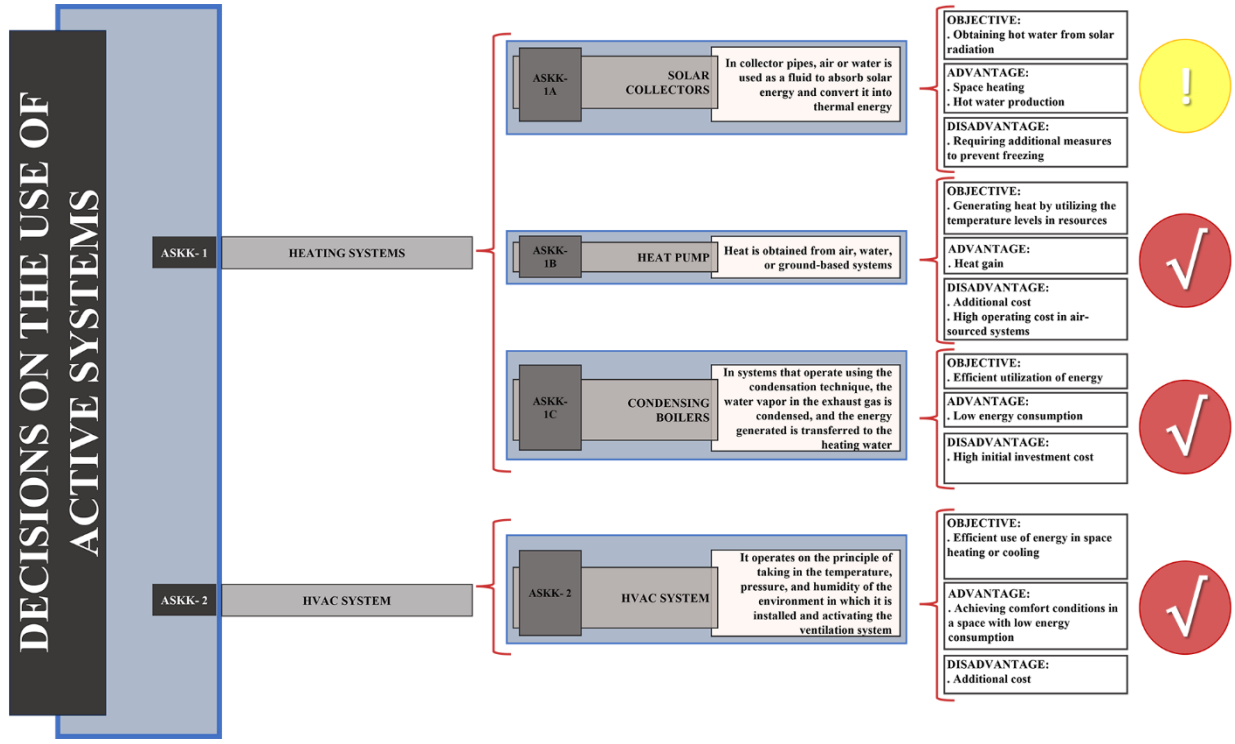



***Figure 5.*** *Net-zero energy-focused active systems usage decisions for the cold climate zone*

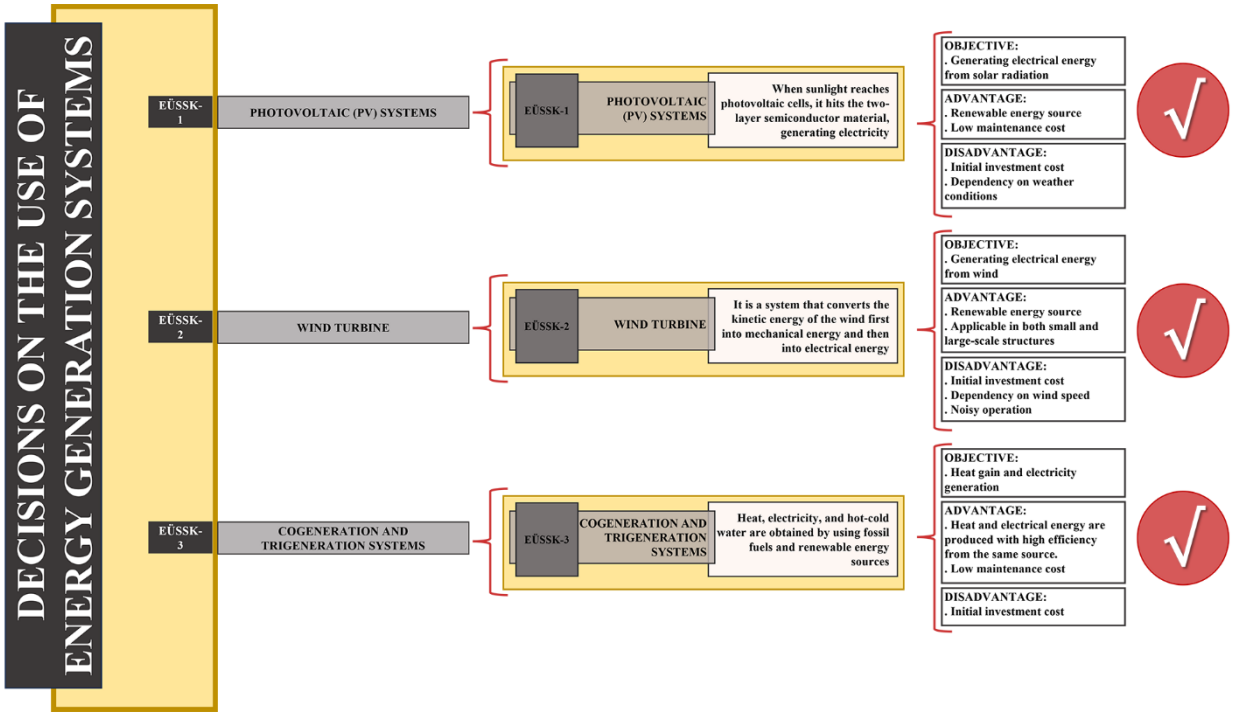



***Figure 6.*** *Net-zero energy-focused energy generation systems usage decisions for the cold climate zone*

## 4. COLD CLIMATE ZONE ANALYSIS STUDY: SIVAS PROVINCE

The majority of Sivas province's land is in upper Kızılırmak section of Central Anatolia, while other parts are in the Black Sea and Eastern Anatolia regions, between 35° 50' and 38° 14' east longitudes and 38° 32' and 40° 16' north latitudes. With an area of 28,488 km², Sivas is second largest province in Turkey in terms of land area. Sivas is in a cold climate zone. Summers are hot and dry, winters are cold and snowy, and frost events are also observed. Climatic data for Sivas province are provided in Table 3.

***Table 3.*** *Climate data for Sivas province between 193- 2023 [27]*

| | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Year |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Average temp.(°C) | -3,4 | -2,1 | 2,7 | 9,0 | 13,5 | 17,0 | 20,0 | 20,2 | 16,2 | 11,0 | 4,8 | -0,6 | 9,0 |
| Ave. max. temp.(°C) | 0,9 | 2,6 | 8,1 | 15,3 | 20,1 | 24,1 | 27,8 | 28,6 | 24,7 | 18,6 | 10,9 | 3,7 | 15,4 |
| Ave. Min. Temp.(°C) | -7,3 | -6,2 | -2,1 | 3,1 | 6,9 | 9,6 | 11,7 | 11,8 | 8,1 | 4,2 | -0,2 | -4,3 | 2,9 |
| Average sunlight duration(h) | 2,6 | 3,6 | 4,8 | 6,3 | 8,1 | 10,5 | 11,9 | 11,4 | 9,4 | 6,5 | 4,2 | 2,5 | 6,8 |
| Average number of rainy days | 12,9 | 12,1 | 13,3 | 13,3 | 13,9 | 8,7 | 2,4 | 2,0 | 4,2 | 7,7 | 9,3 | 12,2 | 112,2 |
| Total monthly rainfall amount (mm) | 43,0 | 39,1 | 46,1 | 56,3 | 60,3 | 35,2 | 9,3 | 6,7 | 17,8 | 33,0 | 40,2 | 44,1 | 431,1 |
| Highest temp.(°C) | 18,6 | 18,1 | 25,2 | 29,0 | 33,5 | 35,5 | 40,0 | 39,9 | 37,0 | 30,5 | 24,0 | 19,4 | 40,0 |
| Lowest temp.(°C) | -31,2 | -34,4 | -27,6 | -11,0 | -5,5 | -0,6 | 3,0 | 3,2 | -3,8 | -9,0 | -24,4 | -30,2 | -34,4 |

***Table 4.*** *Average daylight hours (hours) for Sivas province between 1963-2023 [28]*

| Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 9,7 | 10,7 | 12,0 | 13,3 | 14,4 | 14,9 | 14,7 | 13,7 | 12,4 | 11,1 | 10,0 | 9,4 |

In cold climate zones, heating loads account for the largest share of energy consumption. Due to the widespread use of fossil-based fuels for heating in Turkey, it was deemed appropriate to conduct the study specifically for the cold climate zone. Considering the climate data of Sivas province (Table 5), it was chosen as the study area because it reflects the characteristics of the cold climate zone. Looking at the annual sunshine and daylight hours of Sivas province, it is seen that there is sufficient potential for solar electricity generation.

### 4.1. Design Decisions

Within the scope of the study, the following design decisions were made for the designed building based on the passive design decisions given in Figure 3. The design decision step to which the decisions are related is given in parentheses.

- The building is located on a sloping terrain (PTK-1).
- The wide facade of the building is defined on the east-west axis (PTK-2D).
- The building is oriented towards the south (PTK-2A).
- The building is designed in an adjacent order and compact form (PTK-3A-3B).
- Due to the fact that 4-story zoning is mostly given to building blocks defined as adjacent order in the Sivas implementation zoning plan, the building was designed as B+G+3F according to the road elevation taken as the reference point; basement floor with building entrance, parking garage, and technical volumes; other floors with 2 apartments, each consisting of 3 rooms and 1 living room, for a total of 8 apartments (PTK-3C).
- The gross area of the ground and typical floor apartments in the building is 151.20m2, and the net area is 135.90m2. The floor area is 345 m2, and the total construction area is 1725 m2. The apartment square meters were determined by referencing standard 3+1 residences in Sivas province.
- In the building envelope, materials with low thermal conductivity coefficients were selected. The

thermal conductivity values for the layers are given in Table 5 (PTK- 5B).

- For the building envelope, a near-black anthracite color was chosen (PTK- 5C).
- The ratio of transparent surfaces in the building envelope was kept low, PVC was preferred for the frames, and triple-glazed windows with argon-filled cavities were selected (PTK- 6).
- A 30% sloped awning roof was constructed on the south side of the building's roof. Monocrystalline PV panels were mounted on the awning roof, covering 85.80% of the 14.60 x 24.20 m roof area (PTK- 7).
- In the spatial organization, living spaces such as the living room, kitchen, and sitting room are located on the south facade, while the bedrooms are positioned on the north facade. Balconies were designed on both facades. A 1.10 m high railing wall was defined on the balconies, and triple-glazed folding glass with argon-filled cavities was applied to the surface between the railing and the beam. In this way, it was aimed to create a sunroom on the south facade and a buffer zone on the north facade with the balconies (PTK- 8A).
- The spatial depths were kept minimal and dimensioned in square or near-square rectangular forms (PTK- 8B).

***Table 5.*** *Materials used in the building envelope and U values*

| Building Envelope Element | Layers | U-Value (W/M2-K) |
|---|---|---|
| Exterior Wall | Paint + gypsum plaster + cement plaster + 19 cm brick wall + 30 cm rock wool insulation + cement plaster + thin plaster + paint | 0.141 |
| Adjacent Wall | Paint + gypsum plaster + cement plaster + 9 cm brick wall + 15 cm rock wool insulation + 9 cm brick wall + cement plaster + thin plaster + paint | 0.256 |
| Partition Walls | Paint + gypsum plaster + cement plaster + 9 cm brick wall + cement plaster + thin plaster + paint | 1.681 |
| Ground Floor | 50 cm reinforced concrete foundation + 16 cm XPS insulation + 7 cm screed + wood flooring | 0.18 |
| Intermediate Floor | 15 cm reinforced concrete slab + 5 cm XPS insulation + 7 cm screed + wood flooring | 0.499 |
| Roof Floor | 15 cm reinforced concrete slab + 5 cm felt + 24 cm rock wool insulation + roofing | 0.157 |
| Glazing Type | Low-e triple glazing with argon gas filling (3+13+3+13+3) | 0.78 |


***Figure 7.*** *Basement Floor Plan*


***Figure 8.*** *Ground and Upper Floor Plan*

### 3.2. Simulation Study

In the study where Sivas province was selected as the cold climate zone, the energy simulation was conducted using the EnergyPlus 9.4 based DesignBuilder v7.0.2 program. The TMYx 2009- 2023 package was used for climate data. The year 2023 was preferred for the simulation as the year 2024 has not yet been completed.

In the designed residential building, which was planned to compare energy-efficient improvements within the scope of the study, parameters such as building orientation, layout, number of floors, spatial organization, and room dimensions were kept constant. The building envelope was defined using the thermal transmittance (U-values) specified in TS 825 as a variable. According to TS 825, the values used are 0.38 for walls, 0.23 for roofs, 0.38 for floors and 1.8 for windows. Additionally, no active or energy generation systems were defined. Subsequently, two separate simulation studies were conducted: first, incorporating the envelope improvements specified in Table 5, and then integrating active and energy generation systems. The results obtained are presented in the tables below.

***Table 6.*** *Annual Total Energy Consumption Data for the Building (According to TS 825)*

| | Total energy (kWh) | Energy per total building area (kWh/m2) |
|---|---|---|
| Total site energy | 96240,02 | 109,80 |
| Net site energy | 96240,02 | 109,80 |
| Total source energy | 294755,28 | 322,32 |
| Net source energy | 294755,28 | 322,32 |

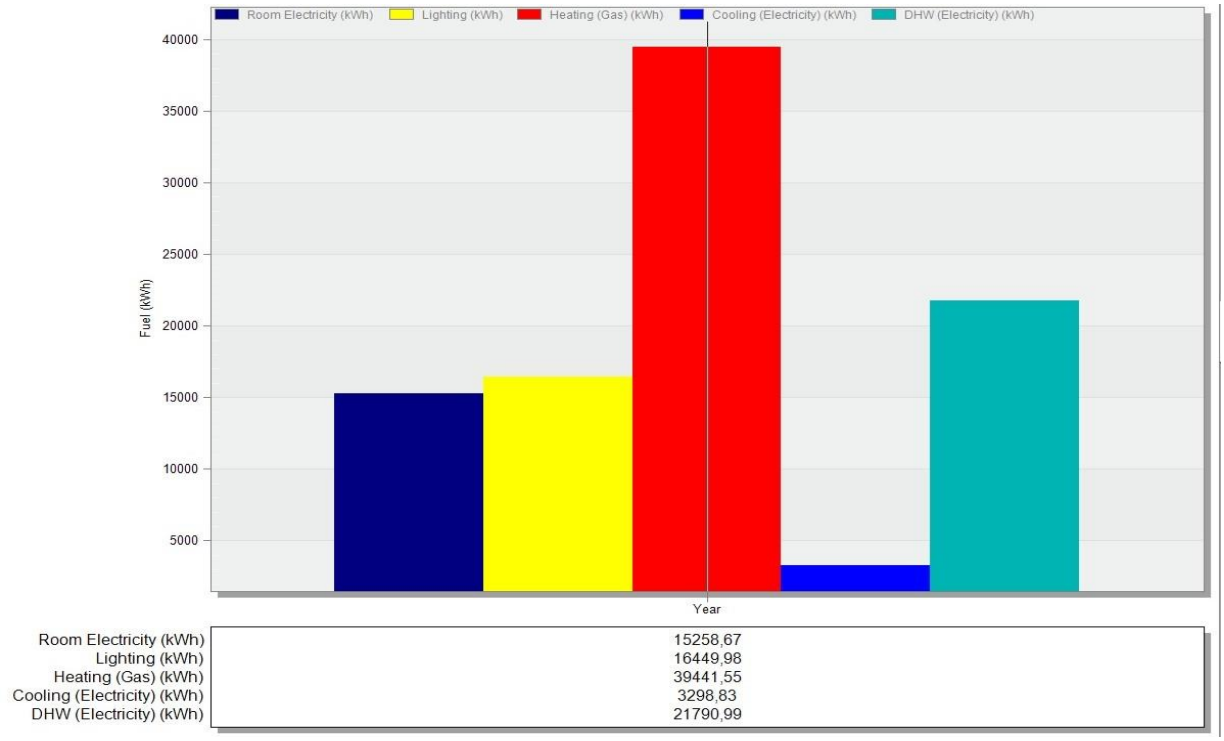



***Figure 9.*** *Annual Total Energy Consumption and Production Distribution Data for the Building (According to TS 825)*

***Table 7.*** *Annual total energy consumption data of the improved structure for NZEB*

| | Total energy (kWh) | Energy per total building area (kWh/m2) |
|---|---|---|
| Total site energy | 86889,21 | 99,12 |
| Net site energy | -357,22 | -0,408 |
| Total source energy | 267756,92 | 305,46 |
| Net source energy | 13072,41 | 14,91 |

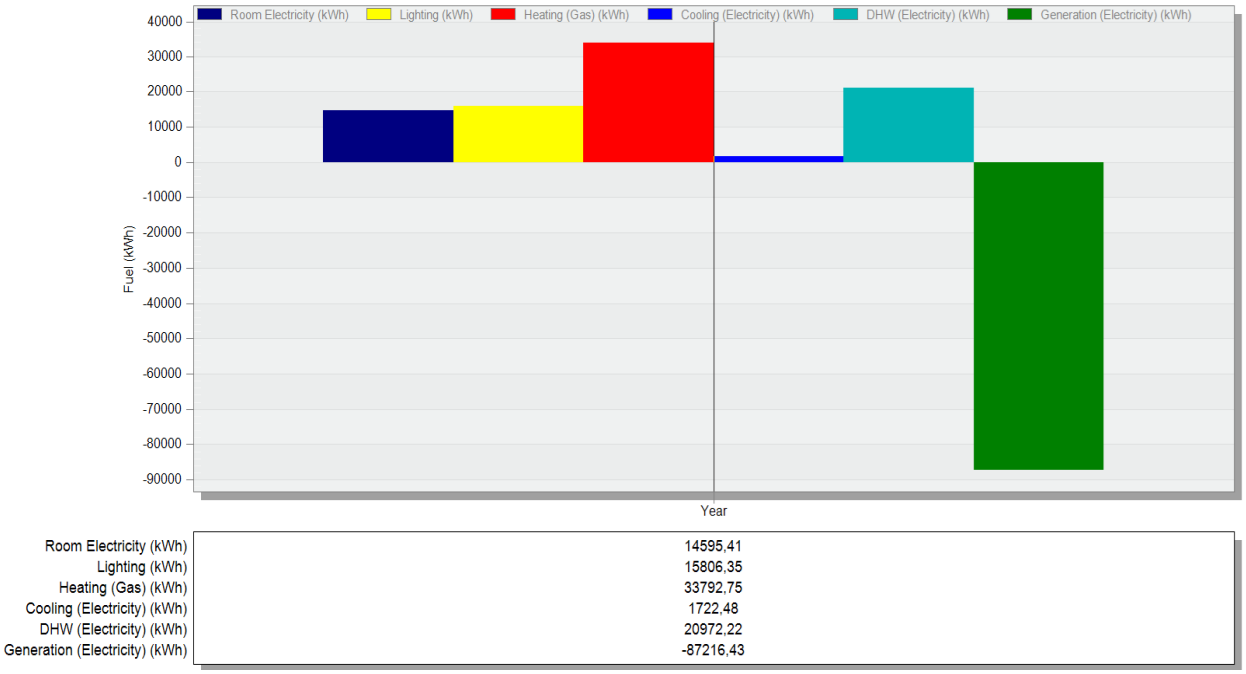



***Figure 10.*** *Annual Total Energy Consumption and Production Distribution Data of the Improved Structure for NZEB*

***Table 8.*** *Monthly Total Energy Consumption and Production Distribution Data of the Improved Structure for NZEB*

| | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Room electricity (kWh) | 1240,78 | 1118,87 | 1226,51 | 1219,17 | 1226,51 | 1190,63 | 1255,05 | 1226,51 | 1204,90 | 1240,78 | 1190,63 | 1255,05 |
| Lighting (kWh) | 1342,94 | 1212,22 | 1337,02 | 1307,27 | 1337,02 | 1295,42 | 1348,87 | 1337,02 | 1301,34 | 1342,94 | 1295,42 | 1348,87 |
| Heating (gas) (kWh) | 8487,12 | 7358,30 | 5130,05 | 2208,57 | 755,39 | 59,99 | 0,00 | 0,00 | 0,00 | 300,74 | 3233,66 | 6258,92 |
| Cooling (electricity) (kWh) | 0,00 | 0,00 | 0,00 | 0,02 | 12,45 | 94,80 | 448,63 | 704,06 | 386,47 | 76,04 | 0,00 | 0,00 |
| DHW (electricity) (kWh) | 1782,67 | 1607,85 | 1764,79 | 1748,24 | 1764,79 | 1712,47 | 1800,56 | 1764,79 | 1730,36 | 1782,67 | 1712,47 | 1800,56 |
| Generation (electricity) (kWh) | -4194,25 | -5153,67 | -7419,55 | -8104,46 | -9137,27 | -9774,80 | -10204,61 | -9989,61 | -8143,79 | -6380,22 | -4681,34 | -4032,87 |

***Table 9.*** *Summary Table of the Simulation Results for the improved structure for NZEB*

| Parameters | Simulation Results |
|---|---|
| Annual Total Energy Consumption | 86889,21 kWh |
| Electricity Consumption per Total Area | 99,12 kWh/m2 |
| Annual Total Heating Load | 33792,75 kWh |
| Annual Total Cooling Load | 1722,48 kWh |
| Ratio of Heating Load to Total Energy Consumption | %38,89 |
| Ratio of Cooling Load to Total Energy Consumption | %1,98 |
| Highest Monthly Heating Load | 8487,12 kWh (January) |
| Highest Monthly Cooling Load | 704,06 kWh (August) |
| Annual Total Energy Production | 87216,43 kWh |
| Annual Total Energy Demand | -357,22 kWh |
| Energy Demand per Total Area | -0.408 kWh |

## 4. CONCLUSION

Energy consumption, which has accelerated since the Industrial Revolution, has reached considerably high levels. Numerous studies are being conducted at national and international levels on buildings, which account for a significant amount of energy consumption. Following the publication of EPBD-Recast in 2010, studies are ongoing in Turkey, as other countries, to calculate cost-optimal energy efficiency and near-zero energy levels in buildings by establishing national methodologies in accordance with EU framework. In this context, efforts such as enacting regulations and participating in international agreements and protocols are being carried out. However, achieve this goal, Turkey still needs long-term research and evaluations by experts, like the ongoing research in EU countries. In studies to be conducted

at national level in parallel with the EPBD-Recast, human, geographical, and climatic data should be considered separately, considering the country's specific conditions, before reaching a conclusion.

Reducing energy dependence, combating global climate change, and preserving the natural environment make it crucial to decrease energy demand through efficient use and to meet this demand from renewable energy sources. According to the statistical data published by TURKSTAT, approximately 87% of the buildings in Turkey are residential, with the majority being multi-family apartment buildings. Therefore, energy efficiency studies conducted in residential buildings are expected to provide faster solutions to Turkey's energy problems. For this reason, this study aimed to enable multi-family residential buildings to reach net-zero energy building standards.

In this context, in the article study prepared after the introduction section, in the second section; passive design criteria, definitions of passive, active and energy production systems and working principles are explained and by creating a design guide that specifies the usage status, usage method, advantages and disadvantages of these criteria and systems specific to the cold climate region, it is aimed to guide designers in net zero energy building design. In the third section, Sivas province located in the cold climate region is accepted as the study area and based on the tables created in the second section, an apartment type residential building is designed and two separate scenarios are defined and energy simulation analyzed are made in the DesignBuilder program. In the first scenario, some variables related to the design are kept constant and the building shell design is made in accordance with the heat transmission coefficients given for the cold climate region in TS 825. Active and energy production systems are not used in this scenario. In the second scenario, an energy efficient improved building shell is defined for the designed residential building and also the accessibility of the building to the NZEB standard is investigated by integrating active and energy production systems.

As a result of the simulation, the annual energy consumption of the structure defined according to TS 825 was 109.80 kWh/m2 per m2, and 96240.02 kWh in total. The annual energy consumption of the structure designed to meet the NZEB standard was 99.12 kWh/m2 per m2, and 86889.21 kWh in total. In this context, the contribution of the improvements made to the energy efficiency of the building was 9350.81 kWh per year. When these values are examined, it is seen that the building envelopes provide 9.71% energy saving to the total energy load of the building. This required energy is met by photovoltaic panels placed on the building's roof, measuring 14.60 x 24.20 m and covering 85.80% of the roof area. The PV panels produce a total of 87216,43 kWh of electricity annually, meeting the entire annual energy demand of the designed residential building and enabling it to achieve the NZEB standard.

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# Architecture of Mise-en-Scène: Courtyards as Central Characters in Akad's 'Migration Trilogy'

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**Abstract**

This study examines the representation of courtyards as women's living spaces in the mise-en-scènes of Lütfi Ö. Akad's *Migration Trilogy* (*Göç Üçlemesi*)—*Gelin, Düğün, Diyet*. Akad adopts a socially realistic perspective to explore internal migration in Istanbul, a significant issue in Turkey from the 1950s onward, through women-centered narratives. Each film portrays courtyards as vital living spaces for women, set within the context of migration and social change. To analyze the architectural dimensions of courtyards represented in the films, the study employs semiotic, analytic and hermeneutic methods to interpret their role as cinematic and architectural constructs. The article consists of two sections. The first contextualizes Akad's filmmaking, examining the socio-political influences that guided his interest in migration films and his realist mise-en-scènes. The second explores the courtyard as an architectural setting, analyzing its portrayal as a women's space through camera angles, spatial depth, prop usage, and user movement. Akad's use of the camera as a realist lens frames the courtyard as both a central narrative and architectural element. By adopting a socially realistic approach, Akad depicts the courtyard as a living space that reflects the everyday realities of migration and gender, with various users, but primarily as a space for women. Through the interplay of cinema and architecture, the study highlights how courtyards in Akad's trilogy serve as dynamic spaces, reflecting the complexities of migration, gender, and modernity.

## 1. INTRODUCTION

The phrase *'mise-en-scène,'* which is formed by using the French word *'mise,'* which means placing or arranging something in a place, together with the word *'scène,'* meaning stage, is primarily used as 'putting on the stage' or 'stage arrangement' to describe the practice of directing theater plays,' has been used as a term corresponding to its meaning. Later, the discipline of cinema borrowed this term from theater and was expanded to refer to film direction similarly, expressing the director's control over what is seen within the film's framework [1]. According to Gibbs [2] the phrase mise-en-scène, which came into English[1] as written in French, has been used since 1833. This study places the concept of mise-en-scène at the center of the research, with its use extending from theater to cinema and with the idea that it forms an intersection with the discipline of architecture. In this context, Lütfi Ö. Akad is considered the pioneer of the auteur directors generation in Turkish cinema. *The Migration Trilogy*, one of Akad's prominent works, is reconsidered through mise-en-scène.

Kurtuluş Kayalı, known for his expertise on the history of Turkish thought and cinema, he commemorates Akad as Turkey's first cinema professor and highlights him as a 'thinker-filmmaker' rather than a director because he incorporated thought into cinema [3]. One of the most distinctive features of Akad's cinema is that he produces films from a sociologist's perspective by dissecting situations, without aiming to resolve

[1] According to Nişanyan Dictionary [4] which includes the words transferred from French to Turkish, this term was transferred to Turkish as mise-en-scène as it is read in French, and was first identified as mise-en-scène in 1914 by Hüseyin Rahmi Gürpınar [...] a theater that considers the most scrappy details of mise-en-scène. It was used as a theater term such as [...] director.

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the issues [5]. In his movies, Akad preferred to tell stories through visuals instead of Yeşilçam's traditional oral narrative tradition. In this regard, he treated the places he created in his images as main characters and used the places effectively in storytelling. With innovations such as taking the camera to the street, liberating the camera from the *traveling* system by creating deep mise-en-scènes, treating the character as a social entity with its environment without commodifying it to bring the thought to the fore, and breaking the fourth wall by making him look at the camera, Akad made significant contributions to Turkish cinema. This innovative approach has attracted the attention of researchers interested in social sciences, especially in the last 20 years, and Akad, as a director, continues to be a subject of study, and his films are among the essential works of Turkish cinema history as cult productions. Many reference books, theses and articles have been written about Akad, especially his autobiographical book *Between Light and Darkness* [6]. Among these books, especially Onaran's book *"Lütfi Ö. Akad"* [7] has become an essential reference book for the study. In addition, many thesis studies have been conducted about Akad and his cinema. Başer [8], Orhan [9] in these theses, all of which were conducted in the field of Social Sciences, within the scope of the Department of Radio, Television and Cinema, the theatrical and realistic effects in the director's cinema, the process of meaning creation, and how he handled Istanbul were investigated. Apart from the articles produced from these theses, the director has been the subject of many articles. Erkılıç [10], Erdal Aytekin [11], Çelik [12], Bostan [13] These studies discuss the social morphology and political perspectives in the films, object-human relations, and the influence of literature on Turkish cinema through village reality, as well as the director's *auteur* identity and filmmaking practices.

The Migration Trilogy, which was chosen as the research object of this study, has been examined by researchers, mainly in the field of social sciences. The trilogy was discussed by Duran [14] in the context of social forms and individuality from a Simmelian perspective, Çakır [15] examined the religious and mythical narrative as a criticism of society, Akyurt [16] evaluated it on the axis of economic and cultural conflict, and Güner [17] examined Turkey in the light of the trilogy. Articles have been published on migration, employment and urbanization problems in Turkey. Although these articles have an important place in understanding the social context of the migration trilogy, Kozan [18], discusses Akad's migration trilogy through female representations, Kırel and Yetimoğlu [19], examine cinematographic preferences in the creation of meaning, Kara [20], Who examines the phenomenon of migration from rural to urban areas. and Çöloğlu [21] and Fazlıoğlu [22], who deal with the modern-traditional and male-female contrasts. Studies also made significant contributions to developing this research and selecting mise-en-scenes. They were also influential in determining the place of the study in the literature.

The literature review shows that although the element of space is brought to the fore in Akad's films, studies have yet to be done on this subject from the perspective of the architectural discipline. This study focuses on Akad's approach to treating spaces as main characters from an architectural perspective, primarily through the Migration Trilogy, thus contributing to the literature. As can be seen from his autobiography, Akad gave great importance to the issue of immigration from the first years of his directorial career and dealt with this issue with determination. The Migration Trilogy deals with the living spaces established by migrating people in Istanbul, which has received intense immigration since the 1950s, with different scenes. In this context, examining the meanings Akad attributes to the mise-en-scenes in his trilogy and how he shapes these elements is of great importance in understanding both the director and his directing style.

In the process of determining the places used in common in the director's trilogy, it is observed that the female characters in all three films relate to other areas such as streets, neighborhoods, and cities. However, these places are excluded from the scope of this article because they are more limited and intermittent in the films, so they do not have a dominant structure. Although their functions have changed in the movie, it has been determined that places such as the courtyard (house and factory courtyard), kitchen, and table stand out. The role of these spaces in the creation of meaning has attracted attention, especially with their relationality with women. In this context, the mise-en-scène in which the "courtyard" is located, stands out as the living space of the woman, who is the main character in all three films and are arranged by the director with the aim of creating realism with reference to Brecht as places where people live are analyzed in detail.

According to Alkan, women who provided unpaid services at home until the 1950s also participated in paid working life as of the 1950s. While this participation creates contradictions about urban land use, it also raises new questions about women's use of space and time. Women participating in the labor market experience two different lives: domestic life and working life. Unlike men, women are the primary workers at home, whether they are in working life or not [23].

In Akad's women-based narratives on the issue of internal migration from a socially realistic perspective, the courtyards, which are the common subject of the stories, are depicted as women's living spaces. This means that the house, specifically the article, the courtyards that function as residences, corresponds to a concept in which many social relations, apart from the general meaning of shelter, are met in ideological and symbolic meanings. The relationship between the concepts of space and gender is attributed to women at the scale of the house - the courtyard - and this is a presupposition regarding gender roles. While living spaces are included as non-public spaces in gender classification, they are generally described as women's spaces [24].

The study mainly consists of two parts. In the first part, Akad, referring to Kayalı [3]. Akad's identity as a thinker and filmmaker will be examined through the innovative firsts the director selected from his cinematography brought to Turkish cinema as a basis for the subject discussed in the article. Then, the process that led Akad to the migration trilogy will be focused on, and information about the social context of the period will be presented. In the second part, a new perspective will be brought to the concept of mise-en-scène, on which the study is based, from the intersection of cinema and architecture. In this section, scenes selected from the trilogy films *Gelin* (1973), *Düğün* (1973), and *Diyet* (1974) will be analyzed in detail from an architectural perspective. In this study, analytical and didactic research will not be conducted on the internal migration problem that has been going on in Turkey since the 1950s, and general inferences about Akad's cinema will not be put brideforward. Instead, Akad's use of locations in his films will be examined in depth through a specific sample.

## 2. METHOD

This study uses a combination of analytical, semiotic, and (hermeneutic) methods based on the idea that cinema, by its nature, creates a narrative through places. In the first stage, the selected mise-en-scènes will be conveyed in a descriptive manner accompanied by visuals. Then, the analytical approach will examine the role of these locations in the film, their structural features, and how they serve the narrative. During the analytical evaluation of the selected scenes, the focus will be on the positioning of the camera, the depth of the spaces, the users, and their movements/actions in the space. The semiotic approach will include the process of interpreting signs to analyze the symbolic and narrative meanings of these spaces. While descriptive and analytical studies will reveal the visual and structural features of spaces, semiotic analyses will reveal the cultural and narrative burdens carried by these elements. Finally, the (hermeneutic) approach will allow us to illuminate the artistic and narrative layers of these elements from a broader perspective by interpreting the deep meanings of the spaces within the context, mise-en-scène, and narrative relationship. In this way, the study aims to comprehensively examine not only the formal parameters of spaces but also their narrative and cultural meanings. This mixed methodological approach seeks to understand how space is used as a cinematographic narrative element in films and to reveal the meanings of these elements in the context of architecture and cinema in a multi-layered manner.

## 3. THE 'FIRSTS' THAT PHILOSOPHER-FILMMAKER LÜTFİ Ö. AKAD BROUGHT TO TURKISH CINEMA

Akad states that he has as much prior knowledge of the camera as anyone before he starts directing, and he sees the camera, unlike the camera, not just as a witness of an object or moment, but as an "impartial witness" of a long or short process. However, from the first moment he steps into directing, he realizes that the camera is not actually impartial. According to him, unlike the borderless and frameless world he is accustomed to, the camera presents the world as a delimited and evaluated part. In addition, Akadian thinks

a moment that seems ordinary to the naked eye takes on completely different meanings within the camera frame. [6] While a mental focus is necessary to distinguish one object from others when viewed with the naked eye, the camera leaves out everything unnecessary and clearly presents what needs to be seen. This approach of Akadian is not only a technical choice but also becomes one of the essential narrative elements of his cinema. Using the camera frame as a means of production of meaning, Akad manages to deepen ordinary moments and offer a different perspective to the viewer.

According to Onaran [7], Akad's cinema career is divided into two periods. The first period started with Akad's film *Vurun Kahpeye*, shot for Erman Kardeşler Film in 1949, and continued until 1962. During this 13-year period, Akad shot 28 films for different production companies and wrote the scripts of most of these films himself. This period was followed by a period from 1963 to 1966, during which he stopped producing films and sought to redefine himself. This process ended with the movie *Sırat Köprüsü*, which he shot in 1966, and the second and last period of Akad's cinema career began. The second period was completed with the shooting of *Diyet*, the last film of the Migration Trilogy, in 1974. After this date, Akad focused on education, documentary films and short television films rather than cinema [7-6].

Akad's career as a director began with the adaptation of Halide Edip Adıvar's novel *Vurun Kahpeye*, for which he illustrated and handwrote the script. This film, which corresponds to the period between 1939 and 1952, defined as the transition period in Turkish cinema, arouses great interest in the period. During this period, Akad shot a few films for Erman Kardeşler, and as a result of the disagreement, he parted ways with Erman Kardeşler and moved to Kemal Film. Akad, who remained within a certain creative limit at Erman Film, found a freer artistic expression and creation environment and the opportunity to produce more socially in-depth works after moving to Kemal Film. The film *Kanun Namına*, which he shot here, is considered to be the film that started the era of filmmakers in Turkish cinema, in which a new cinema language emerged that lasted approximately six years [25]. The importance of this film is that Akad takes the camera to the streets [7]. With this way of doing things, Istanbul ceases to be a stage and turns into a natural environment in which the actors live (Figure. 1.). In this movie, Akad instinctively discovers his ability to use limited opportunities to the maximum extent. As he stated in his autobiography, he later realized that the Russian director Kuleshov had unwittingly used the method of creating a previously unexpressed and non-existent idea by stringing together various shots. The limited resources of the actors taught Akad to imply a situation and direct the audience with a stream of consciousness rather than explaining it directly. He had to rediscover the principles of names such as Griffith, Eisenstein and Pudovkin, who shaped cinema theories 30-40 years before his time, through his own experiences. As Akad progressed in directing, he realized that making cinema is not just about putting images together consecutively; He has learned that this is a much deeper and more complex form of expression [6].

***Figure 1.*** *Footage of the camera going out onto the street from the movie in Kanun Namına (1952)*

Another innovation Akad brought to cinema was his pioneering approach to decor design and mise-en-scène in the 1954 movie *Öldüren Şehir*. In this film, three-dimensionally designed props were positioned in the background and the actors performed in front of these props. This method enabled the creation of in-

depth mise-en-scènes and offered the director the opportunity to create scenes in which the foreground and background characters are in focus at the same time. Thus, the need for the traditional traveling system has been eliminated and player mobility has gained a freedom similar to that of the theater stage. This approach, in which the camera is used as a tool that reflects the director's view, made it possible to edit long-term scenes with an uninterrupted flow [7]. This innovative method of Akad also appears frequently in the Migration Trilogy. In this context, in the analysis part of the research, the depth of space and the effect of mise-en-scène fiction on the narrative were explicitly discussed.

Another essential feature that can be said for Akadian cinema is the realistic perspective in his cinema. Instead of directly explaining or showing a situation, Akad preferred to enrich the narrative language by using symbols, euphemisms and analogies that would inspire the audience's stream of consciousness [6]. One of the first examples of this narrative style can be seen in the 1955 movie *Beyaz Mendil*. In this film, Akad reflects the village life realistically, conveying the difficulties experienced by the people and the dynamics of the society in a cinematic language [11]. In this context, Bostan's [13] opinion that the characters in Akad's films are neither politically advantageous nor epic heroes is essential. The characters in Akad's films reflect ordinary Turkish people and their drama. He further deepened this realistic perspective throughout his career, especially with the Migration Trilogy, aiming to tell the inner dramas of the people and the transformation of society.

Akad discovers that in the movie *Üç tekerlekli Bisiklet*, the actor does not have to move or form a sentence to describe a situation, but can convey the psychology of the situation by holding a certain picture at a certain length. Akad wanted to make the actors perceive themselves as a social entity with their environment instead of commodifying them, and therefore adopts an objective point of view with the interpretation "A face that covers the whole screen takes the actor out of the concept of human and turns him into an object." [6] Akadian describes this approach in his films as "breaking down the fourth wall[2]" (Fig. 2.) and diegetic space[3], allowing to reflect social reality and the characters' relationships with their environment in a more natural and effective way. This approach, as one of the essential elements of Akadian cinema, was applied in all three films examined within the scope of the study.

***Figure 2.*** *Images from the scenes in the Migration Trilogy, where the fourth wall is torn down in the films Gelin, Düğün and Diyet, respectively.*

### 3.1. The Context That Prepared Akad for the Migration Trilogy: Who Are They?

The 1950s marked the period when internal migration in Istanbul began, and the city grew rapidly. During this period, the lives of the villagers began to change with the modernization of agricultural production and technological developments that increased productivity in agriculture. The increased use of tractors and the increase in agricultural production enabled small landowners in the villages to earn more income. In addition, emphasis was placed on infrastructure work to transport agricultural products to urban markets more quickly and efficiently. These developments triggered the migration of villagers to city centers [26-27- 19]. In addition, the nation-state policies that started with the Democrat Party coming to power in the early 1950s caused the non-Muslims who settled in Istanbul at that time to migrate from the city [28]. However, the importance given by the Democratic Party administration to urbanization increased and this accelerated internal migration movements. Thus, the population of Istanbul increased rapidly and the city became a city of immigrants. This social change was also reflected on the big screen, and the 1960s began

[2] This concept, which originates from theatre, means acting in epic theater by showing that the actors are aware of the presence of the audience, without acting as if there were four walls surrounding them. [31]

[3] Sound, music, and other elements that are part of the story found in diegesis, the fictional story world. Diegetic elements in Akadian's films. [32]

to be shaped by the influence of internal migration-themed films and the social realism movement in Turkish Cinema [27- 29- 30].

The event that brought this trilogy to Akad's mind was an article published in the Milliyet Newspaper dated January 18, 1958 in the early 1960s, supported by a panoramic photograph titled "WHO ARE THEY?" It is an article. In the picture, six unemployed men are sitting next to the wall of the New Mosque and watching the surroundings. At the same time, the article states that some of them came to Istanbul from the countryside in the summer and returned to their hometown in the winter, and some of them continued to live in Istanbul by staying in an inn room they could find. Akad emphasizes in his autobiography that this situation is not as superficial as it is stated in the news. According to him, the constant migration of these scattered people to Istanbul is an important social phenomenon and, therefore, has the potential to be a good movie subject [6]. Akad has aimed to reflect this social phenomenon realistically in cinema throughout most of his career. It has taken several steps in this direction. First, he asked for a script from Orhan Kemal, whom he met frequently at that time. From Akad's autobiography, it is learned that Orhan Kemal experimented with scripts on the stories of people migrating from rural to urban areas. However, it is understood[4] that this idea was abandoned because none of these scenarios were in line with what Akad was looking for. Because Akad thought it was essential to work with a writer, he started a working process with Selim İleri in the following years. However, this work has not progressed due to differences in opinion and method. Finally, Akad decides to continue the process alone [6]. At the end of this whole process, he collaborated again with Erman Film and started to realize his migration-themed trilogy, which he had been subconsciously maturing for years, in 1973. This trilogy, which first began with the movie *Gelin*, continues with the movie *Düğün* and ends with the movie *Diyet* in 1974. The movie Diyet has special importance because it is also the last movie shot by Akad. In this work, cinematographer Gani Turanlı, who played an important role in creating the mise-en-scène, should also be mentioned. As understood from Akad's autobiography, Turanlı is a name that Akad particularly preferred because his ability to successfully handle visual issues such as depth earned the director great trust [6]. Turanlı's contributions have an essential place in Akad's cinematic language and he has been one of the most valuable accompanists especially in this project.

The trilogy tells the stories of people who came to the city but had no chance to return and had to hold on to the town [6]. In Gelin, people who are trying to hold on to the city with their small capital by selling all their assets from their hometowns; In The Düğün, a family of six with no capital and no craft; In the Diyet, some people work in the factory and form a class consciousness over time. The trilogy is about the 'man who has fallen into drama', which Akad has dealt with in his other films. These films reveal the interactions of social, economic, and cultural developments in Turkey of the period by dealing with different social sections, such as shopkeepers, hawkers, and workers, and emphasize the changing effects on tradition [5].

If a general evaluation is to be made about the Gelin-Düğün-Diyet trilogy, it can be said that Akad deals with the urbanization process and the problem of slums in Turkey in depth with its economic, social and cultural dimensions through these films. Akad offered a comprehensive perspective on the process of slums brought about by rapid urbanization and tried to show the class roots of human behavior and the influence of traditions and values in obtaining rights in the class struggle. Akad emphasized that social and individual changes cannot be explained only by socio-economic factors, but also the influence of traditions and values on structural transformations. He drew attention to the fact that these transformations can be used as a tool for social change as well as their effects on the current order of society [5].

## 4. MISE-EN-SCENE AND REALISM AT THE INTERSECTION OF CINEMA AND ARCHITECTURE

In his book *The Architecture of Image: Existential Space in Cinema,* referenced by many researchers working on cinema and cinematic space in the discipline of architecture, Pallasmaa (2001) justifies the commonality of the architecture and cinema disciplines, which are very close to each other, through the

[4] After Orhan Kemal's work, it turned into the novel "Gurbet Kuşları" [35] and was published by attributing it to Lütfi Akad, who coined the phrase "Istanbul's stones and soil are gold".

concept of 'lived space'. According to Pallasmaa [33], both forms of artistic expression create and instrumentalize detailed images of life. Güzer [34] mentions that the space in the cinema ceases to be the background of the story and becomes a frame that determines the boundaries of life, and adds that sometimes experiences and actions go beyond the limits of the space, allowing the forms of action, habits and alternative relationships to be seen.

Again, Pallasmaa [33] expresses the similarity between architecture and cinema through the fact that both disciplines undertake the function of creating and preserving images of the context, culture and particular lifestyle in which they are made. Just as buildings and, on a larger scale, cities embody and maintain the context, cinema, through the fictional spaces it produces, illuminates the cultural archeology of both the period in which it was made and the age it visualizes or reflects. Erk [36] takes this situation one step further and states that the places framed in cinema turn into visible cities and that films make visible not only a city's physical structure (buildings and streets), but also its invisible and intangible dimensions. In summary, both art forms define the dimensions and essence of existential space and; Both create experiential scenes of life situations [33].

Likewise Şumnu, since cinema and architecture are two separate disciplines that think and produce on the subjects of action, time and space, they have been influenced by each other and have provided new possibilities to each other since the first film made [37].

German theater historian Max Herrmann, who researched the historical development of the theater space and the spatial dimensions of dramatic arts as cited in Hermann, Erk, [36]. It mentions that the fundamental values of performance in performance arts are revealed on the space and puts a significant burden on the space. Film critic and theorist André Bazin approaches the issue of space a little differently. According to him as cited in Bazin [1], the human element is much more critical in theater than space. However, in cinema, meaning can be produced only through places and the events that take place there, without the human element: a door slamming, a leaf swinging in the wind, etc. That is why, in cinema, space goes beyond being just a volume for human events or performances and becomes an indispensable element by becoming a part of the narrative action [1].

In his book 'How to Read a Film', Monaco [38] writes that a director thinks about three questions: What will he shoot? How will he shoot? How will he present what he has suffered? According to him, the questions starting with 'what' and 'how' here are the areas of mise-en-scène. The director searches[5] for the answers to these questions by arranging the 'framed images' produced and presented to the audience through three-dimensional installations (referring to the word mise) in the space [38-2] Who interprets mise-en-scène as a concept, makes a similar definition and states that mise-en-scène is the director's organization of what the audience can see and how they see them. As can be seen from these two definitions, the director is associated with two places; 3-dimensional *scene space*, where installations are made and things are organized, and 2-dimensional space, that is, *screen space*, where the image framed from this stage space is reflected to the audience. From this point of view, it would not be wrong to see and define mise-en-scène as the act of arranging or creating the stage space and screen space by the director.

According to researchers from the cinema discipline such as Gibbs [2] and Bordwell, Thompson & Smith [1], when creating the mise-en-scène, the director uses light, costume, make-up, decor, (*props*), space - or (*setting*). It makes choices and arrangements about the actor and the acting, and creates a meaningful narrative by establishing their relationship with each other. Çinici [39] points out that most of the basic parameters that make up the visual language of cinema, such as frame, camera angles, point of view, perspective, shooting scales, light-color and time, overlap with the terms used in architecture.

Directors can choose an existing location for mise-en-scène, as well as produce alternative spaces. The arrangement of the selected or constructed spaces, or as expressed in this study, their design and architecture, are related to how the storytelling will be. According to Schaal [40], film architecture is a fictional architecture. It does not matter whether a city, structure, or room exists or is only built on its facades; film architecture is, in essence, an architecture of meaning. The director deals with mise-en-scène elements such as light, décor and accessories specified by Gibbs [2] and Bordwell, Thompson & Smith [1],

[5] The coming together of framed images is the answer to the question of fiction, 'How will he present what he shot?' [38]

together with elements such as user density, depth perception and camera angles of the performance that will take place in the space, and builds the architecture of meaning with the holistic relationship of all these elements. In this construction process, directors aim to achieve an authentic image or to create 'realism' that will allow the actors to perform as naturally as possible. [1] The film director Godard (from Godard. Monaco), [38] and film critic Bazin cited in [1]. The German playwright and director Brecht provides an essential perspective on this issue when he states that "realism does not involve reproducing reality, but showing how things are." This phrase is an essential reference for this work, which examines the mise-en-scène of Akad, which seeks to reflect the reality of things in framed images.

In the next part of the study, the spaces that are common to all three of Akadian's films, which are instrumental in the production of meaning about the main character, the woman—the courtyard; Mise-en-scène—which includes elements such as the kitchen and the table—will be examined in detail. In this context, the spatial features and reality reflections of the mise-en-scène designed by placing the elements in the stage spaces will be described and analyzed, and how the director creates the narrative through the spaces will be [5].

### 4. 1. Courtyard as a Woman's Living Space

In The *Gelin*, the first film of Akad's *Migration Trilogy*, the process of adaptation of a little family who migrated from the Sorgun district of Yozgat to the extended family and the city that had migrated before is discussed. The second film, *Düğün*, is about the efforts of six brothers who have recently migrated from Urfa to hold on to the city with a hawker business. In the third film, *Diyet*, the story of a working woman and her family, who have primarily adapted to urban life after they migrated to the city, is told. The main characters of all three films are women: In the movie *Gelin*, the female character is married with children; In the movie *Düğün*, the female character is single and engaged; In the film *Diyet*, the female character is a widow and mother of two children. In this context, the director makes the audience experience the spaces she has constructed with these three different states of being a woman.

Throughout the trilogy, Akad takes the audience to explore the effects and consequences of migration—that is, significant spatial change. In this process, urban spaces, streets, courtyards, home interiors, and work areas are the main scenes in which the story is traced. Looking specifically at women, the living spaces of women who migrated to Istanbul are concentrated in the courtyard and house in the *Gelin* movie, while the courtyard stands out as the primary location in the *Düğün* movie. In the movie *Diyet*, it is seen that the woman's daily life largely takes place in the factory area.

The mise-en-scenes discussed in the article were selected by focusing on women's experiences of the courtyard, which is their living space. In this section, the mise-en-scenes of the courtyard arranged as a living space will be described and analyzed using parameters such as the courtyard's functions, depth of space, user situations, and camera positioning.

Functions

In the movie *Gelin*, the woman uses the courtyard as a traditional business processing place. In the courtyard, pickles are set up for the house's men to sell (Fig. 3.), carpets are washed and beaten, men and women come together, and guests are welcomed. In this way, the courtyard functions as a semi-public space. It is also used as a private place to escape the crowds of the interior and communicate between two people. In addition, the courtyard is also the area where the sacrificial ram bought by the family to fulfill religious obligations is kept. Although this courtyard combines different functions and is actively used by all characters throughout the film, it appears as the woman's living space with varying user situations and numbers.

***Figure 3.*** *Images of the use of the courtyard in the Gelin movie.*

In the *Düğün* movie, the director reuses the same house and courtyard he used in the Gelin movie, with some changes in the stage setting. These changes include adding or removing architectural elements (stove) and accessories, changing shooting angles, and installing new functions (Figure 4). This time, the courtyard functions as a kitchen and table area, living spaces where daily life takes place, a guest reception area, and a commercial kitchen. In this film, the director adapts many of the interior functions to the courtyard, combining traditional and commercial functions and emphasizing the different usage possibilities of the courtyard.

***Figure 4.*** *Images of the use of the courtyard in the düğün movie.*

In the movie *Diyet*, in line with the spirit of the social approach in the whole movie, there is a courtyard shared by two slums. In this courtyard, people eat, sit, gather, do business with neighbor women, and host guests (Figure 5). Additionally, due to women's involvement in business life, the factory courtyard is frequently used in this film. The courtyard appears in the film as an important part of both daily life and the business life of the female character.

**Figure 5.** *Images of the use of courtyards in the diyet film.*

Generally, the courtyards featured in the movies are observed as areas where these immigrant people continue their traditional lifestyles. This situation is clearly expressed in the film Gelin, when the courtyard is described as "little Yozgat." In this context, the courtyard functions as a place where migrating families try to adapt the lifestyles they brought from their villages to urban life.

Mise-en-scène Design: Depth of Space and Camera Angles

In the film, the *Gelin*, mise-en-scène involving the act of work, used the courtyard as a living space (Figure 3). In the first three selected frames, the angle at which the camera is positioned is fixed. The depth of the space is provided by the experience of the space through the movements of the actors, which are frequently

observed in Akadian films. In these frames, we see the different users in front of the entrance façade of the slum in the frame, which vary in number and the way they experience the space. In the fourth frame, with the camera angle changing in the opposite direction, garden fences, garden gates, street images, and partly the city are also reflected in the image. With this change in the camera angle, the depth provided by the first angle is increased, creating a general impression of the entire courtyard and making the dimensions and usage patterns of the space more prominent.

As stated, Akad used the same house and courtyard in his *Gelin* and *Düğün* films. In the courtyard pictures shown in depth from the same point from two different angles in the *Düğün* movie, it is seen that in the first frame, unlike in the *Gelin* movie, an open living space was created with couches and pillows. The remaining facade of the hut was closed and arranged as a blank surface, almost a stage. The materials used were chosen based on the traditional structure and are compatible with texture and patterns. The fact that the courtyard is a living space is reinforced by placing potted flowers in front of the glass (Figure 4). In the second frame, there is an earthen stove in the corner of the area representing a kitchen. The fence behind the furnace, which fills the center of the mise-en-scene, forms the basis for various cooking utensils representing the kitchen cabinets. The counter in front of the fence is positioned as the food preparation section of the kitchen. The rug and stool on the floor represent the dining area in the mise-en-scène created by the director (Figure 4). In these two scenes, we cannot observe user movements and the feeling of depth. However, in the third frame, the facade of the building opens with the actor entering the frame and the changing angle; The entrance door of the house and the tap that serves as a sink complete the mise-en-scène (Figure 4).

In Figure 6, it is possible to see the director's use of depth and the three different mise-en-scène created by the three scenes shot at the same angle. In the first two frames, a visual space is created that extends from the corner of the courtyard with the cedar used as the living area to the border of the courtyard and the neighborhood behind it. In these frames, where we see the different areas of use of the courtyard, the director gives this feeling with the female character cooking coffee in front of the burning stove and the kitchen area behind her. With the woman's movement within the stage, the depth of the space is understood; with this movement, the courtyard space is made realistic and familiar as a place to live. Additionally, thanks to the use of depth in the first two frames, the city facades can be read clearly (Figure 6).

***Figure 6.*** *Images of the use of courtyards in the düğün movie.*

Figure. In the frames in the 7th, two different camera angles used by the director in the courtyard can be seen. The depth of space created at these angles allows for multi-user mise-en-scènes that reinforce the movement that takes place with the different courtyard uses. In the first two selected frames, the entrance gate of the courtyard, which is a domestic situation in the film, and the fences marking the border with the street are visible. In this scene, the director reflects on the village life of the family in the city with the flowers planted in the finished oil cans and the items stacked in the corner of the garden. In other frames, starting from the house door with varying user movements, with the help of depth, the floor carpet positioned as the fountain, the dining area, the living area, and the facade of the house behind the frame can be followed, respectively.

***Figure 7.*** *Images of the use of courtyards in the düğün movie.*

In the movie *Diyet*, because the female character takes a more active role in social life and becomes a worker, two different courtyards are observed: the house courtyard and the factory courtyard (Figure 8 and Figure 9).

As in other films, the house's courtyard is presented to the viewer from different angles. In these shots, looking at the courtyard and the slum, the director emphasizes the functionality and dynamics of the space by displaying the various ways of using the courtyard and its different users (Figure 8). The director sets the first frame as a residential facade. The wooden tray in front of the door, the cedar at the foot of the wall, and the pegs hanging on the pergola show that the users experience the courtyard as a multifunctional area, such as a dining and living area. In the first frame, the director sets the frame as a residential facade. The wooden tray in front of the door, the cedar at the foot of the wall, and the pegs hanging on the pergola show that the users experience the courtyard as a multifunctional area, such as a dining and living area. The coal burner attached to the facade and the converted box flowerpots in front of the window symbolize continuing ties with tradition. The coal burner attached to the facade and the converted box flowerpots in front of the window represent the continuation of relations with tradition.

In the second and third frames, the director sets up in-depth scenes, showcasing the use of the courtyard by multiple users. In the second frame, we follow the boundaries of the entrance of the courtyard together with those who experience the space. In the third frame, the laundry hanging on the line is the laundry that the neighbor woman washes and hangs to earn money. In this way, the courtyard has different functions, such as washing and drying laundry. The street bordering the courtyard was also included in the image by using depth. In the same frame, the director places the work area of the neighbor woman, who uses the courtyard as both a living space and a workplace, at the center of the mise-en-scène, together with the washbasin where the laundry is washed and her customer.

***Figure 8.*** *Images of the use of courtyards in the Diyet movie.*

In Figure 9, the living space outside the home, which is part of a woman's daily life working in a factory, is shown for the first time in the movie *Diyet*. In two frames, arranged at the same angle but with a different sense of depth, the director supported the scenes with various building materials, a wheelbarrow, and pieces of iron to emphasize that the space was a factory yard. In addition, the metal sliding door, the poster hung on the door, the iron bars on the windows, and the sheet metal roofing materials were also used to indicate that the place was a factory courtyard. User diversity and clothing style are also among the elements that

reinforce the mise-en-scène. Again, in these frames, the audience is given the feeling of a living and experienced space with the depth of space and user movement.

***Figure 9.*** *Images of the use of the factory yard in the diyet film.*

In the frames in Figure 10, the director created the exact moment using different angles and depth. In the first image, the factory facade was chosen as the frame, while in the second image, a part of the factory structure and the urban environment were included by using depth. In both frames, the sense of space in the courtyard is strengthened by the mobility of the users. The number of users and their appearance stand out as elements that complement the director's factory courtyard mise-en-scène.

***Figure 10.*** *Images of the use of the factory yard in the movie Diyet.*

In Figure 11, the director captured three sequentially close moments from different angles and at various depths. In these frames, we can see the courtyard from three different angles and its borders. In the first frame, the users line up in front of the factory structure to give an idea of the dimensions of the courtyard. In contrast, the structure clearly completes the scene as a factory structure with its band windows and the way the interior is illuminated. In the second frame, from another angle, an administrative building bordering the courtyard and a limited amount of urban structures can be seen at the border of the frame. In the third frame, the director offers the audience a look at the guard section, which indicates the courtyard exit, thanks to the angle chosen. Nizamiye borders the street, and the urban elements behind it form the horizon of the stage. The facades on the sides of the frame and the positioning of the users are elements that reinforce the courtyard. The succession of mise-en-scènes from these three different angles gives the viewer an idea about the courtyard space in general and makes the courtyard feel like a realistic and lived-in space.

***Figure 11.*** *Images of the use of the factory yard in the movie Diyet.*

## 5. CONCLUSION

Known as the director of firsts in Turkish Cinema, Akad noticed the internal migration in Istanbul since the 1960s and believed in the necessity of making a film on this subject, considering that this was an important social issue. Throughout his career, he thought about how to transfer this social phenomenon to the cinema, and in the early 1970s, towards the end of his film career, he made the films *Gelin, Düğün,* and *Diyet*, which he called the *Migration Trilogy*, to achieve this goal. Interestingly, the film The *Diyet* was also the director's last film. Akad's perspective on the issue of migration is different from that of Orhan Kemal and Halit Refiğ, two of the most critical thinkers and directors of the period. Akad observed that people who migrated from the countryside to Istanbul were not afraid of the city, did not underestimate themselves, and had no concerns about adapting to the city. Over time, these people established their neighborhoods in the places they came from and never thought of returning [6]. Akad has shaped this situation around the female characters he places at the center of his stories, focusing on the efforts of these people, who have no possibility of returning, to hold on to the city in all three of his films.

The daily life cycle of the woman, who is portrayed as the main character in all three films, takes shape in a courtyard. In this context, the director has placed the courtyard element at the center of the movie, almost as a main character. In the first film, *Gelin*, the woman spends her life at home and in the courtyard representing the Yozgat border. This space becomes a multi-purpose area that performs functions such as handling outside and inside work and gathering and receiving guests for a crowded family. The director created the mise-en-scène by arranging the courtyard in a simple and multifunctional way. In the second movie, The *Düğün*, the director chose the same courtyard and house he used in the first movie. Akad has built different lives in this courtyard, where two family structures that are different from each other in terms of lifestyle and tradition live together. The director, who strongly emphasizes the perception of space, reflects women who can move in and out more quickly and have a more extroverted lifestyle in the courtyard. Thus, the courtyard has become a space where life and traditions are carried to the outdoors, and the opportunity to observe the use of this space for a longer period of time has been created. In the third movie, *Diyet*, the spaces inside the house are almost not visible, except for the kitchen and living area. Much of daily life is spread around a common courtyard and factory courtyard, in keeping with the social spirit seen throughout the film. Here, women actively participate in business life in addition to their role at home. The boundaries of private and unmahram have disappeared in accordance with social life, and equality has been achieved in social life, except for jobs that require strength. In this film, women take on roles both at home and in the social sphere, and their way of existing in daily life spreads to a broader area.

In all three films, an evolution is observed between space, lifestyle, and the way women exist in daily life. While the courtyard, which was the woman's limited living space in the first film, expands into a livelihood and living space in the second film, in the third film, the woman becomes a part of the common living space and a center that integrates into social life. Thus, the courtyard element has created a medium in which women's social roles are transformed in each film, with lives expanding from the inside to the outside over time.

The director's filmmaking technique is based on establishing in-depth mise-en-scènes to create meaning. This approach creates a frame-by-frame structure in his films, allowing the meaning to emerge in a layered manner through the arrangement of space in each scene. The reason why the director is the subject of an architectural article is the deep and realistic mise-en-scenes he created in line with this search for meaning. The setting stands out not only as an aesthetic element but also as a tool used to meaningfully reflect the thematic depth of the film and the worlds of the characters, and even as the main character. The director demonstrates how the courtyard is used and experienced in daily life in all three films through the physical features of the space as well as the movements and interactions of the users. In this way, the space appears as a dynamic, living, and realistic space that is constantly changing and shaped by the users in it rather than a static environment. Every detail of the setting is meticulously structured to reflect the story in the film and the internal conflicts of the characters so that the location and characters become an essential narrative force in the movie.

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# In the Absence of Public Space: The Concept of *Common Space*

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**Abstract**

This article examines the privatization and commodification of urban public spaces through the concept of "common space," offering a comprehensive assessment of space's counter-political roles. Drawing on Henri Lefebvre's assertion that "Space is a manifestation of social relations," the study argues that common spaces are dynamic processes for cultural sharing, social interaction, and collective identity formation, rather than merely physical areas. Within Lefebvre's theory of the right to the city, the re-publicization of common spaces is framed as essential for social equality, justice, and participatory democracy.

Adopting an interdisciplinary approach, the study integrates Elinor Ostrom's theories on common resource management and David Harvey's work on urban space, highlighting how sustainably managed common spaces can foster social solidarity. It critically evaluates the impact of neoliberal urban policies on spatial justice, shedding light on their broader implications.

The research explores the historical and social contexts of common spaces, positioning them as critical venues for spatial justice and social participation. As a result, the study emphasizes how "common spaces," rather than being finished products, are shaped through participatory processes, establishing them as living, evolving spaces, and develops a model proposal for the protection and reproduction of these spaces.

## 1. INTRODUCTION

The public sphere is a struggle ground where not only daily life but also social relations, political power and individual rights emerge simultaneously. In this context, Jurgen Habermas's seminal work "The Structural Transformation of the Public Sphere" constitutes an important reference point that deeply examines the impact of public spaces on social structure. Habermas defines the "public sphere" as an area where people can freely come together, exchange ideas and reach social consensus. According to Habermas [9], the public sphere should serve the common public interest rather than the private interests of individuals. This perspective emphasizes that public spaces are the basic structures necessary for democratic participation and social interaction. Habermas [9], stresses that the notion of the public is related to the notion of the common. This view resonates with Hannah Arendt's perspective, wherein the public sphere is "the common world" that "gathers us together and yet prevents our falling over each other" [1].

According to Carmona [5], the idea of public space has always provided a concrete and symbolic ground for social interaction and citizen participation as a sign of democracy, participation and shared responsibility. This understanding of public space is closely related to Lefebvre's concept of the right to the city; Lefebvre argues that city dwellers should not only live in urban areas but also play an active role in their creation and transformation [16]. Public space functions as a democratic arena where individual and collective expressions, social harmony and equality are consolidated.

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Lefebvre's views on cities and urban life also expand our spatial understanding. He argues that cities and urban life should be seen as dynamic and creative processes, almost as works of art. According to him, cities should continue to exist as spaces shaped by human experiences and providing opportunities for these experiences [22].

According to Habermas [9], public space has been characterized throughout history as a place where people congregate to share ideas, interact with one another, and talk about shared issues. However, the democratic participation and social solidarity functions of public space have been undermined by the commercialization and privatization of these locations, particularly under the impact of neoliberal policies [13]. The transformation of urban space has reshaped the social and physical context of social life and caused a radical change in the ongoing functions of public spaces.

This transformation process has led the public space to seek another concept that can replace it in the terminological context. At this point, commons have caused the public space to be reconsidered and paved the way for conceptual discussions. Common spaces do not only refer to a physical area, but also to a social production and sharing practice [18]. Lefebvre's theory of the production of space emphasizes that commons are constantly reproduced by social relations and practices [16]. The concept of "common space" emerges beyond public and private spaces as areas where participants take an active role and become the center of social interactions. Common spaces, rather than being fixed and completed spaces, appear as spaces that are constantly shaped and evolved with the participation of users.

This article aims to examine the concept of common space, which emerged with the transformation of public space, within a theoretical framework. First, the relationships between public space and common space will be explained, and then the effects of neoliberal urban policies on these concepts will be discussed. In the last section, an objective view will be presented on the sustainable management of common spaces and their potential weaknesses, creating a discussion area regarding the possibility of a tragedy of the commons.

## 2. METHOD

This research is designed to examine the theoretical foundations of the concept of "common space" and the meanings of these spaces on social life. The basic method of the research is based on a comprehensive and systematic examination of theoretical approaches in the literature. In this context, Henri Lefebvre's theory of space production, Jurgen Habermas' concept of public space, and Elinor Ostrom's approaches to common resource management are analyzed in depth. The works of other important thinkers working on urbanism and urban space, such as David Harvey, are also integrated into the research.

The first stage of the method section focused on determining the conceptual framework of the concepts of "public space" and "common space". An interdisciplinary approach was adopted in this process; fields such as architecture, urbanism, sociology, social theory, and spatial policies were utilized. In order to visualize the conceptual framework, a diagram has been added that reveals the different theoretical approaches addressed in the study and the relationships between these approaches. This diagram will help the reader to understand and follow the concepts systematically.

The second stage of the research continued by addressing the ideas put forward in the theoretical framework in the context of spatial justice and social participation. The data obtained during the literature review were evaluated with a critical and comparative approach, and these analyses created a discussion platform on the sustainable management of the concept of common space and its possible weaknesses.

Finally, in order to prevent repetitions in the research process and to strengthen the conceptual context, each approach was systematically addressed, and how common spaces are shaped by social and cultural dynamics was clearly analyzed. Thus, the article aims to understand the place of common spaces in modern urban life with its theoretical and practical dimensions.

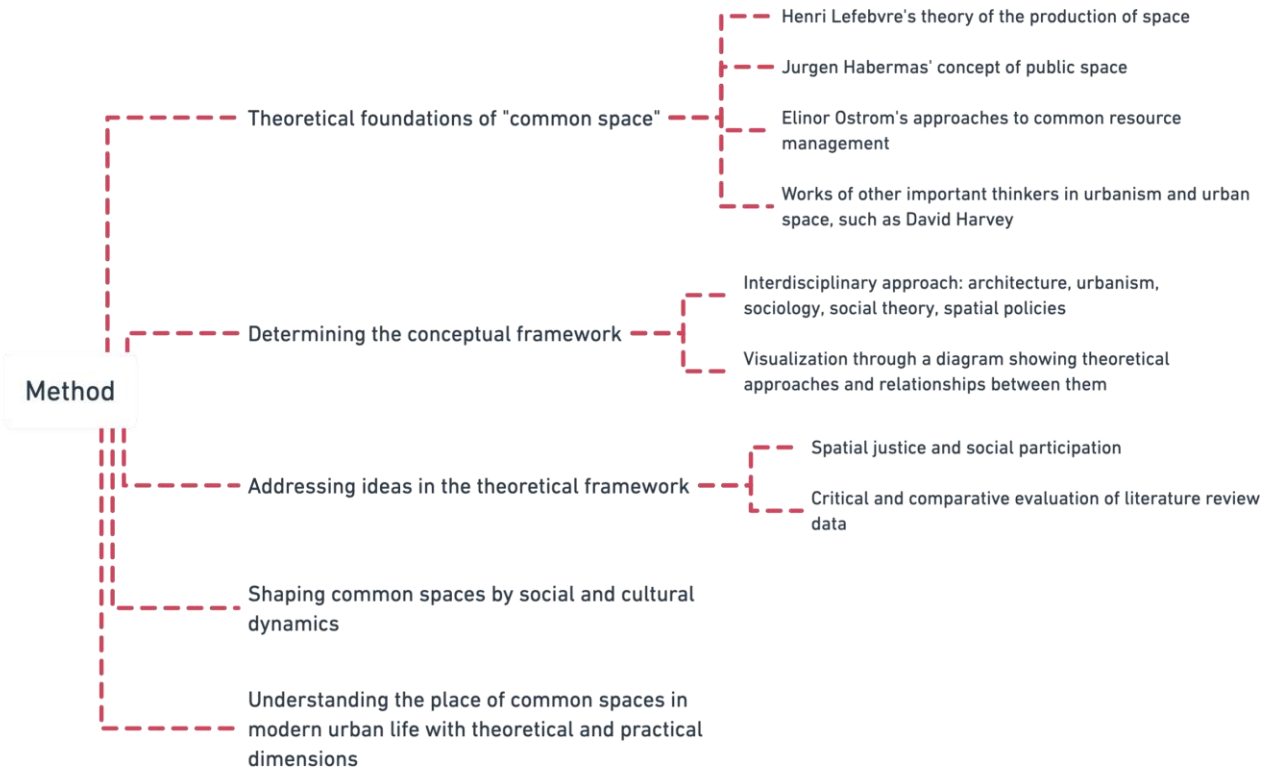


***Figure 1.*** *Mind Map of Article Method*

## 3. TRANSFORMATION OF PUBLIC SPACE

### 3.1. From Public Spaces to Commons

With the spread of industrialism (industrial capitalism) in the 19th century, several concepts and phenomena that triggered the collapse of the public sphere came to the fore. These concepts were considered important in explaining the changes in the social structure and the new dynamics brought about by modernization, and thus in terms of better understanding the "commons". With the emergence of concepts such as privatization, bureaucratization, mechanization, urbanization, social alienation, commercialization and social stratification processes, the transformation of the social structure accelerated and this situation led to the emptying of the concept of the public sphere.

With the rise of industrial capitalism, private property and individual interests came to the forefront more. Individuals focused on their own private property, work and family life instead of common interests in the public sphere, leading to the weakening of the public sphere. This rise of private life against the public sphere weakened social solidarity. On the other hand, the role of the state expanded and bureaucratic structures emerged in administrative systems. This caused the decentralized, participatory and collective decision-making processes of the public sphere to be replaced by a centralized and hierarchical administrative structure. In this process, citizens have become more distant from decision-making mechanisms. Industrial capitalism has caused economic activities and markets to expand, and a significant portion of the public sphere has been surrounded by commercial activities and consumer culture. The public sphere has ceased to be a space of discussion, participation and negotiation, and has become the center of shopping, consumption and economic activities. Another change is the emergence of large cities and the large migrations from rural areas to cities. This process has caused the weakening of face-to-face relationships and community ties between individuals. In large cities, people have become more anonymous and alienated within large masses of people, and public spaces have given way to less interactive spaces.

The development of capitalism has also seriously deepened the economic and social stratification between the working class and the bourgeoisie. These class differences have made it difficult to share common public spaces, and concrete, physical distinctions have emerged between the rich and the poor in the public sphere. Social divisions have made it difficult for a common public space to function. Towards the end of the 19th century, with the spread of printing and mass media (such as newspapers), public debates gained a more centralized structure. However, rather than democratizing public debate, these media tools contributed to the collapse of the public sphere by increasing the influence of certain authorities on public opinion.

As a result of all these changes, architectural spaces also underwent a major transformation. Factories, large production areas and workers' housing became decisive in cities, while public spaces became commercialized. Commercial structures such as shopping malls, arcades and large stores shaped public life, while spaces for socialization and discussion remained in the background. While new transportation infrastructures and wide avenues in cities accelerated economic flow, spatial segregation increased as the rich retreated to the suburbs. Thus, architecture began to serve industrial and commercial purposes rather than the social functions of public spaces. In this process, public spaces became commodified, and space began to be considered only as a physical entity. As a result, the design and management of space gradually came under the control of a more limited group, and city residents were excluded from the production of public space and pushed into the position of passive spectators.

According to Hegel's philosophy, a concept gains meaning only when what it represents is under threat or is nearing its end [14]. Starting from this perspective, the transformation of the public sphere can also be evaluated in this context. Historically, the public sphere has been seen as a space of freedom, expression, discussion and common life; however, as it began to lose its function under the pressures of the modern capitalist order, it became increasingly questionable. Just like Hegel's concept-reality relationship, as the public sphere comes under threat from processes of commercialization, privatization and individualization, the protection and redefinition of this space comes to the fore.
In this context, the concept of the commons emerges as a response to this transformation of the public sphere. The commons represent the idea that in a world where the public sphere is increasingly shrinking and commercialized, common resources, spaces and social life must be reorganized with a collective consciousness. The collapse of the public sphere necessitates the rediscovery and defense of this very space as the commons. Therefore, this transformation proves Hegel's dialectical process; At the point where the public sphere loses its existence, it gives way to a semantic search and a functional finding.

As noted by Fuller, “In order to change an existing paradigm you do not struggle to try and change the problematic model. You create a new model and make the old one obsolete” [2].

## 4. THE CONCEPT of COMMONS/ COMMON SPACES?

### 4.1. Origin and Theoretical Foundations of Common Spaces

To provide a theoretical framework for the term common, it would be a good start to go back to the origin of the word common. The Latin word "communis," which means "belonging equally to several" or "shared by all," is where the word "common" first appeared [16]. The fundamental words "com" (together) and "munis" (service or responsibility) are the source of this word [15]. The idea of shared ownership or involvement in something that benefits the public or a group is conveyed by this root [4]. The word was originally "comun" in Old French and then changed to "comon" in Middle English, which gave rise to the present English word "common" [21] It now refers to something that is utilized, shared, or available to many people or organizations. The term is often used to describe places, rights, or resources held or used in common in various disciplines such as law, sociology, and architecture [8].

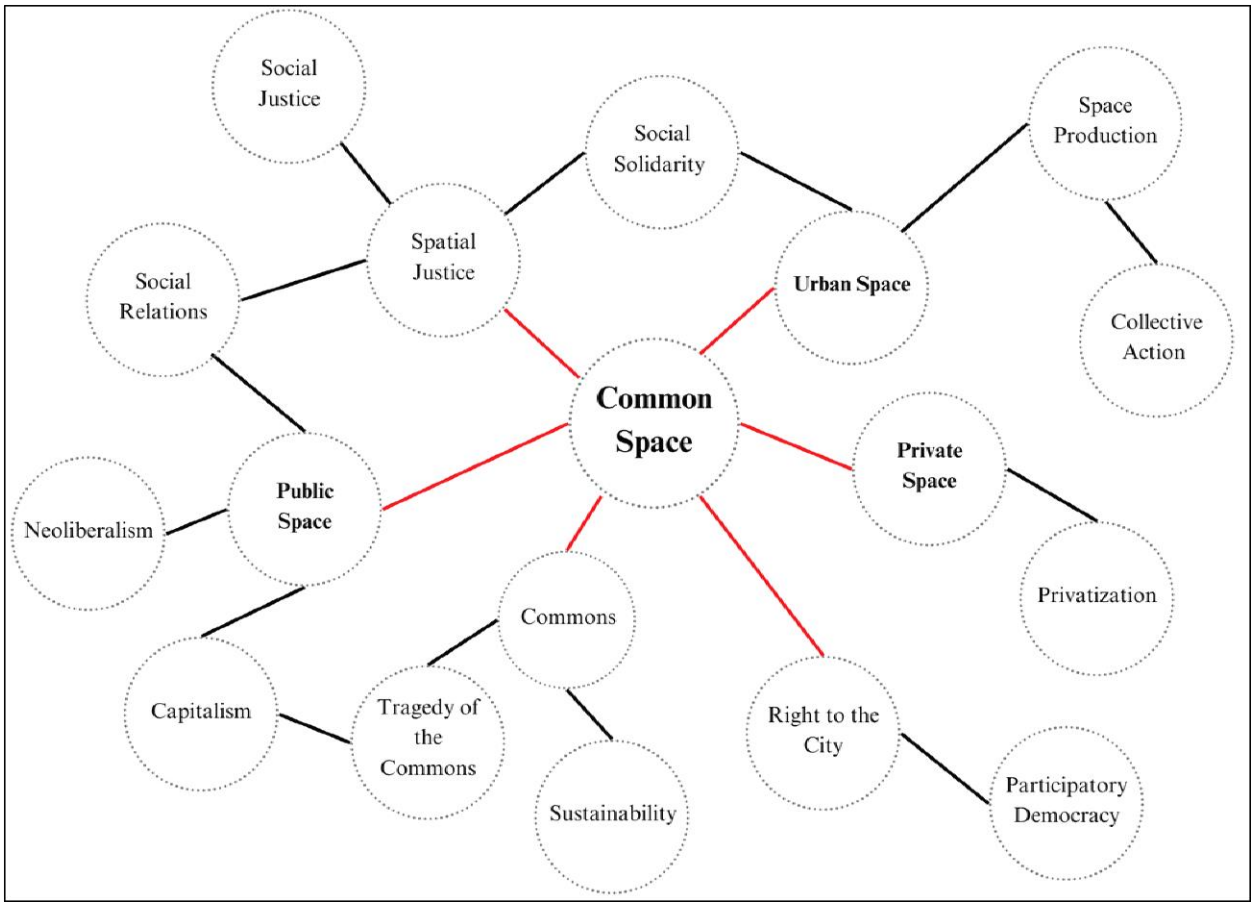


***Figure 2.*** *Concept Map: Theoretical Framework of Common Spaces and Related Concepts*

The idea of common space has its origins in the way the public sphere functions in the traditional sense. Public space has always been a place where people may openly express their opinions, participate in democratic discourse, and experience common life. Public space is defined as "a ground where people, as equal individuals, discuss and make decisions about their common issues" [1]. However, under the influence of the modern capitalist order, this function has gradually weakened, commercialized and privatized spaces have replaced the public sphere. In this process, common spaces have re-emerged to offer an alternative to these transformations caused by capitalism.

The capitalist urbanization process emerges as a dynamic that threatens the existence of public spaces. Especially in big cities, the commercialization and privatization of public spaces have led to the need for common spaces. According to Harvey [13], neoliberal urbanization policies have commodified public spaces and restricted the rights of individuals in these areas. For example, shopping malls and private housing projects have narrowed the public spaces of the city and limited areas of social interaction. In this context, common spaces have the potential to rebuild social life and solidarity in the city. Common space is a concept that refers to areas where public space is reconsidered with a collective consciousness and where common use and benefit are provided. "Common space is relational and relative" [20].

The concept of "common space" is introduced in [20], where it is explaining that:

> It is not the public space as we know it: space given from a certain authority to the public under specific conditions that ultimately affirm the authority's legitimacy. Nor is it private space either, if by this we mean space controlled and used by a limited group of people excluding all others. Communities in movement create common space, space used under conditions decided on by communities and open to anyone who participates in the actions and accepts the rules which were collectively decided upon... The community is formed, developed and reproduced through practices focused on common space. To generalize this principle: the community is developed

through commoning, through acts and forms of organization oriented towards the production of the common. (p. 165)

### 4.2. Comparison of Public, Private and Common Spaces

“The common space is both spatially and verbally outside of the public/private space dichotomy. For example, neighborhoods such as urban thresholds, community actions such as slum areas, and spaces in transformation, albeit long-term or short-term; they embody the potentials of spatial experience and collectivity outside the public or private realm” [6].

Common spaces have a few essential characteristics that set them apart from commercialized and privatized public areas. Common areas are accessible to everyone and permit unrestricted engagement from an access and participation standpoint. They are not constrained by certain social or economic classes, in contrast to commodified environments. The goal of these areas is to establish a value that is shared by everybody [13]. Common spaces are managed collectively, by local communities and users instead of by centralized authority. This is known as communal management. A democratic functioning is ensured by emphasizing participation in decision-making processes [3]. Additionally, commons give precedence to group interests over private ones. Furthermore, commons give precedence to group interests over private ones. In these settings, cooperation and solidarity foster societal solidarity and develop social ties [10].

In the neoliberal world, commons stand out as an alternative to the conflict between public and private. Commons are shared spaces. While the public sphere, that is, the area determined by the existence of a sovereign authority, is a space "offered" to people under certain conditions, the common space is a space "obtained" by people through their own efforts. Unlike public and private spaces, "common spaces" are open to the public but are not subject to the control of any authority.

In this way, instead of the hierarchical structure that serves the capitalist system, it has its own order. The practices of commoning, which aim to redefine the usual forms of use of public spaces and whose rules are determined by the public authorities, give a clue to the scope of the notion of the right to the city as conceptualized in [16]. Likewise, the right to the city, as described in [16], expresses the city's desire to transform the city as a whole, not simply the sum of the rights they have. The public spaces of the city constitute the common space as a result of a transformative action, interaction of the participants.

To assert the right to the city, as [12], means to assert a certain level of influence over the dynamics of urbanization, concerning how cities are constructed and altered, and to achieve this in a fundamental and transformative manner.

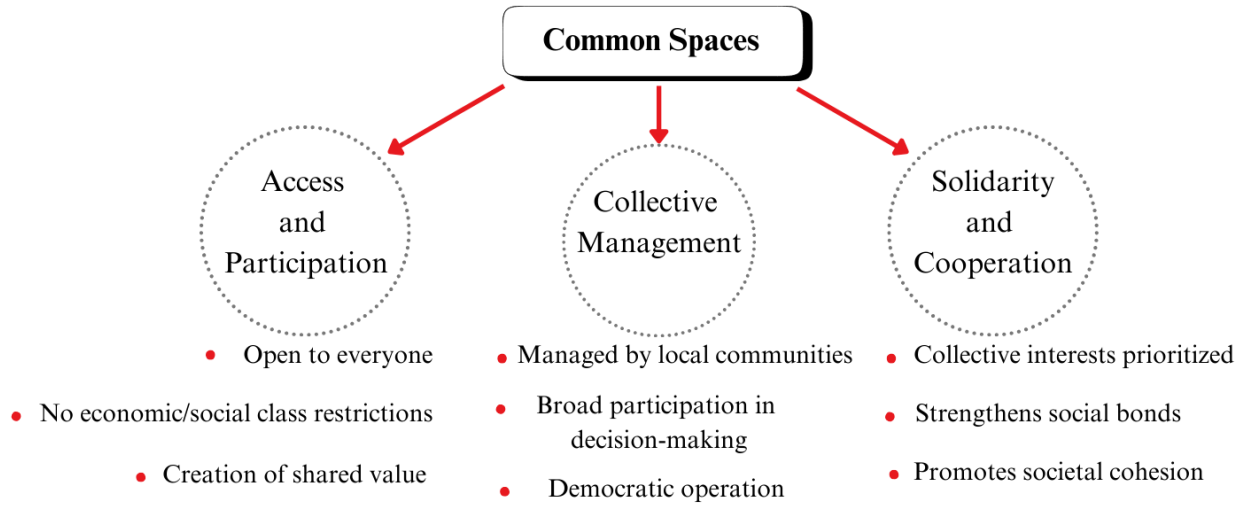


***Figure 3.*** *Characteristics of Common Spaces*

An important conceptual framework that forms the theoretical basis of the commons is found in Elinor Ostrom's studies on the management of common resources [18]. It has been argued that common resources can be successfully managed by local communities without the need for state or market intervention. This approach supports the idea that common spaces can be managed collectively at the local level. The research demonstrates that individuals can cooperate to use common resources sustainably, and in this context, it is an important reference point for social movements advocating the protection of common spaces [18].

This perspective emphasizes the role of these neighborhoods in cultivating opportunities for collaborative practices and shared identities among residents, highlighting their significance in the broader discourse on urban commons and community dynamics [3].

## 5. COMMONS AND COMMON OWNERSHIP RELATIONSHIP

### 5.1. Urban Commons

The concept of commons originally referred to resources used collectively, especially natural resources, before their gradual takeover by capitalism. As Linebaugh [17] notes, "The commons existed before private property and capitalism, and the resources that were once shared by communities have gradually been taken over by capital" (p. 14). Commons were part of a system that was, at its origin, outside the realm of private ownership and capitalism. In [19], the concept is further elaborated by asserting that "commons are the public resources used collectively, and in the age of digital networks, this includes not only natural resources but also cultural and intellectual resources." This shift from natural resources to cultural and intellectual ones illustrates the broadening of the commons concept beyond its traditional boundaries.

However, commons also encompass cultural heritage, information, and public spaces such as parks and squares, as well as urban thresholds—both the material and intangible products of collective creativity. These urban commons contribute to the shaping of social life and community engagement. In this sense, they are not just resources, but also how these resources are used, shared, and accessed by a collective subject. "Capital needs the commons to perpetuate its accumulation through dispossession, enclosing common resources to privatize them and shift them into the market," emphasizing how capitalism exploits commons for continuous accumulation [11].

Urban commons play an important role in fostering a sense of belonging by providing participants with responsibility over existing resources and encouraging them to co-produce. In this perspective, participants do not claim ownership of these areas, but rather claim a sense of belonging through collective participation in the production of social spaces. As a result, this supports collectivism as a way of living and governing. As Harvey [13] notes, "the struggle for the appropriation of public spaces and public goods in the city for a common purpose continues" (p. 145). This ongoing battle to reclaim urban commons is essential for addressing issues of spatial justice in modern cities. Harvey further asserts that the reconstruction of an "urban common" is the key to realizing this spatial justice.

In this context, urban commons reflect the intersection of politics and space, as they are both produced through space and capable of producing new spaces. According to Stavrides [20], "The production of urban commons is not merely a question of reclaiming public space but involves creating a new type of space based on collective ownership and shared responsibility." This idea links political struggles and spatial practices, where the creation of urban commons serves as a means of opposing the capitalist appropriation of public goods.

To sum up, the urban commons are essential to reorganizing space for shared use and responsibility. The commons—whether they take the shape of public areas, cultural heritage, or shared resources—represent a fundamental obstacle to privatization and the growth of capital because, as Lefebvre [16] contends, the production of space is profoundly political. In all of its forms, the urban commons provide a way to redistribute power, allowing for more inclusive and equitable ways to produce space.

### 5.2. Challenges in Managing Commons: The Tragedy of the Commons

When considering how public spaces are managed and used in relation to ownership, it is important to remember that giving up control of public spaces to different institutions and authorities runs the risk of turning them from areas of public importance to areas governed by private interests. The fact that public areas are now under the control of private or governmental organizations separates them from their fundamental function as common areas, which is to serve the needs of the entire society without being constrained by ownership lines.

The term "commons" describes resources that are used and managed by a community as a whole. Prior to the emergence of private property and capitalism, the commons historically comprised natural resources like pastures, water, and forests [17]. In addition to natural resources, this idea has expanded over time to include cultural heritage, public areas like parks and squares, urban thresholds, and the intangible outcomes of group creativity. The commons is a system of social relations designed to subvert conventional ideas of private property ownership by offering a venue for the collective maintenance and management of shared resources.

Nonetheless, managing commons effectively requires careful consideration of rules and collective action. These areas cannot be maintained without a consensus on how to utilize them, according to Ostrom, who won the Nobel Prize in Economics for her seminal work on the commons. In [18], besides to being resources, commons are structures of governance that require accountability, trust, and collaboration. This study shows that local knowledge and community-based decision-making are crucial for effectively managing shared resources. Furthermore, her research highlights the necessity of establishing accountability and penalty enforcement mechanisms within these systems [18].

Garrett Hardin introduced the concept of the "tragedy of the commons" in 1968, which critiques the idea of shared resources. According to Hardin, when a resource is shared by everyone, people who act individually and in their own self-interest often overuse or exploit it, which causes it to deteriorate or even collapse. Hardin asserts that a tragedy will unavoidably result from the absence of desire for individual users to preserve the resource: "If there is a shared resource, it will inevitably be destroyed, because no individual has the motivation not to use it." This idea has received a lot of attention in social and environmental contexts, frequently portraying the commons as fundamentally unsustainable unless controlled.

However, Ostrom [18] directly challenges this pessimistic view by demonstrating that communities can avoid the tragedy of the commons through self-governance, rule-making, and enforcement. Through a combination of communal rules and trust-building processes, [18] provides case studies of diverse commons, such as irrigation systems, forests, and fisheries, where local communities have successfully managed their resources without outside intervention. The theory in [18] holds that when individuals in a community are invested in the preservation and correct use of a resource, and are given the means to manage it collectively, they are capable of avoiding the misuse and mismanagement described by Hardin.

The concept of the commons offers a new perspective on urban justice and spatial equity in city environments. By using the framework of urban commons, community members can reclaim spaces that have been commodified and collaboratively manage urban resources such as parks, streets, and public squares. These spaces promote civic participation and group accountability by ensuring that urban resources are distributed fairly among all community members.

Nevertheless, well-designed governance systems that incorporate resource management, access restrictions, and group action protocols are required for shared spaces to succeed in urban settings [7]. The survival of urban commons depends on the growth of shared accountability and social cohesiveness, ideals that go beyond individual benefit and promote the long-term welfare of the community.

Finally, while commons offer an alternative to traditional property-based ownership, they also raise a debate about the balance between collective responsibilities and individual rights. The management of

urban common areas should be approached with an approach focused on creating inclusive, fair and sustainable systems that prioritize collective good rather than private ownership.

## 6. PRACTICAL REFLECTIONS of COMMON SPACES

Theoretical discussions on common spaces, especially the management challenges addressed under the title of "The Tragedy of Common Spaces", necessitate an examination of how these concepts are applied in practice. Common spaces are more than a theoretical concept; a variety of solutions must be developed to ensure their long-term viability and spatial justice. In this part, how common spaces operate in practice, examples of community-based management, and the obstacles encountered will be discussed.

While common spaces in cities increase social solidarity as collective property and use areas, they also offer solutions to potential problems such as spatial justice and social equality. This section evaluates the extent to which common spaces strengthen social harmony, how they encourage collective participation, and scenarios wherein urban resources can be shared fairly with concrete examples. At this point, examples will also be discussed in terms of spatial sustainability. As a result, in various urban contexts, the functionality of common spaces can be better understood through concrete examples.

Urban spaces foster community interaction, establish social bonds, and promote shared values. For instance, Henri Lefebvre's theory that "space is a manifestation of social relations" was concretized in the 1968 Paris student protests. During this time, public spaces in Paris became a "common space" because to protests and communal engagement. However, these spaces cannot be defined as common spaces in the full sense because they lack long-term collective management and sustainability [16]. However, these examples are important in terms of emphasizing the potential of common spaces in social transformation.

Furthermore, Zuccotti Park, analyzed by David Harvey, was a space used with collective participation during the Occupy Wall Street movement in 2011. This space functioned as a common space where neoliberal policies were criticized and spatial injustice was discussed [13]. However, the transience of use and the fact that the space is not subject to a long-term collective management distance Zuccotti Park from its status as a common space.

Elinor Ostrom’s theories of common resource management provide a powerful framework for demonstrating that common spaces can be managed sustainably. The Brooklyn Community Gardens in New York City is a successful example of a common space managed through community participation in accordance with Ostrom’s principles [18]. These gardens embody the concept of common space as models that promote sustainability and social solidarity.

The Exarchia neighborhood in Athens is important for demonstrating how common spaces can be created in times of crisis. Solidarity kitchens and community organizations have enabled the collective use and management of space [20]. Similarly, the Prinzessinnengarten in Berlin is an example of a common space based on urban agriculture. Created with the participation of users, these gardens offer a sustainable model of common management in urban areas [3].

Through these instances, it is made clear that common spaces must satisfy a few fundamental requirements in order to qualify as such. Brooklyn Community Gardens, Prinzessinnengarten, and the Exarchia Neighborhood fully meet the definition of common space by meeting the criteria of community participation, sustainable management, and providing common benefits. In contrast, even while they reflect transient uses of common spaces, locations like Zuccotti Park and those utilized during the 1968 Paris student protests do not entirely fit this criteria since they lack long-term communal control.

In this context, common spaces should be defined not only as spaces used with community participation, but also as spaces shaped by the sustainable collective management of these spaces. This discussion is important in terms of defining the concept of common space more clearly and understanding how it can be applied in different contexts.

## 7. CONCLUSION

Throughout this study, the transformation of public spaces under capitalist pressures, the concept of the commons and their role as collective governance and shared resources have been examined. The analysis has shown that the commons offer a critical response to the privatization and commodification of urban life and propose an inclusive, sustainable resource management model in response to criticism.

A comprehensive analysis of the literature explored the historical, social, and political components of the commons, drawing on the theoretical frameworks of philosophers such as Lefebvre, Harvey, Ostrom, and Stavrides, and evaluated the concept's significance in the present urban context.

The importance of defining urban commons as dynamic social spaces rather than static, stable spaces was emphasized. It was concluded that protecting these spaces required resisting privatization and commodification and advocating for equal access and community-centered governance. This approach was seen as having strong potential to not only preserve the physical and social benefits of the commons, but also to promote spatial justice and participatory democracy, thus reclaiming the “right to the city” in the face of increasing urban inequality.

It was determined that the commons are places where collective identities and practices are formed in addition to being resources. The commons are perceived as challenging conventional ideas of property and providing alternative models for urban living by promoting participation and placing a strong emphasis on shared governance. Ostrom's ideas showed that the commons could overcome obstacles like the "tragedy of the commons" and remain sustainable resources if the proper governance techniques (rules, sanctions, and collaboration) were in place.

The appropriation of the common area on the use value of the public area, as a defense of "expropriation" against privatization and "collective" use against commodification, this research has reached an interdisciplinary objective conclusion.

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# Exploring the Future of Housing-Technology Interaction with Literature

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**Abstract**

This research aims to examine the interactivity between house and technology and explore the prominent subjects and concepts about imagining the future of houses. For this purpose, it is utilized systematic literature approach based on bibliometric analysis which involves qualitative and quantitative methods. According to this, research codes (house, home, technology, future, and transformation) are determined, and these codes are examined in different combinations on the Scopus database. These data are analyzed by the maps and diagrams obtained by the VOSviewer program, and their densities, temporalities, and relationalities are spotted, and focus articles are examined in detail. According to recent research findings, key themes shaping the conceptualization of the future of housing include the Internet of Things (IoT), digital technologies, artificial intelligence (AI), smart homes, and smart buildings. Moreover, a deeper analysis of papers reveals that concepts such as digital domesticity, ubiquity, smart home devices, and physical mobility are emerging as critical areas of inquiry in envisioning the future of the home. These developments significantly influence housing's future impacts on security, privacy, and a sense of belonging within both architectural and social contexts.

## 1. INTRODUCTION

Technological developments have triggered a change in every discipline from the past to the present. They have affected life in different fields, from social dynamics to individual experiences, architecture, city, and house in different contexts and scales. Thus, they changed and transformed life in diverse ways. Various opinions and products have become prevalent through televisions, computers, the internet, and artificial intelligence, and these developments have changed humans' time, space, and perception. Interpreting how the planet, cities, and houses respond to these continuous changes is critical for predicting future changes and transformations.

According to Riley [1], the house is both the leader's architecture and current situation and the herald of the future direction [2]. So, the house has been on the researchers' agenda; it has been seen as a research field in various disciplines, from sociology to architecture, city planning, policy, economy, and philosophy. Because the issue of the house identifies the space including all people throughout their lives but in distinct roles. This is because understanding of this issue necessitates understanding that goes beyond itself [3]. The reason for this could be associated with having meanings beyond being a space. Daily practices and experiences ascribe different meanings to the house. These are attachments, identity, representation, etc. However, these meanings are not stable; they evolve in line with time and time features. Technological developments have transformed life and all activities from the smallest to the largest scales, from the past to the present, and will continue to do so. Therefore, investigating, conceptualizing, and interpreting this relationship is significant.

This research is based on this interaction and its aims are examining the literature in depth, synthesizing existing knowledge, and exploring prominent issues and concepts in this context. Firstly, a theoretical framework is presented. Cross-evaluations and the studies in this part mentioned here are important in terms of constructing the research. This section places the topic on a conceptual footing and distinguishes

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this article from a passive literature review. The next section presents the research strategy, and the research questions and the research method concerning these questions are explained in detail. In the second section of the article, the findings of the research conducted are presented from a systematic perspective, and in the third section, all findings are evaluated holistically and determinations related to the research questions are made.

### 1.1 Literature Review and Theoretical Framework

In this part of the study, the concepts of house, technology, and future, which are the focus of the research, are examined, with particular emphasis on their etymological roots, and the positions of these concepts relative to each other are discussed through literature According to the Etymonline Dictionary [4], both the concept of 'house' and 'home' originate from the Proto-Germanic language, derived from 'hus,' which initially meant 'hide.' These terms broadly refer to a dwelling or shelter, a structure designed to serve as a residence. However, the term 'home' evolved to be more inclusive, incorporating the suffix 'khaim,' which signifies residence rather than mere shelter (Figure 1). 'Home' is defined as 'the house, apartment, etc. where you live, especially with your family,' 'property that you can buy or sell,' 'family you come from,' and 'a place where people or animals live and are cared for.' In contrast, 'house' is defined as 'a building that people, usually one family, live in, according to the Cambridge Dictionary [5]. While 'house' is associated with physical space or a building, 'home' is also tied to family, origin, and life experience. Therefore, 'house' functions primarily as a physical space, whereas 'home' is a concept associated with the living experience and space.

Technology is increasingly transforming the 'house' and 'home' concepts. Both mean more than the etymological meanings. For example, the advent of smart home technologies -including automated lighting, climate control, and security systems- has fundamentally changed the way we perceive and interact with the built environment. Today, simply a static physical structure, the house has become an interactive, responsive system that can adapt to its inhabitants' needs, preferences, and behaviors. These technologies extend the concept of 'house' by embedding functionality and adaptability of the building itself. Furthermore, innovations such as voice activated assistants, smart appliances, and IoT devices create a integration between the physical space and humans. So, the concept of 'home', associated with living experiences, is changing parallelly. This blurring of boundaries between the built environment and technology transforms the house from a passive shelter into a dynamic, active participant in the daily lives of its occupants. As these technologies evolve, they not only improve comfort and convenience of physical space (house) but also transform new forms of living (home).

The Metapolis Dictionary expands on the relationship between concepts like architecture, urbanism, technology, and society, facilitating an exploration of 'house' and 'home' beyond traditional definitions. In the Metapolis Dictionary [6], 'home' is defined as a universal iconic reference, a place of belonging that defines and surrounds the residence, serving as both a place of ownership and identity. Furthermore, technological innovations -such as the integration of computers, televisions, and smart systems- are seen as expanding the concept of 'home' from a physical shelter to an interactive, fluid environment. In this sense, 'home' becomes an intermediate space that is continuously redefined through technology. Imagination and innovation are no longer just about design; they now also involve the creation of spaces that are responsive and adaptive, serving as interfaces for communication and interaction. While 'house' traditionally refers to a functional, physical space, it is increasingly seen as a place of desire, versatility, and quality of life. The integration of technology influences this evolution, creating new possibilities for how we will live and where we will live. As we examine the connection between 'house' and 'home,' it becomes evident that these concepts are deeply interconnected, with technology as a transformative force enhancing both. The distinction between 'house' as a physical structure and 'home' as a living experience becomes more difficult to define as technology continues to shape and redefine these spaces.

In summary, the transformation of 'house' and 'home' goes beyond physical spaces, highlighting their interconnectedness in a World increasingly shaped by technology. The role of technology in this transformation cannot be underestimated, because technological advancements provide to reimagine and redefine the living and its spaces. Therefore, to completely understand 'house' and 'home', it is necessary

to consider both the physical and conceptual dimensions together. This requirement made it necessary to address both concepts in the research to make this study more holistic.

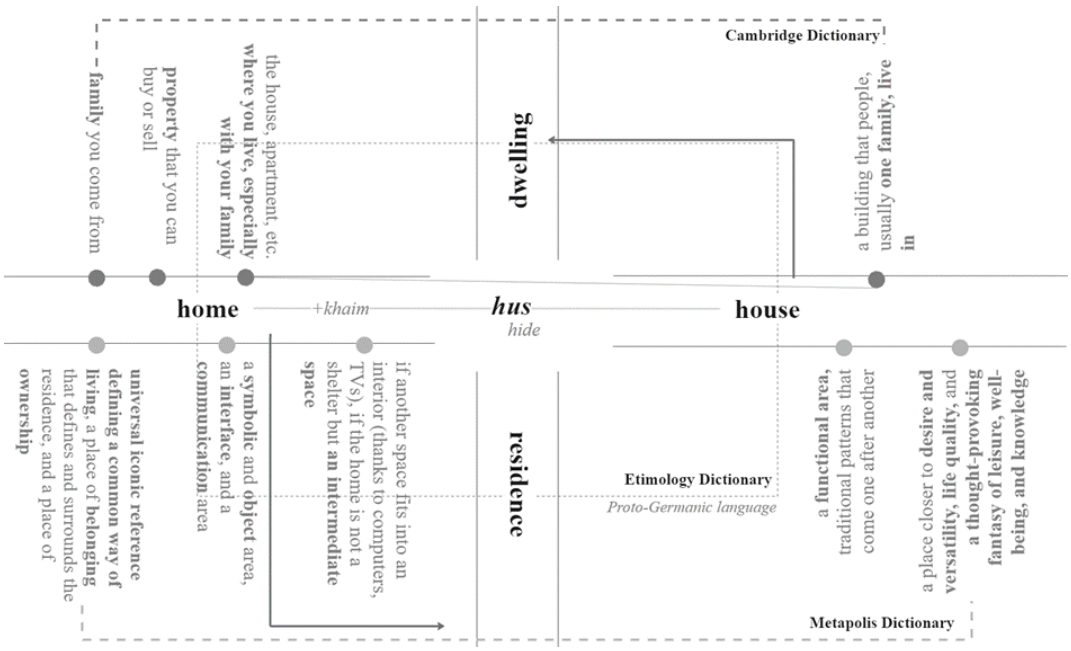


***Figure 1.*** *Etymological Perspective on 'Home' and 'House'*

In architecture, a house, when viewed formally, refers to physical structures designed for people to live in and open spaces associated with these structures [7]. These physical structures also contain social and cultural meanings (different views of home, domesticity, daily routines, family rituals, and lifestyles). In other words, a house is not only a physical structure but also a complex set of needs, desires, and meanings. This is because is that the form and spatial organization of the house are shaped by its cultural environment [8]. On the other hand, since thought and social relations are also determinants in the physical change of space, the house should also be examined with its environment, life, the uses of objects, and their formal aspects [9]. There are many studies, discussions, and approaches on the house and its definition in different ways in the literature. Especially when it comes to the meaning and interpretation of house, different concepts that are similar to each other, sometimes replace each other, can be used instead of each other, or indicate a transformation are added here. The conceptual ground expands with the concepts of shelter, home, and home. Tanyeli [10], explained the relationship between dwelling, house, and home by pointing out a transformation of social change. According to him, "From the 19th century onwards, the home ceased to be a house and turned into a sublimation, even sanctification, referring to the nuclear bourgeois family. In the 20th century, the home was defined as a space that was no longer personalized, adopted, or identified with the family, and the apartment was accused of this. The reason for this was the collapse of the social stereotype that could be called the identification of the family with the house." Işıkkaya [11], explained the transformation of home into the house in the 20th century concerning capitalism: "Since the home did not turn into a product until the 20th century, it is not perceived as a house in the current sense. While the home referred to emotion, which was a multifunctional, original, private, multi-stakeholder, crowded sacred space in the pre-modern period, in the 20th century it turned into a house that contained certain functions, that we benefited from, that we had fewer ties with, and that we used for a limited time."

Houses transform into homes along with the life they inhabit. House as a pure space, and especially urban houses, establishes a connection with many other areas of life by creating an interaction between the structure and the program over time and space. A house should not be understood as a static physical construction unit. Because even if the inhabitants do not intend to create a home, this housing always indicates a social dimension [12].

Estimating the future home could be possible by using the method which is dwelling experiences used by Lawrance based on today's home architecture, technology usage, and space. It is an undeniable fact that

today's technological advances have affected and reshaped whole life, the relation of production and consumption, experiences, architecture, space, and objects, and the way of doing and thinking: In the last 100 years, devices that have been integrated into homes and life with the promise of making people's lives easier (refrigerators, washing machines, dishwashers), entertainment and communication sources (radios, televisions, computers, telephones) and increasingly more advanced (smart) versions of these devices... Don't they directly change the meaning of house as well as physically? Werner, Altman and Oxley [13], could answer this question by saying that changing the meaning of home could be read with human acts. Dovey [14], defined home as a relation between human and environment rather than part of an environment. At this point, home is the node between the city and human and it's dynamic change could be explained with laces in this node. Also, this dynamic transformation occurs the new needs, lifestyles, spaces, regulations in city, architecture. Technological advances and social, political, cultural changes which trigger these advances are critical on this issue.

Word of technology occur with "tekhne" and "logos" in Greek. While "tekhne" means art and craft, "logos" means wisdom and logic. Technology means knowledge, equipments and methods on science and industry in Cambridge Dictionary [15]; equipments that humans invented to inspect and change their environment and its knowledge in TDK [16]. Nightingale [17], separate the approaches on technology in two groups: First one -mostly used by engineers- is filling the blanks with artificial functions, second one -mostly used by philosophers- the product of a desired problem-solving process through ideas or design that transform the world. Technology changes not only production but also humans' lives and it can make easier or more difficult. As Benjamin [18] stated, the ruptures/crises experienced with technology shape human nature not only superficially but also deeply and upwards. Technology is one of the crises that led the world to transformation, and in fact, it is the thing which has changed and transformed human life the most since the 18th century. Moreover, the role of technology in this change is greater than ever today and its weight is increasing. Technology will be the most important dynamic that will shape the future. Reichenbach [19] defines the time order as before and after, the time direction as past, present, and future, and asks: "In what sense is the future different from the past?" The answer to this question can be explained by the crises that trigger transformation. The continuity of technological developments, which is one of these crises, also makes the change continuous and characterizes the change by intersecting with other events [20].

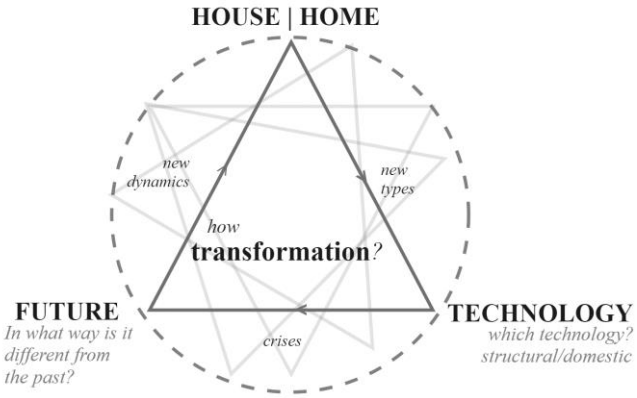


***Figure 2.*** *Conceptual Ground*

It can be said that technological advancements, defined as a crisis by Tanyeli[1], are the movements and direct the time. Crises (wars, earthquakes, technological improvements) bring new things and obligate adaptations. Transformation is an ordinary production of this process. The etymological roots of 'house,' 'home,' and 'technology,' discussed earlier, reflect the evolution of these concepts from functional and physical definitions to inclusive, experiential, and interactive meanings. This shift highlights how the intersection of technology with other crises shapes the transformation of living spaces, contributing to the redefinition of the house and the home. The new situations and dynamics which occur with technology

[1] Tanyeli comprehends "cris" as a deformity on the working system in the book which is "*Mimarlık Düşünmek İçin Verimli Arızalar*" and cris neither possibility or breakdown. Health and technology crises are unpredictable, and they cause the adaptations to new lifestyles and pose the new perceptions.

and its co-existence with other crises, and the transformation based on these is critical to the issue of the change of the house (Figure 2). So, how do researchers perceive this topic?

## 2. METHOD

This research aim is to bring out the prominent topics and concepts about relationality between the concepts of house, technology, and future and determine the tendencies in literature. According to this aim, this research utilizes the method of bibliometric analysis (Figure 3).

Bibliometric analysis is a quantitative research method systematically examining and interpreting academic literature. This method involves assessing various attributes of published works, such as authorship, publication trends, citation patterns, and thematic evolution within a specific field of study. Bibliometric analysis method reveals the transformation of a specific field while also providing foresight into future developments in that area [21]. These kinds of research, examining the literature systematically, are valuable because they make visible the current research area's dynamics and tendencies. In this research, bibliometric analysis is utilized to uncover the relationships and trends between the concepts of house, home, technology, transformation, and the future. So, it helps to identify patterns and predispositions in the literature while also revealing gaps that may support further investigation.

This research tries to answer these questions: 1) Which subjects and concepts have the relationship between housing, technology, and the future been examined by researchers? 2) How can researchers' approaches to the relationship between house, technology, and the future be systematized? 3) How has the future of the transformation of house with technology been evaluated by researchers?

When the concepts related to the research topic have been addressed in the literature have been examined, it has been seen that there may be alternative routes for the literature research to be conducted due to the comprehensive nature of the topic. This determination has added another question to the study. 4) Which keyword should be used to analyze the literature on the relationship between house, technology, and the future? (house/home) In this article's context, to occur the more holistic perspective, both concepts are examined in different routes, and these routes and process-flow diagram are shown in Figure 3.

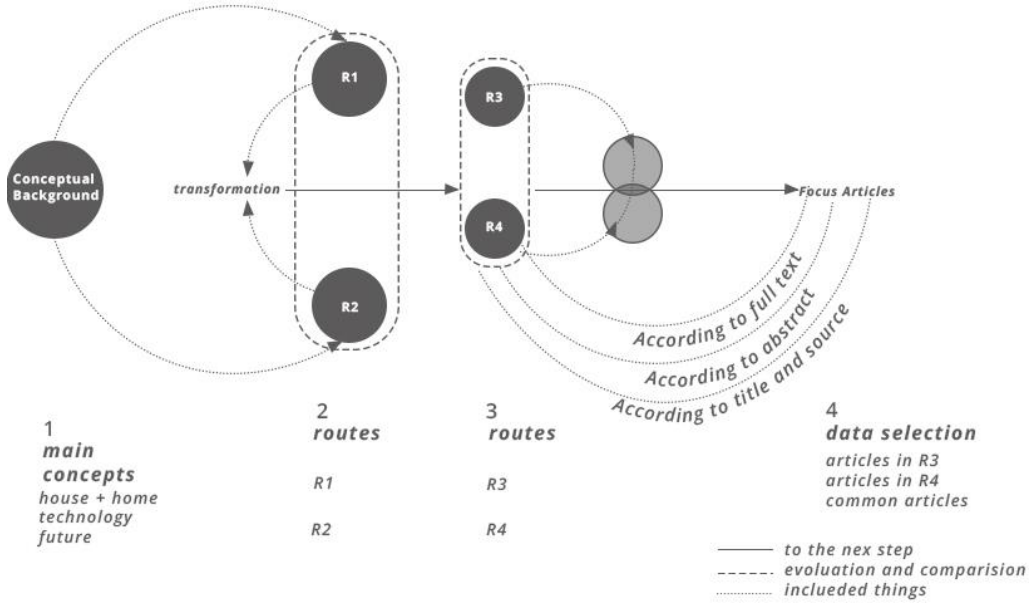


***Figure 3.*** *Bibliometric and Content Analysis Flow Diagram*

To interpret the different sides of the research topic, thematic analysis method (Braun & Clarke, 2006) which based on determining, analyzing and revealing the thematic patterns on data, is used, research codes are identified as house, home, technology, future and transformation and these codes are examined with different combinations. This research was run between November 19, 2023 – January 6, 2024, and it

is limited to period (2020-2023), English publications which encompass these words in their abstracts and keywords and articles, proceedings and book series on Scopus database. 12.576 publications have been attained and their statistical and numerical data have been investigated. These data have been analyzed with maps and diagrams produced via the VOSviewer program, and usage densities, temporalities, and relationalities of the concepts are detected. Furthermore, data attained via Vosviewer have been grouped by researchers and findings interpreted. To expand and deepen the research context, 11 articles related to this research's approach have been identified and analyzed in detail (Table 1).

***Table 1.*** *Research Steps: Bibliometric (1) and Content/Thematic Analysis (2), Scopus, 2000-2023*

| Research Steps | Research Scopes | Research Routes | Research Codes | Tools | Outputs |
|---|---|---|---|---|---|
| *1. Bibliometric Analysis* | Article, Proceedings, Book Series (in English) | R1 | *House, technology, future* | *Density Map Network Map Overlay Map* | *Concepts used most (n>5) Groups of topics researched most* |
| | | R2 | *Home, technology, future* | | |
| | | R3 | *House, technology, future, transformation* | | |
| | | R4 | *Home, technology, future, transformation* | | |
| *2. Content, Thematic Analysis* | Focus Articles (in English) | R3 - R4 | | *Articles (title, full text) Source, discipline* | *Relationality of topics and concepts and arguments about them* |

Research steps can be explained briefly. In the first stage, the conceptual background is revealed through network, density, and overlay maps attained via VOSviwer. Concepts of home and house were evaluated together and traces in the literature of how these concepts interacted with technology and the future have been examined separately. To do this, limited to period, database, language, and paper types, Route 1) [house, future, technology] and (Route 2) [home, future, technology] have been determined and searched. Network visualization maps have been created for both routes by analyzing the most used word, current concepts are determined with overlay maps via VOSviewer software. In the next step, the outputs of these maps have been compared, and similarities and differences have been determined. After that, Route 3 [house, future, technology, transformation] and Route 4 [home, future, technology, transformation] were created by adding the concept of "transformation" and analyzed and compared like Route 1 and Route 2.

In the second stage, firstly articles articles, attained with R3 and R4 have been examined according to topics, scopes, methods, channels, keywords, and primary approaches. Then, articles encountered in the previous stage have been listed, and the most interrelated to this research have been selected and analyzed content-wise. Finally, all data have been analyzed holistically, and the relation between home and house and their transformation concerning the future and technology has been questioned. Prominent topics and concepts have been detected and transformations of home and house in parallel with technology have been questioned.

## 3. FINDINGS

In this section, findings detected in the literature review have been explained in line with the above-mentioned by being systematized.

### 3.1. Route 1 (R1): House, Future and Technology

• 3166 publications (1213 proceedings and 1180 articles) have been attained with a survey including the keywords (house+future+technology) in their keywords and abstracts' parts among publications after 2000 on the Scopus database.
• These publications have been examined via VOSviewer software; it has been detected those concepts of human, technology, automation, construction industry, and energy efficiency have become prominent, and the Internet of things, concepts of smart buildings, and greenhouse gas follow them.
• Network map has occurred with the same data. The network map shows the relationship between concepts and usage density. It reveals the most used and repetitive concepts and concepts, used together, codified with the same color. According to this, In R1, there are 5 groups, and this grouping has been marked manually on the map (Figure 5). These groups have been named with the most used concepts: G1: Automation, G2: Human, G3: Construction Industry, G4: Energy Efficiency, G5: Greenhouse Gas.
• Vosviewer Software shows the temporality of the frequency of usage of concepts via overlay map. In line with this mapping, the distribution of concepts, which have become prominent since 2010, is G1: Internet of things, security, integration; G2: wellness, covid 19, children's algorithms, telehealth; G3: printers, estimation, health risk, BIM; G4: zero energy buildings.

### 3.2. Route (R2): Home, Future and Technology

• 9010 publications (3814 proceedings and 3084 articles) have been attained with a survey including the keywords (home+future+technology) in their keywords and abstracts' parts, among publications after 2000 on the Scopus database.

• These publications have been examined via VOSviewer software; it has been detected that concepts of human, automation, and COVID-19 have become prominent, and quality of life and communication follow them.

• A network map has occurred with the same data, and according to these, 5 groups have been detected for R2. This grouping has been shown manually (Figure 5), and groups have been identified with prominent concepts: G1:c Automation, G2: Human, G3: Covid-19, G4: Quality of Life, and G5: Communication.

• Vosviewer Software shows the temporality of the frequency of usage of concepts via overlay map. In line with this mapping, the distribution of concepts, which have become prominent since 2016, is G1: Internet of things, smart homes, artificial intelligence, machine learning, virtual reality, sustainability, climate change, and energy; G2: flexibility, health, fragility; G3: working from home, technology usage; G4: mobile applications, wearable sensors.

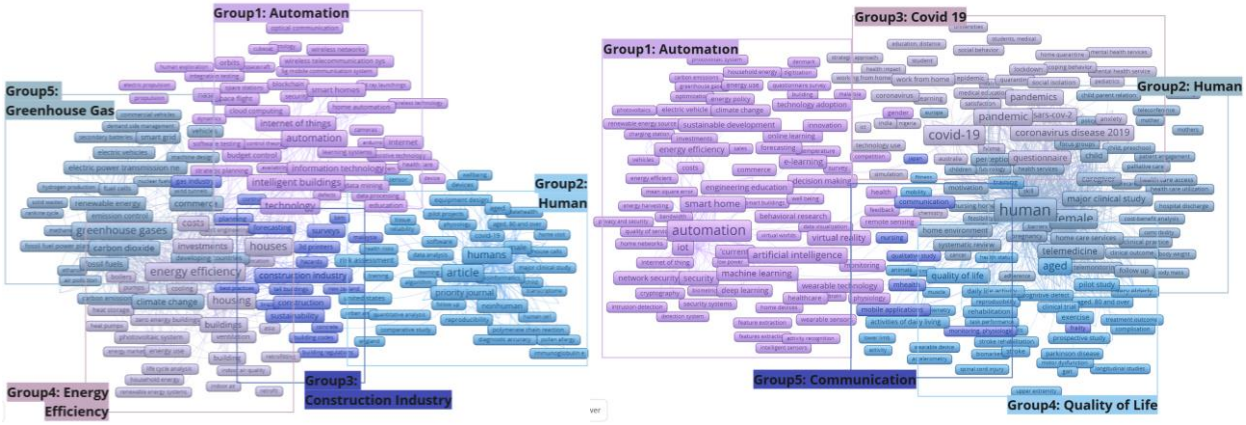


***Figure 5****. Data groups of Route 1 and Route 2, respectively, from left to right (Network maps were obtained via VOSviewer with a minimum word limit of 5 and were grouped manually by Author.)*

### 3.3. Comparison of R1 and R2

In this part, outputs of R1 and R2 have been compared to each other (Figure 5) and findings with the comparison conclusion have been asserted item by item.

- For R1, these concepts have been became prominent in groups: In G1_Automation: smart homes, buildings; in G2_Human: covid 19, tele-health, psychology, risk management; in G3_Construction Industry: building codes, construction, 3D printers, BIM; in G4_Energy Efficiency: ventilation, reinforcement; in G5_Greenhouse Gas: energy systems, renewable energies.
- For R2, these concepts have become prominent in groups: G1_Automation: smart homes, artificial intelligence, privacy, security; G2_Human: woman, child, home environment, flexibility, cooccurrence; G3_Covid 19: pandemic, working from home, social behavior, technology usage, simulation; G4_ Quality of Life: daily activities, elderly; G5_Communication: mobile applications, psychology.
- There are groups of automation and human in both searches. However, both concepts are related to different sub-concepts. For example, while R1 has been associated with the construction industry, energy efficiency, and greenhouse gas topics, R2 is associated with covid 19, life quality, and communication. Also, the concept of "automation" has been associated with smart homes, buildings, and security in R1 but with smart homes, artificial intelligence, and security in R2.

***Table 2.*** *Concepts and groups that stand out with R1, R2*

| R1 (*house+future+technology*) | | | | |
|---|---|---|---|---|
| **G1:** Automation | **G2**: Human | **G3:** Construction Industry | **G4:** Energy Efficiency | **G5:** Greenhouse Gas |
| Smart homes, buildings, security | Covid 19, tele-health, psychology, risk management | Building codes, construction, 3D printers, BIM | Ventilation, reinforcement | Energy systems, renewable energies |
| R2 (*home+future+technology*) | | | | |
| **G1:** Automation | **G2:** Human | **G3:** Covid 19 | **G4:** Quality of Life | **G5:** Communication |
| Smart homes, artificial intelligence, privacy, security | Woman, child, home environment, flexibility, cooccurrence | Pandemic, working from home, social behaviour, technology usage, simulation | Daily activities, elderly | Mobile applications, psychology |

*R: Route, G: Group*

### 3.4. Route 3 (R3): House, Future, Technology and Transformation

- 92 publications (32 proceedings and 34 articles) have been attained with a survey including the keywords (house+future+technology+transformation) in their keywords and abstract's parts, among publications after 2000 on the Scopus database. 7 belong to the Arts and Humanities category, including architecture.
- When these publications are examined on a density map, attained via VOSviewer, it is seen that the concepts of sustainable development, environmental technology, economic collapse, construction industry, and architectural design and energy become prominent.
- In the network map, with the same data (Figure 6), the relationality of concepts is seen. The same color codes are used in VOSviewer. In this respect, data obtained with the search of

"house+future+technology+transformation" are grouped and named according to the prominent concepts: G1_Sustainable Development, G2_Environmental Technology, G3_Ekonomic Collapse, G4_Construction Industry and Architectural Design, G5_Digital Transformation and G6_Energy (Figure 6).

• VOSviwer demonstrates the frequency of usage of concept on overlay map. According to the evaluation of this map, the distribution of concepts, which have become prominent since 2008, is G1: rurality, remediation, heating; G2: transportation, noise; G3: budget control; G4: construction, technological innovations; G5: marketing, cloud technology; G6: circulation, energy efficiency (Table 3).

### 3.5. Route 4 (R4): Home, Future, Technology and Transformation

• 213 publications (61 proceedings and 78 articles) have been attained with a survey including the keywords (home+future+technology+transformation) in their keywords and abstracts, among publications after 2000 on the Scopus database. 12 of them belong to the Arts and Humanities category, including architecture.

• When these publications are examined on a density map, attained via VOSviewer, it is seen that the concepts of digital transformation, human, artificial intelligence, automation, Internet of things, COVID-19, and sustainable development become prominent.

• In the network map, with the same data (Figure 6), the relationality of concepts is seen. The same color codes are used in VOSviewer. In this respect, data obtained with the search of "home+future+technology+transformation" are grouped and named according to the prominent concepts: G1_Covid 19 and Artificial Intelligence (concept have same color and size), G2_Automation, G3_Digital Transformation (Figure 6).

• VOSviwer demonstrates the frequency of usage of concept on overlay map. According to the evaluation of this map, the distribution of concepts, which have become prominent since 2016, is G1: pandemic, education, e-learning, home care; G2: smart homes, buildings, cities; G3: agriculture, energy efficiency, robotic technology (Table 3).

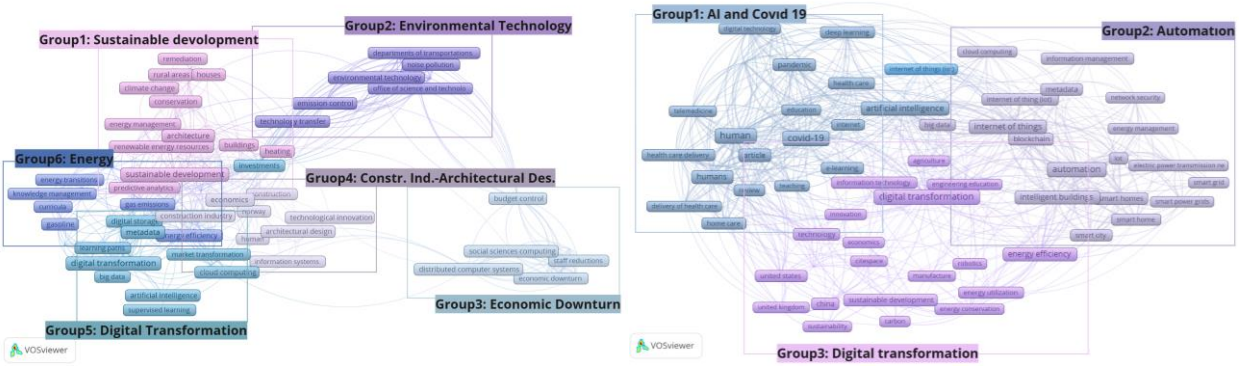


***Figure 6.*** *(Data groups of Route 3 and Route 4, respectively, from left to right (Network maps were obtained via VOSviewer with a minimum word limit of 5 and were grouped manually by Author.)*

### 3.6. Comparison of R3 and R4

In this part, outputs of R3 and R4 have been compared to each other (Figure 6) and findings with the conclusion of the comparison have been asserted item by item.

• For R3, these concepts have been became prominent in groups: In G1_Sustainable Development: rurality, remediation, heating; in G2_Environmental Technology: transportation, noise; in G3_Economic Collapse: budget control; in G4_Construction Industry and Architectural Design: construction, technological innovations; in G5_Digital Transformation: marketing, cloud technology; in G6_Energy: circulation, energy efficiency.

• For R4, these concepts have become prominent in groups: In G1_Covid 19 and Artificial Intelligence: pandemic, education, e-learning, home care; G2_Automation: smart homes, buildings, cities; G3_Digital Transformation: agriculture, energy efficiency, robotic technology.

• There are groups of digital transformation in both searches. However, digital transformation is related to different sub-concepts in separate groups. For example, while R3 has been associated with topics of marketing and cloud technology, R4 is associated with agriculture, energy efficiency, and robotic technology. When other data groups are examined, while both R3 and R4 indicate physical issues like noise, agriculture, smart homes/buildings/cities, circulation, and energy, only R4 indicates the topics related to life such as pandemic, e-learning, home care, and education.

***Table 3.*** *Concepts and groups that stand out with R3, R4*

| R3 (*house+future+technology+transformation*) | | | | | |
|---|---|---|---|---|---|
| **G1:** Sustainable Development | **G2:** Environmental Technology | **G3:** Economic Collapse | **G4:** Const.Ind.-Arch. Design | **G5:** Digital Transform. | **G6:** Energy |
| Rurality, remediation, heating | Transportation, noise | Budget control | Construction, technological innovations | Marketing, cloud technology | Circulation, energy efficiency |
| R4 (*home+future+technology+transformation*) | | | | | |
| **G1:** Artificial Int.-Covid 19 | | **G2:** Automation | | **G3:** Digital Transformation | |
| Pandemic, education, e-learning, home care | | Smart homes/ cities, buildings | | Agriculture, energy efficiency, robotic technology | |

*R: Route, G: Group*

### 3.7. Focus Articles

In this part, there are focus articles to deepen the research. To determine them, a progressive selection methodology has been adopted (Figure 7). According to this, 64 articles attained via R3 have been listed and evaluated. Then, firstly 9 articles were excluded according to titles and sources, and remained 55 articles. Then, abstracts of 55 articles were read, and 34 of them were eliminated because they were weakly related. In parallel with this scan, 152 articles for R4 have been detected, listed, and evaluated. Firstly, 60 have been excluded according to their titles and sources. Then, the remaining abstracts (92) were read, and 42 of them were eliminated because they were weakly related. Then, the articles most related to this research have been determined. 6 articles for R3 and 9 articles for R4 have been selected and it has been seen that there are 4 same articles in both searches (Figure 7).

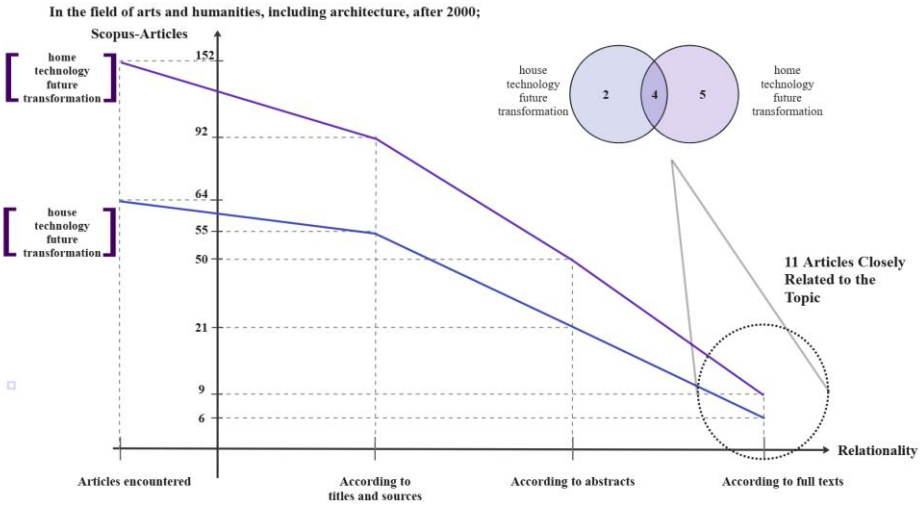


***Figure 7.*** *Data/Article Selection Process*

***Table 4.*** *Focus Articles*

| *R* | *Code* | *Writer/Writers* | *Year* | *Title* |
|---|---|---|---|---|
| *R3* | **A1** | *Byounggwan LEE, Okhyun KWON, Inseong LEE, Jinwoo KIM* [22] | 2017 | Companionship with smart home devices: The impact of social connectedness and interaction types on perceived social support and companionship in smart homes |
| | **A2** | *Fredrik TORISSON* [23] | 2023 | The Digitalization of Swedish Housing |
| *R4* | **A3** | *Aykut COŞKUN, Gül KANER, İdil BOSTAN* [24] | 2017 | Is smart home a necessity or a fantasy for the mainstream user? A study on users' expectations of smart household appliances. |
| | **A4** | *Luis HERNAN, Carolina RAMIREZ-FIGUERROA* [25] | 2023 | A Home with a Future. Digital Domesticity and the Vague Fictions of Silicon Valley |
| | **A5** | *Antoine PICON* [26] | 2023 | Dwelling in the Digital Age: Imagination, Experience and Subjectivity |
| | **A6** | *Yvonne FÖRSTER* [27] | 2021 | Painting by numbers: Digital technology and the art of living |
| | **A7** | *Sotiriosa KOTSOPOULOS, Jasonb NAWYN* [28] | 2023 | Rethinking Autonomous and Robotic Systems in Residential Architecture |
| *R3 + R4* | **A8** | *Donghyeog CHOI, Hyunchul CHOI, Donghva SHON* [29] | 2019 | Future Changes to Smart Home Based on AAL Healthcare Service |
| | **A9** | *Léa-Catherine SZACKA* [30] | 2021 | Screen's Domesticity: from the Postmodern House to Our House |
| | **A10** | *Hamid ABDOLLAHYAN* [31] | 2018 | An Ethnographic Study of Communication Between Humans, Nature, and Place: In Search of a Sense of Belonging in Abarkouhi Homes, Iran |
| | **A11** | *Daniel A. BARBER* [32] | 2014 | Tomorrow's House: Solar Housing in 1940s America |

*R: Route, A: Article*

*When focus articles for **R3** (A1, A2) are examined, these are detected:*

A1 emphasizes technological advancements as a response to increasing loneliness caused by changing social structures, highlighting the potential of smart devices to reduce loneliness and partially replace human interaction. The study demonstrates that as the prevalence of living alone increases, the interaction between individuals and smart devices within their homes transforms, serving as a form of social support. This shift suggests that the home itself, augmented by technology, may assume a role akin to that of a "companion". This perspective underscores how technological developments contribute to changing the meaning of the home. A2, on the other hand, differentiates between "smart houses" and "smart homes," highlighting the distinct meanings each term embodies. While smart houses are associated with structural technologies such as energy and security, smart homes are connected to household appliances like refrigerators and vacuums. By distinguishing these terms, A2 demonstrates that the home is not merely a shelter but a space shaped by technology, gaining new functions and meanings. This analysis reveals how technology not only enhances individual objects within the home but also contributes to the broader structure and purpose of the home itself.

*When focus articles for **R4** (A3, A4, A5, A6) is examined, these are detected:*

In the A3 and A6 articles, discussions focus on smart homes. A3 presents a case study on how future homes should be designed according to the expectations of various social groups. It explores the relationship between the adoption of smart home technologies and the expectations users have from these homes. The study observes that different socio-cultural groups have varying expectations and levels of

technology adoption. Users were categorized by age and parental status, and daily living habits and the needs of different age groups regarding smart home technologies were assessed using descriptive cards. A6, taking a more speculative approach, emphasizes human-machine interaction and explores how technological advancements may transform daily life and the home. It draws projections from science fiction cinema, referring to this lifestyle as "techno-culture." A4 introduces the concept of "digital domesticity" in the context of digital devices and their integration into everyday life. It argues that through miniaturization and widespread presence, digital devices have become almost imperceptibly integrated into daily life. The placement of AI-supported devices in the home is examined in terms of their potential to transform both space and lifestyle. This new understanding of "home" is described as digital domesticity and serves as an example of the "techno-culture" lifestyle discussed in A6. A4 envisions the future home in physical terms while emphasizing changes in daily life and the meaning of home, aligning with the "techno-culture" lifestyle. A5 focuses on the pandemic, new types of dwellings, and the dreams of housing, highlighting the blurred boundaries between the physical and virtual realities of home. A5 discusses how digital technologies have reshaped home expectations, influencing its location, lifestyle, and function. It also examines how these technologies, by enabling remote work, socializing, and education, have added new meanings to the concept of home. In A7, the transformative role of artificial intelligence and autonomous technologies is discussed through three future home prototypes. A7's contribution to this study lies in its exploration of how technology impacts human life and, in addition, provides insights into how architects and residents make design and usage decisions regarding the integration of AI technologies into the home.

*When common focus articles for **R3 and R4** (A8, A9, A10, A11) is examined, these are detected.*

When these articles are examined, the concepts of "home" and "house" are interrelated, except for A10. The concept of "house" is used when describing physical features, whereas the concept of "home" is used when discussing interior space, roles, and lifestyle. Therefore, A10 contributes to this study by helping define the scope of these concepts. While A8, A9, and A10 are case studies, A9 explores domesticity through examples. A8 addresses smart home technologies for elderly people and the future of health services in homes. A9 discusses how, while screens have not altered the architectural organization, they have transformed the domestic space, including furniture arrangement, lifestyle, and roles. A11 examines the structural transformation of houses through solar technologies, focusing on domestic life in parallel with socio-cultural changes. The concepts and topics in these articles are both innovative, such as screen domesticity and digital domesticity, which define modern lifestyles, and classical, such as solar energy and smart homes, which are described in physical terms.

## 4. HOLISTIC EVALUATION

A systematic literature review is acknowledged as an effective research methodology for examining the current studies and systematically bringing out the outputs and findings perspicuously and reproducible by synthesizing [33]. This section includes a holistic evaluation of the article from this perspective. Routes have been determined when transformations of house and home have been examined and maps related to these routes have been created. In line with data attained via maps, the frequency of usage by years of prominent topics and concepts in maps has been demonstrated in Figure 8. In this context, it is seen that the most prominent topic is *energy* for all routes by years between 2008 and 2015. After that, *technological developments and investments followed them until 2021, but the pandemic and the topics which are related to the pandemic, such as working from home, digital transformation, and COVID-19,* became prominent in 2021. As of 2023, *artificial intelligence technologies* have become the leading actors of transformation in house and home issues, as they have been included in every area of life, such as education, training, engineering, and medicine (Figure 8).

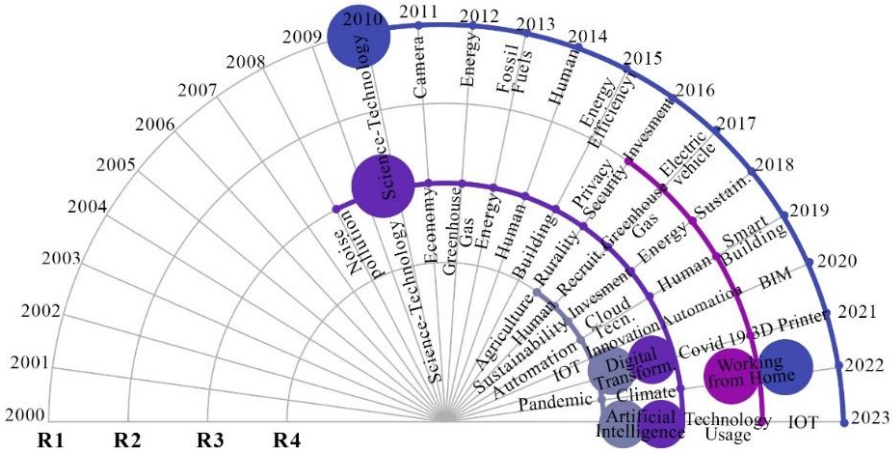


***Figure 8.*** *Concepts according to years in routes*

When the related publications examined in detail to deepen research, the transformation of home has been associated with *artificial intelligence, automation, and digital transformation*; the concept of home has been used for explaining life, human and physical home. For example, While Hernan and Ramirez-Figuerrova [25] discussed the mixing of these technologies into life with the concept of *"digital domesticity"*, Picon [26] emphasized the change in both the dream and meaning of home with *digitalization*.

The concept of digital domesticity first emerged in Spigel's [34] article *"Media Homes: Then and Now,"* where she discusses smart homes as the modern representation of digital domesticity. Domesticity refers to how families and housemates live within their homes, highlighting how daily life is experienced in domestic spaces. Historically, domestic life has always been shaped by various items such as furniture, appliances, fixtures, decorations, and utilities. In contemporary times, however, this mediation has expanded to include an incrasing presence of media technologies, communication infrastructures, and software applications that shape and organize life within modern households [35]. Digital domesticity, the concept of integrating digital technologies into the home environment, represents a shift from traditional living to one centered around continuous technological engagement. It signifies a transformation of the home into a space where digital tools mediate both daily routines and social interactions, affecting both the physical structure of the home and the way people live within it. These technologies are reshaping the meaning of home, making it more than just a shelter but an active, dynamic environment influenced by technological advancements. While the physical transformation of the house expresses the structural integration of digital technologies and smart home technologies, the semantic transformation changes the bonds people establish with the house and their perception of life. With this process, the house ceases to be just a shelter and turns into a dynamic living space shaped by technological developments. The house, on the other hand, is related to physical and structural change, and digitalization and smart home technologies transform the static structure of the house into a more interactive and constantly changing space.

The integration of smart home technologies within digital domesticity redefines *communication* and *interaction* boundaries, significantly transforming how individuals engage with their environment and each other. Picon [26] posits that the concepts of "house" and "home" are inseparable, involving both spatial and experiential dimensions that mutually influence each other. Thus, the home evolves beyond a physical structure, fostering a sense of belonging and leaving lasting impressions and meanings shaped through its interactions with its environment and inhabitants. However, digital technologies bring new complexities to traditional concepts like privacy and security. On one hand, *smart home* technologies enhance physical *security* (e.g., protection against theft) by providing greater security; on the other hand, these expanding communication networks increase the home's *traceability* and potential for *surveillance*, challenging conventional notions of *privacy*. This dual impact creates an ecosystem where *privacy* and *security* are interwoven, transforming the concept of privacy in the smart home. Supporting this perspective, Coşkun, Kemer, and Bostan [24] highlight how *smart home appliances* shape daily routines,

while Förster [27] emphasizes the evolving *human-machine relationship* within these settings. Hernan and Ramirez-Figuerrova [25] also envision the future home as a transformed daily environment, though they primarily address physical changes such as architectural plans. Additionally, Kotsopoulos and Nawyn [28] argue that homes can be studied from both structural and spatial perspectives, with human behaviors examined through interdisciplinary frameworks to better understand these transformations. In summary, the integration of smart home technologies does more than alter lifestyle; it compels a reconfiguration of the home's spatial and structural dimensions, especially in relation to *privacy, security, and interaction.* Concepts like *digital domesticity, ubiquity, and smart appliances -related to smart home technologies-* are reshaping the modern home into a *dynamic, responsive* space, adapting to its inhabitants' needs and redefining the traditional notion of what it means to live in a "home."

The concepts of *Internet of Things, security, integration, 5G communication systems, smart homes, wellness, COVID-19, child algorithms, tele-health, health risk, zero-energy buildings,* and *Building Information Modeling (BIM)* are becoming more important in research on homes, technology, and the future. Similarly, concepts like *artificial intelligence (AI), machine learning, virtual reality, sustainability, climate change, energy efficiency, flexibility, health, fragility, working from home, technology use, daily activities, mobile apps, and wearable sensors* are key topics in research about homes, technology, and the future.

Smart home technology is driven by artificial intelligence (AI), which functions through three primary tools: sensor data, speech recognition, and automatic actions. These technologies enable the home to *monitor, analyze, and adapt* itself with minimal need for input from residents. This is also related to the idea that homes will evolve to become more integrated with our daily lives, functioning almost as companions. AI is the key factor that makes a home "smart" by learning the routines of its residents and automatically adjusting devices and systems based on their needs. This structure provides residents with greater independence, a safer living environment, improved quality of life, and enhanced energy efficiency [36]. Therefore, smart homes and artificial intelligence bring together all the technologies mentioned above and play an important role in *sustainability, adaptation, flexibility, and enhancing overall quality of life.*

Abdollahyan [31] clarifies the distinction between house and home, suggesting that the house relates to structural and physical aspects, while home embodies social and emotional connections. Picon [26], emphasizes the transformative relationship between "house" and "home," noting how each influences the other. As smart technologies continue to blur the boundaries between the *physical and experiential,* future homes are expected to integrate digital functionality seamlessly with physical space. This transformation will shift the home from a passive shelter into an active, adaptive space, responding to the inhabitants' needs and behaviours. Torisson [23] differentiates between *"smart house"* and *"smart home"* technologies. Smart house technologies focus on structural improvements, such as *energy efficiency, security, and sustainability.* Examples include smart lighting, HVAC (heating, ventilation, and air conditioning) systems, and advanced security solutions, all designed to enhance physical security and optimize energy use, contributing to sustainability. On the other hand, smart home technologies prioritize user experience and convenience, involving devices that interact with daily routines. These technologies use *machine learning* and the *Internet of Things (IoT)* to adapt to users' behaviors, predict needs, and adjust settings autonomously thanks to artificial intelligence. For example, smart systems may monitor sleep patterns to adjust bedroom lighting or integrate voice-activated assistants to manage tasks, improving privacy by restricting unauthorized access and enhancing sustainability through energy efficiency.

Researchers such as Torisson [23] and Szacka [30] envision future homes as integrated spaces where structural resilience and experiential adaptability converge. Hernan and Ramirez-Figuerrova [25] describe these spaces as designed to accommodate flexible lifestyles, transforming homes from mere physical structures into dynamic, intelligent environments that anticipate and meet the evolving needs of their inhabitants.The prominent topics and concepts in search with the concepts of house, future, technology and transformation, *smart houses, interaction, and smart technologies, show similarities with house,*

*technology, and future*, but digital transformation differs in this search. The prominent topics and concepts in search with the concepts of home, future, technology and transformation, smart *homes, and pandemic show similarities with home, technology, and future*, but concepts of *smart home appliances, ambiguity, digital domesticity, ubiquity, physical mobility, digitalization, and digital experience* is seen here for the first time. The common topics and concepts are smart homes, the Internet of things, attachment, and energy houses for all searches. When the research has been deepened through selected articles, concepts of ubiquity, screen domesticity, telematic house, media house, VR house, and small home are seen (Figure 9). It can be said that these concepts are the sub-concepts of the concepts at the center of this discussion. As Grübler [20] puts it, these concepts that come to the fore at the intersection of technology and the home, distinguished from other events by their continuity and characterized change when it intersects with them, **are important in imagining the home of the future.** On the relationality of technology and the future, the topics transforming both house and home are the Internet of Things, digital technologies, artificial intelligence, smart homes, and *smart buildings.*

They are also about smart homes and artificial intelligence technologies. The development and adoption of artificial intelligence-based solutions are crucial for advancing smart home technologies. To fully realize the vision of a proactive, ubiquitous smart home, intelligent software solutions are needed [37]. While smart homes are gaining popularity, many people still hesitate to adopt the technology due to concerns about security, privacy, and potential physical risks [36]. In addition to these concerns, concepts such as digital domesticity, ubiquity, smart appliances, and physical mobility, discussed in various research, are key indicators of future trends in housing. These concepts have the potential to not only transform the physical aspects of homes but also reshape how we perceive and use space. As a result, they could significantly alter the meaning of "house" and "home," marking a shift towards more dynamic, adaptive, and interconnected living environments.

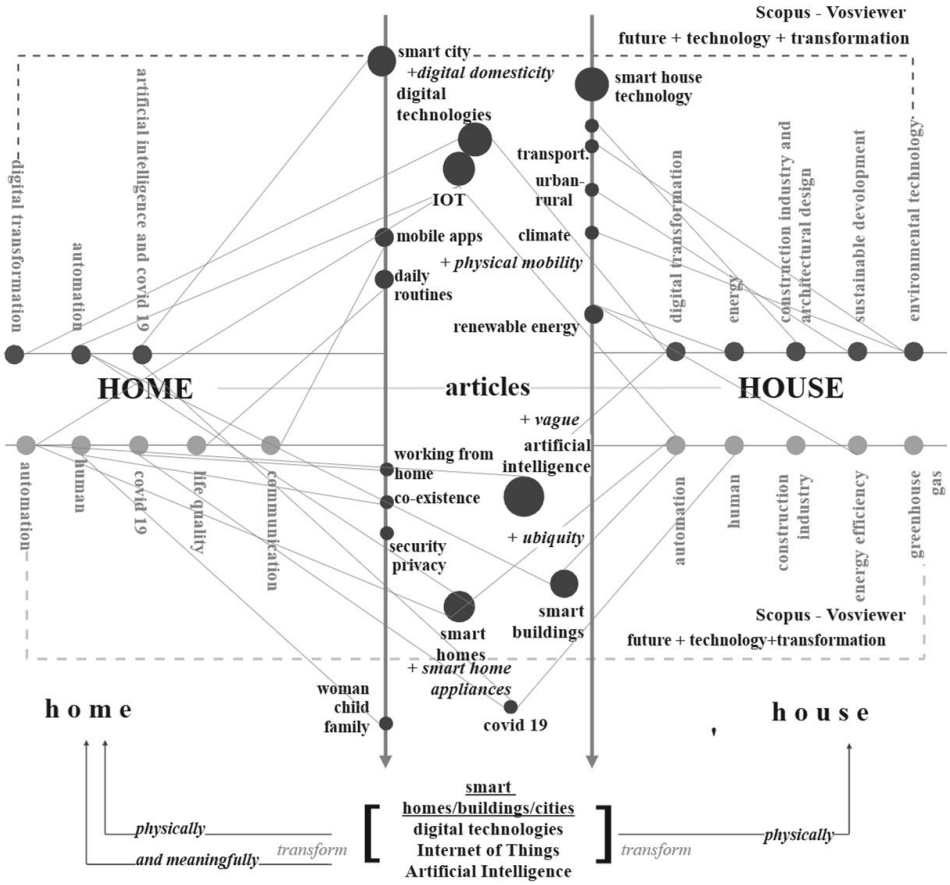


***Figure 9.*** *Home and House: future, technology and transformation*

Within the scope of the research, when the concepts of house and home are examined, it is seen that they are used together instead of featured by researchers. But, in line with data attained via maps, the home concept is more inclusive because it is associated with physical and life issues. For instance, Szacka [30], investigated change of home through media technologies both physically and in terms of life activities. Barber [32] discussed the change of topic of home ownership both in terms of new building types and new ways of living. In contrast, concepts used for indicating living spaces such as home, house, dwelling, motherland, and something like this, change according to the dynamics of the period in which the publication was produced. For example, Işıkkaya [11] pointed out that homes had too many functions, such as sheltering, working, and socializing previously, but with the changing process that started modernization, homes obtained only sheltering function and transformed into houses. Also, he discussed gaining functions of home again during pandemic through the digital technologies. This research focuses on technology, changes in new ways of living, lifestyles, usage, and perception of space have been revealed.

## 5. CONCLUSION

This research examines the interaction between housing, technology, future, and transformation in existing literature. Prominent topics and concepts were identified, categorized, and analyzed through thematic analysis. Subsequently, focus articles have been detected and examined in detail, and how current issues in the relationship between housing, future, and technology are addressed are examined. Within the scope of the article, alternative routes were detected to research the effects of technology on the house; the literature review improved through these routes. According to this, the first route includes physical imagination, which can progress the house's conceptual framework. The second route points out social, cultural, and psychological aspects, and in this way, it is convenient for the researcher who aims to make a prediction/future estimation through meaning. At this point, the concept of home can be chosen to instrumentalize. However, based on studies on both architecture and human behavior, it can be said that both transformations undeniably affect each other.

Beyond the scientific contributions, the individual and social impacts, especially those highlighted in the comparison of the concepts of house and home, must also be considered. These impacts reflect how personal experiences with one's living space and broader social contexts shape our perceptions of home. The concept of home is deeply connected with an individual’s sense of identity, belonging, and the emotional bond they have with physical space. Individual experiences, memories, and cultural factors shape how people interact with and relate to their homes. In social context, these relationships are not only personal but also influenced by collective social norms and cultural values. The transformation of the concepts of house and home can be viewed as both an individual and collective journey, where personal identities and cultural practices evolve to adapt to new realities.

Collen and Meesters [38] expressed the house as a physical structure and the home as the relationships we live with it and argued that the two are intertwined and inseparable parts. Tanyeli [10] and Işıkkaya [11] emphasized that the concepts of house and home transform into each other with crises (pandemic, industrial revolution, renaissance, etc.). With this perspective, it can be said that the conditions of the period in which the publications were produced are decisive in evaluating these phenomena. This determination can also be interpreted as an indicator of the necessity of researching/understanding the transformation of the home/house together -in the context of the future and technology-. Evaluating the concepts of home and house with a holistic perspective will enable researchers who aim to create a future foresight to develop a more comprehensive perspective since one will be incomplete without the other. In addition, examining the processes of how these concepts transform and transform each other can reveal new possibilities regarding both semantic and physical transformation.

An important area for future research could focus on privacy, security, and socio-cultural relationships within the context of smart homes. These aspects are increasingly relevant as technology transforms domestic environments. The privacy and security challenges posed by connected devices in smart homes, as well as the effects on social relationships within these digitally mediated spaces, offer a rich avenue for further exploration. Further studies could explore how smart homes influence emotional well-being,

cultural dynamics, and user adaptability across different contexts. In particular, the integration of personal data and surveillance systems into the home environment requires further investigation regarding its implications for individual autonomy and social cohesion. Moreover, examining the impacts of smart homes on social interactions, community participation, and individuals' sense of belonging can provide crucial insights into the social fabric of future homes. Additionally, analyzing the implications of surveillance and data privacy on social interactions will provide essential insights into the evolving role of smart homes.

As we look to the future of housing, the evolution of the house will increasingly integrate innovative technologies such as artificial intelligence and the Internet of Things. This convergence of technology and architecture will reshape how space is utilized, influencing not only the functionality of homes but also how they contribute to the emotional and social well-being of their inhabitants. The future house is likely to be a dynamic, adaptable environment, responding to the needs and desires of its inhabitants in real time. These developments promise to transform the very essence of what it means to live in a home, altering both its physical form and its role within society. In addition, concepts like digital domesticity, ubiquity, and mobility will increasingly define how individuals interact with their homes, offering new opportunities for flexibility and connectivity that will influence the design and usage of homes in the future.

This literature review summarizes scientific research on the relationship between home, house, technology, and the future. The research has determined that the relationship between the future of houses and technology is established through digital technologies, artificial intelligence, smart homes/houses, and the Internet of Things, indicating a semantic and physical transformation. Discussions on the future of the house can be based on a combined evaluation of technology and current dynamics. The future of the house and its interaction with technology offer a rich research potential with its various contexts. Investigating the implications of smart homes on privacy, security, and socio-cultural interactions can open new research directions, especially considering the increasing integration of personal data and surveillance systems in the home environment. These challenges, including balancing comfort with privacy, the impact of surveillance on social relationships, and technology’s role in either fostering or inhibiting social interaction, are crucial areas for future research.

The literature research presented within this article’s scope can be considered a step for future studies. Further research can explore the psychological effects of living in fully automated homes, focusing on user autonomy, trust in technology, and impacts on family dynamics and well-being. Long-term studies on the environmental sustainability of smart homes are also needed, particularly regarding energy efficiency, carbon footprint reduction, and material sustainability. Additionally, examining how different cultures adapt to technological changes in housing will provide valuable insights into the transformation of the concept of “home” in specific context. The topics and concepts identified through this research can pave the way for new fields of study and innovative research with the perspectives of different researchers.

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# Proposal for a Product Classification Strategy for the AI-Assisted Generative Design Approach in Industrial Design Process

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**Abstract**

There are numerous product types where the design processes surpass the product lifespan. This circumstance increasingly emphasizes the significance of time management in design processes over time. The generative design approach stands out compared to traditional design processes by generating alternative forms in a shorter timeframe. In the field of industrial design, the utilization of generative design is relatively recent compared to areas like architecture and computer technologies. The integration of AI-supported generative design algorithms into CAD software has eliminated barriers requiring software and programming knowledge, rendering generative design more feasible for designers. While there are numerous studies in the literature on topics such as generative design systems, the advantages provided by generative systems and their application areas, shortcoming have been observed in research evaluating the feasibility of generative design according to products. This study aims to propose a product classification strategy for the generative design approach in industrial design processes. Within the scope of the study, form classes, structural types in product design and example products created with generative design were examined through the working system of Fusion 360 Generative Design and a product classification strategy for the generative design approach has been suggested. A pilot study was conducted to test the proposed classification strategy within the scope of the study. Trials for form creation were conducted with two expert designers in three categories. Feedback was collected through interview and observation notes. The experts have expressed the view that the proposed classification is consistent with the working system of generative design and the concept of usability.

## 1. INTRODUCTION

Product development processes can be defined as the methods used by businesses for stages ranging from the ideation to the sales and even post-sales of a product before its launch into the market. These methods aim to facilitate the execution of the process in a controlled, efficient, and low-risk manner. Industrial design can be characterized as a sub-discipline that constitutes a critical segment of the product development process [1]. In the product design process, which requires labor-intensive effort, there is a cyclical process of iterative idea development and evaluation of alternatives, during which cognitive, psychological, and physical burdens are imposed on the designer at each step [2]. In this iterative design process, various factors such as resource utilization, innovation, budgeting, production technologies, and market conditions significantly impact success and effectiveness.

According to the literature, one of the fundamental factors that drives success and generates a competitive advantage in the design process has sifted. Competition, which was formerly driven by cost considerations, now predominantly centers on the time required for new product development. Time efficiency in product development and design processes is of paramount importance and

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cannot be disregarded. This is because the time required to develop a new product now often exceeds the average product lifecycle in many sectors [3].

Artificial intelligence (AI) technologies are emerging as key enablers in optimizing design processes to achieve greater efficiency within compressed timeframes.

With ongoing advancements, AI technologies, which are increasingly utilized at various stages of design processes, have become proficient in predicting and analyzing possibilities within extensive datasets. The motivation for utilizing artificial intelligence in product development processes is increasing by advancements in computational design technologies, which are based on user-inputted data, as well as by the valuable design insights obtained from online AI applications [2].

Generative design tools, enhanced by advancements in AI, are increasingly being employed in industrial and research applications to support the design process [4]. Additionally, the integration of AI-assisted generative design algorithms into CAD programs has made the use of generative systems more accessible for designers and has removed technical knowledge barriers required for operating these algorithms in certain software applications [5].

An examination of the literature reveals a considerable body of research addressing the advantages offered by generative design. However, the number of studies on AI-assisted generative design applications in product design is relatively limited compared to the body of literature in architecture and engineering [5]. Additionally, a research gap has been identified regarding the applicability of generative design to different types of products within the field of industrial design [6]. When the literature is reviewed, it has been observed that the examples of generative design applications in industrial product design tend to focus on products with frame and solid structures, which raises a question [4],[5]. Can the advantages offered by generative design, particularly in the generation of manufacturable form alternatives, vary depending on the type of product? The primary reason for proposing a classification for the application of the generative design approach in the industrial design process is the gap identified in the existing literature on this topic. This study aims to address this gap in the literature by focusing on the following research question:

RQ: Based on the form-generation methodology of AI-assisted generative design, how can products be classified according to the advantages of generative design in generating alternative forms?

Based on this research question, the study aims to propose a classification that guides users, namely designers, regarding the limitations of AI-assisted generative design. The feasibility of form alternatives generated through generative design in terms of product functionality has been examined through structures. As the development of artificial intelligence continues, the algorithm of generative design and the opportunities it offers may evolve. For this reason, the study proposes a classification strategy based on structures, rather than a direct classification based on product names or industries.

The findings presented in this article are based on the operational system of Autodesk Fusion 360 Generative Design and classification studies within the product design literature. Additionally, a pilot study was conducted to test the proposed classification strategy within the scope of the study. Form generation trials were conducted with two expert designers. Observation notes were taken during the implementations conducted with the participants in three categories. Additionally, feedback was obtained through interviews conducted after the implementations and data was gathered through descriptive analysis.

## 2. AI- ASSISTED GENERATIVE DESIGN

Artificial intelligence can be defined as a computational technique that enables a machine to make recommendations or decisions affecting real or virtual environments based on goals specified by humans [6]. Recent advancements in artificial intelligence (AI) are providing designers with new tools that can be

integrated into the design process [4]. These tools are utilized by designers throughout various stages of the design process, from the early phases to post-design stages. In recent years, advancements in technology and software have accelerated the development of artificial intelligence (AI) and expanded its applications. “Today, AI is integrated into various services and digital platforms, such as intelligent assistants (e.g., Siri, Alexa), predictive text tools (e.g., Grammarly, Gmail), and autonomous vehicles (e.g., Tesla Autopilot)” [7]. With current technologies, generative algorithms are employed to support the design process. Artificial intelligence-supported algorithms are utilized to automate design tasks that previously required extensive manual manipulation [8].

Generative design is an approach that aims to create new design processes by offering alternative manufacturable forms, evolving in parallel with the advancement of computer, software, and manufacturing technologies, where designers interact indirectly with materials and products through a digital system as of the 21st century [9], [10]. From its early years up to recent times, practitioners have utilized methods of shape generation and replicating the generated shapes with variations in position or scale to achieve the generative system [5]. With the advancements in computer technologies, practitioners of generative systems have found the opportunity to conduct their work in digital environments. However, the level of knowledge required for successful programming has limited the widespread adoption of digital generative processes in the design domain. The integration of generative systems into CAD programs and advancements, especially in artificial intelligence technologies, have ensured the increased applicability and widespread adoption of the generative design approach by designers [5]. With the integration of AI-supported generative design algorithms into CAD programs, the utilization of generative systems has been simplified for designers and technical knowledge barriers required to run the algorithm have been removed in certain programs. The increasing feasibility and advantages in optimization have led to a rise in examples of large corporations collaborating on generative design processes. The cabin partition design for the Airbus A320 aircraft, designed in collaboration between Airbus and Autodesk Generative Design, presents crucial data to observe the advantages provided by generative design. The cabin partition, created with generative design support and manufactured with the assistance of a 3D printer, achieved a weight reduction of 30 kg compared to the standard partition, while using 95% less raw material [11]. As a result of this weight reduction, the decreased fuel consumption is predicted to reduce CO2 emissions by up to 166 metric tons per aircraft annually. These data can serve as an example of the time, resource, and cost savings that generative design can offer when integrated into processes.

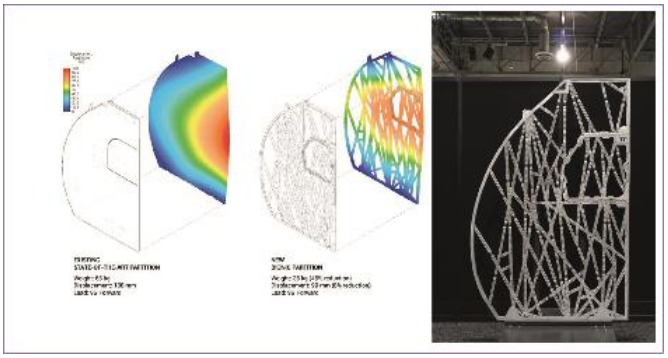

***Figure 1***. *Cabin partition design for Airbus created using Autodesk Generative Design [11]*

Another example is a chair designed for Kartell by Philippe Starck utilizing Autodesk Generative Design [16]. Starck's chair design is described as the first chair produced through collaboration between artificial intelligence and humans [16].

***Figure 2**. Chair designed for Kartell by Philippe Starck utilizing Autodesk Generative Design [16].*

The seat bracket, designed using generative design in collaboration between General Motors and Autodesk, is one of the most prominent examples demonstrating the transformative impact of generative design [17],[18]. The software generated over 150 alternative design options based on parameters [18]. The new product, which is 40% lighter and 20% stronger than the original part, integrates eight different components into a single 3D-printed piece [18].


***Figure 3.** The example of seat bracket designed using Generative Design [18].*

Current examples offer insights into the operational mechanisms of the generative design form-generation algorithm. Generative design creates organic forms based on the principle of minimum resource usage and maximum efficiency, within the parameters defined by the designer or engineer. Figure 4 [17],[18] presents a visualization of the alternatives produced by generative design, demonstrating the diversity of forms generated according to the specified parameters. Detailed information regarding the parameters established by the practitioner will be provided in the methodology section

***Figure 4****. Alternative examples suggested by Autodesk Generative Design based on different manufacturing methods [17],[18].*

Another example is related to the application of generative design in the lamp design shown in Figure5. The paragraph below, directly quoted from the author, clearly articulates the operational principles of the generative design approach.

> The base of the lamp was created using the generative design tool. In this case, five points were assigned in space: one up high to define where the lamp would be hanged from and four point that would connect the lamp to the shield. At each of this point, forces were defined in terms of weight load and moving forces to make sure that the structure would be strong enough to hold the weight of the lamp as well as external forces such as someone hitting the lamp accidentally from the side or below. A few areas were also defined as "obstacles" to make sure that the resulting shape remain within a certain envelop and didn't expand too much. The results of the simulation provided several exciting possibilities for the shape of the lamp [5].

***Figure 5.*** *Example of a lighting fixture designed using generative design [5].*

In the literature of generative design, the concepts of innovative form generation and time efficiency are emphasized. The basis of achieving formal innovation with this approach lies in moving beyond constraints associated with geometric forms and instead, in the ability to generate complex forms resembling natural structures [5]. The ability to create natural and unique forms is achieved through algorithms known as evolutionary algorithms or genetic algorithms. These algorithms mimic processes found in nature, such as evolution, reproduction, and selection, within a digital environment and aim to achieve optimal results for the intended output by exploring probabilities [1],[19]. In other words, genetic algorithms operate similarly to the evolutionary process, shaping optimal results within a search space

defined by functional fitness constraints [19],[20]. Beyond its contribution to formal innovation, generative design also plays a significant role in process automation. The automation of complex and repetitive tasks, which would be challenging or tedious for humans to perform, by computer technologies, is a significant characteristic of generative design [5]. The process of generative design is guided by a designer who has a general idea of how the outcome might appear. The researcher's [5] statement regarding the control of the designer is noteworthy. In the literature, there is a debate about whether the generative design approach has the potential to completely replace designers in the future. In fact, some researchers have made a distinction between machine and human in design processes, referring to designers as "human designers"[21]. Generative design systems and the CAD programs operating these systems in computer environments are not currently capable of making design decisions independently of designer control. They generate alternatives within the constraints established by the designer. Here, it is crucial to elucidate the term "constraints established by the designer." The conceptual design decisions that need to be determined in the early stages of the design process are not included within these constraints. Decisions such as "a furniture design reflecting Scandinavian style" or "a gender-neutral toy design" are not data that can be input into the program where generative design will be implemented under current conditions. With the support of artificial intelligence applications, the conceptual design process can be guided, but generative design algorithms primarily work with quantifiable data such as weight, force, and material properties. The designer primarily establishes quantifiable boundaries. For example, in the generative design process, the boundaries set by the designer may include factors such as the maximum or minimum dimensions the product must reach, the choice of materials to be used, the method of production, the load it needs to carry, and the direction of the load.

One of the prominent concepts associated with productive design is optimization, which can lead to confusion between generative design and topology optimization. Topology optimization can be characterized as a subset of generative design. [22]. According to researchers [22], this is because the primary function of this tool is to optimize a design made by a traditional CAD system through algorithmic processing. Topology optimization relies on the removal and lightening of unnecessary geometries and materials from an object while preserving its performance characteristics. According to researchers, this involves the improvement of a design that has been morphologically established rather than the creation of a design. Generative design, on the other hand, begins by defining the constraints of the object to be designed and based on these constraints, generates hundreds or thousands of design solutions without relying on a preconceived morphological idea. In generative design, there is no obligatory initial form upon which the form will be based. However, depending on the algorithm operating the generating system, working with an initial form may help guide the designer towards the desired optimal outcome.

While designers may need specific knowledge to operate certain programs, they do not necessarily require full expertise in software-related calculations [5]. Some of the programs that fulfill these tasks include Autodesk Generative Design, Grasshopper, and Dynamo. The study will focus on the generative design process using Autodesk Fusion 360 Generative Design. The primary reason for this choice is that the generative system operates with an artificial intelligence-based algorithm, thereby minimizing technical knowledge barriers for the designer.

## 3. GENERATIVE DESIGN IN INDUSTRIAL DESIGN PROCESS

The product development process consists of stages such as planning, concept development, system-level design, detail design, testing and refinement, and production ramp up [1]. In the literature, it is possible to see some examples where the concepts of industrial design, product design, and product development are used interchangeably. Some researchers have raised objections to the interchangeable usage of these concepts [23]. The process of product design can be defined as a collaborative process involving industrial design and engineering design [23],[19]. Engineering design refers to the systematic, mechanical and even mathematical aspects of the design process that can be expressed with quantifiable

values [15]. When a product is evaluated in terms of its inside and outside design, engineering design is associated with the inside design, which encompasses the components that ensure the functionality of the product [23]. Industrial design, on the other hand, can be associated with the outside design, encompassing components such as user interface, ergonomics and aesthetics, which play a role in the product-user interaction [23].

Industrial design is involved in various stages of the product development process, and the stages it participates in vary depending on the type of product [1]. When differentiating between user-centric and technology-driven products, it is observed that the industrial design process in user-centric products is involved in more stages of the product development processes. In technology-driven products, however, industrial design comes into play in the final stages of the product development process. In analyzing product development processes, categories such as engineering design and industrial design are delineated; however, for successful process management, collaboration among industrial designers, engineers, software developers, technicians, and other members of the project team is necessary. As emphasized in the definition of industrial design by the World Design Organization, industrial design is inherently interdisciplinary in nature [24].

The generative design approach enables designers to generate design alternatives based on technical specifications such as load, material requirements, weight, and durability. There are also online generative AI applications that do not rely solely on rational data. These tools can be applied across various aspects of design processes and in different creative field. Generative AI tools such as Midjourney, DALL-E2, and Stable Diffusion have demonstrated impressive capabilities in producing large volumes of realistic and speculative outputs with semantically coherent content features. These tools can be applied across various creative fields, showcasing their ability to generate content that is both meaningful and visually convincing [25]. However, these tools will not be addressed within the scope of this study.

The significance of generative design in design processes is increasing day by day, as it not only demonstrates design alternatives based on rational data but also serves as a decision support mechanism through optimization filters. The integration of generative design into the industrial design process can vary depending on factors such as the software used, the type of product, and many other variables. In this research, the operational mechanism of Autodesk Fusion 360 Generative Design will be examined. Fusion 360 Generative Design operates differently from programs like Grasshopper or Dynamo, bringing the process closer to real generative design [5]. This AI-based program takes predefined rules and objectives from the user and generates a multitude of shape grammars from scratch [26]. Thanks to artificial intelligence, the limitations typically associated with high-level knowledge requirements such as programming and algorithm creation are largely eliminated for designers. Generative design guides the designer to input data. These data consist of elements such as areas to be preserved in the generated alternatives, obstacles to be left blank, surfaces to be fixed, applied loads, production methods, and material selection. After the designer has input the designated data, the computer takes this information and automatically generates multiple designs. The algorithm, operating in a manner similar to natural processes, presents unique form alternatives to the designer. The ability of generative design to rapidly generate unique tens or even hundreds of form alternatives may appear as an advantage for design processes. However, generative design may raise a question. Based on the form-generation methodology of AI-assisted generative design, how can products be classified according to the advantages of generative design in generating alternative forms? The fundamental objective of this study is to formulate a product classification strategy that will provide guidance for research endeavors aimed at addressing these inquiries.

## 4. CLASSIFICATION EXAMPLES IN PRODUCT DESIGN

When developing a strategy for product classification in generative design, a literature review of product and form classification reveals a plethora of diverse classification studies that vary depending on the

research context. Various definitions of products contribute to the diversification of classification studies. For instance, according to Kotler and Armstrong, products are not limited solely to tangible objects [27]. Researchers who include services, people, and organizations in the product definition typically categorize products into two main headings based on their purchase purposes and durability-tangibility [27]. As depicted in Table 1, products are subcategorized based on their users into consumer products and industrial products.

***Table 1***. *Kotler and Armstrong's Product Classification* [27]

| A) Durability and Tangibility | B) User | |
|---|---|---|
| | B.1. Consumer goods | B.2. Industrial goods |
| Non-durable<br>Durable<br>Services | Convenience goods<br>Shopping goods<br>Specialty goods<br>Unsought goods | Material and parts<br>Capital items<br>Supplies and business services |

When considering the association between Kotler and Armstrong's classification study and the proposed classification study for generative design, it is noted that certain categories fall outside the scope. This is because the generative design approach is employed for processes dealing with tangible products. The operational mode of generative design systems is predicated on the generation of alternative solutions grounded in rational data. Therefore, it would be more appropriate to classify products based on morphological characteristics rather than categories such as shopping products or convenience products, given the nature of generative design systems, which rely on generating alternatives based on rational data. Another classification study aims to elucidate the relationship between manufacturing processes and feasible forms by classifying product components based on their geometries and complexities [28]. In this classification model, the forms are categorized as round, bar, section, open-semi-closed, tube, flat, and spherical [28]. While the study provides guidance in terms of formal characteristics, it should be noted that it is based on production technologies of the 2000s. Ashby and Johnson's classification study, on the other hand, is formulated independently of the development of production technologies, usage context, user group, and material properties, focusing instead on the structural form of the product or product component [29],[30]. As depicted in Figure 6, shapes are divided into three primary classes: prism, sheet, and three-dimensional. In this classification, the concepts of flat-dished and solid-hollow emerge as prominent for the proposed classification strategy for generative design. For generative design, which generates alternatives based on morphological structures, these concepts have been deemed significant.

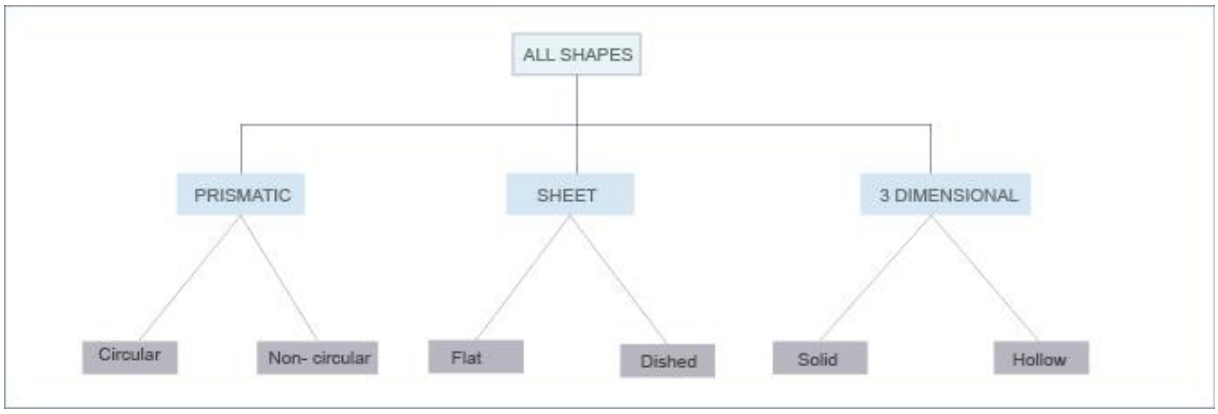


***Figure 6***. *The shape classification [29],[30]*

The classification seen in Figure 6 can guide form-based research independently of conditions such as technology and manufacturing capabilities, solely based on formal characteristics. However, it is not sufficient on its own for creating a classification strategy tailored for generative design.

***Table 2***. *General shape taxonomy* [30].

| Piece | Preferential axis | Transversal section | Thickness | Boundary | Details |
|---|---|---|---|---|---|
| Hollow<br>Solid | Straight<br>Curve | Constant<br>Variable | Simple<br>Complex | Plane<br>Curve<br>Circular | With surface details<br>Without surface details |

The shape classification seen in Table 2 is based on the shapes of single-piece static objects. The classification based on products that do not require external energy to perform their function and are made from a single material is divided into solid and hollow parts [30]. Each class is further subdivided into separate categories based on properties such as axis, transversal-section, thickness, boundary, and surface detail [30]. Agudelo et al. states that if a designer has a product consisting of several parts, the classification can be utilized by dividing the product into its constituent parts, and if the part is analyzed as a whole, it should be considered as a single material.

Classifications created based on formal characteristics, usage, user groups, or sectors alone are not sufficient to develop a product classification strategy for the generative design approach. Because generative design generates alternative forms based on materials, manufacturing methods, and specified optimization filters. Considering the operational mode of the generative system based on these parameters, the concept of structure becomes prominent in the product. In design, structure is a term that delineates the physical constitution of a design objects. In industrial design, structure encompasses a system of assembled components arranged in an orderly manner to support the product, shape its form, and facilitate its functionality [31].

***Table 3.*** *Structure types in industrial product design* [31]

| |
|---|
| Shell structure |
| Solid structure |
| Frame structure<br>a) Hollow section frame<br>b) Solid section frame |
| Membrane structure<br>a) Surface membranes<br>b) Filled membranes<br>c) Inflatable membranes |
| Plate structures<br>a) Flat plate<br>b) Corrugated plate<br>c) Folded plate |
| Space frame structures |
| Suspended tension systems |
| Hybrid structures |

In Table 3, types of structures in product design are depicted. Considering the function and design objectives of products, structure types that are not aligned with the objectives of the generative design approach will not be included in the scope of the research. For instance, there are products or design processes where it is not necessary to produce alternative forms or extract materials to lighten the product. Indeed, for such a product, the involvement of generative design in the industrial design process might not be meaningful. Hence, it is not appropriate to include certain types of structures within the scope of the study. The justifications have been elaborated extensively in the method section.

## 5. THE OPERATIONAL SYSTEM OF AUTODESK FUSION 360 GENERATIVE DESIGN

The first step within the scope of the study involves an examination of the operational mechanism of the generative design system. While various generative systems such as L-systems, shape grammars, genetic algorithms, and cellular automata exist [32],[33],[34], upon analysis, two main categories emerge: subtraction method and addition method [5]. Subtractive method involves the removal of unnecessary parts from the product, without compromising its performance, based on goals such as applied load, durability, maximum weight, among others. Parameters are inputted based on defined objectives, and alternatives are generated to achieve optimal performance. On the other hand, in the additive method, iterative generation of thousands of solution alternatives is pursued within constraints to achieve the intended objectives [5]. As we delve from the encompassing features of generative design into its more specific characteristics, analyzing the operational system of Autodesk Fusion 360 Generative Design within the scope of the study will provide guidance for forming the classification strategy.

Engineers or designers should follow certain fundamental steps to ensure the correct operation of the algorithm when using Fusion 360 Generative Design. As guided by the program interface, the parameters defined according to the objectives must be specified within the software. The following steps are followed in sequence:

1: Preserve Geometry: Users must first select the geometry they deem critical for the part. These bodies are "protected" and remain intact throughout the manufacturing process. This step is indicated as number 1 in the Figure 9. In Fusion 360, the protected geometry is highlighted in green [35].

2: Obstacle Geometry: This refers to areas defined by the designer or engineer where material assignment is not desired. In Fusion 360, obstacle geometry is indicated in red [35]. It is indicated as number 2 in Figure 7.

3: Starting geometry: This can be optionally created. Its purpose is to ensure that alternative forms are generated in close proximity to the defined initial form. In Generative Design, starting geometry is represented in yellow [35]. It is indicated as number 3 in Figure 7.

4: Symmetries: Fusion 360 allows designers to constrain the design to be symmetrical around selected planes [35]. This is indicated as number 4 in Figure 7.

5: Obstacle Offsets: These are used to increase the size of the obstacle geometry bodies without altering the model geometry. This is indicated as number 5 in Figure 7.

After defining the geometries in the program, the following steps are undertaken: applying structural loads, selecting fixed points, and choosing the material and manufacturing method [35].

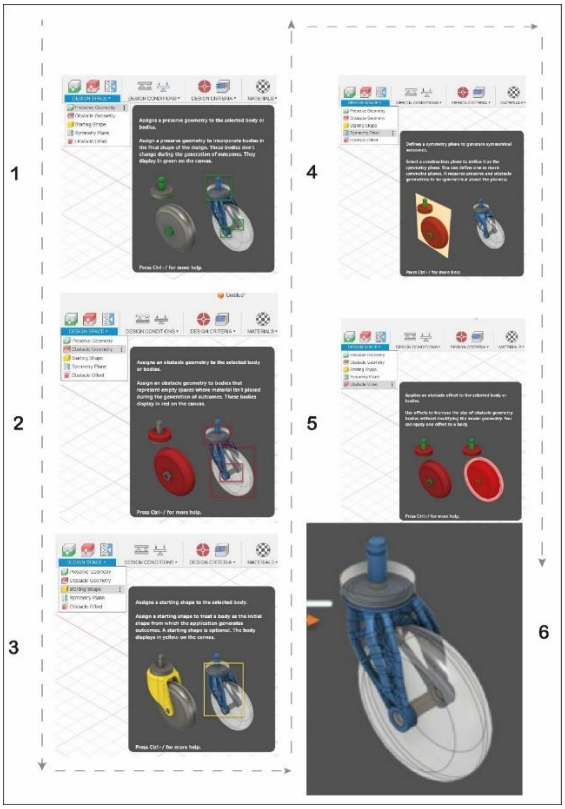


***Figure 7.*** *Autodesk Generative Design Interface and Tool Previews*

As shown in Figure 7, each step of the process is carried out under the control of the designer or engineer. This approach demonstrates that generative artificial intelligence algorithm does not operate independently of designers or engineers.

Generative Design utilizes evolutionary algorithms driven by artificial intelligence to produce alternative form solutions, akin to natural processes, constructing objects as single-piece and solid objects. Understanding its operation of both material addition and subtraction, to achieve optimum performance based on specified parameters, is crucial in comprehending its functionality. The algorithm accumulates materials in certain parts of the object to enhance its resistance against applied loads, while forming hollow structures in other parts. This situation indicates that generative design may not be feasible in the design process of certain products, as there are structures where material subtraction cannot be applied. Additionally, as seen in the product examples shared in Figure 2, Figure 3, Figure 4, and Figure 5,the fact that the generative design algorithm generates alternatives as single-piece and solid is important information for the classification method. This information has guided the classification strategy to categorize products into single-piece and multi-piece forms.

## 6. THE CLASSIFICATION PROPOSAL

After analyzing the operational system of Fusion 360 Generative Design, the generative design process shaped by formal and structural variables has been associated with the prominent concepts of formal and structural classification examples through a concept map. As illustrated in Figure 8, certain categories within product, form and structure classifications have been associated with generative design. This association has been made based on factors such as alignment with the algorithm's operational system, the need for the advantages provided by generative design, and compatibility with the algorithm's form generation strategy.

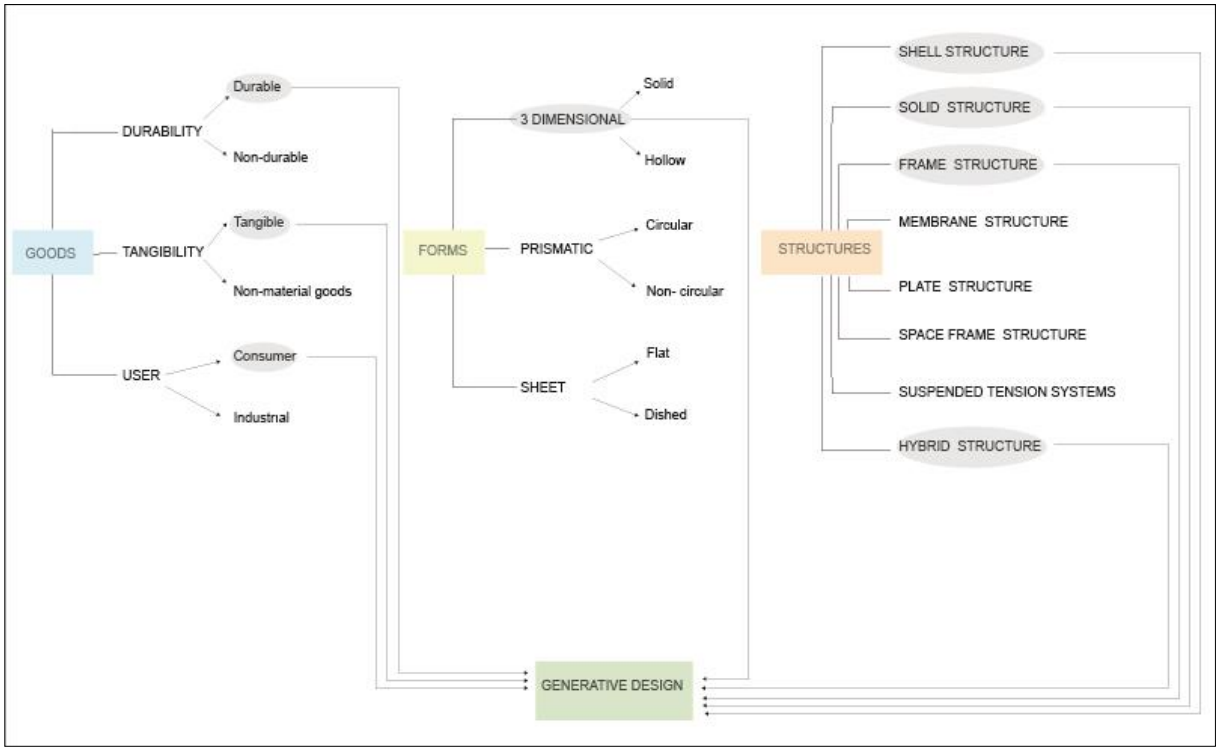


***Figure 8****. Consept map for the recommended strategy* [27],[29],[30],[31].

According to Kotler and Armstrong's classification [27] in marketing literature, non-durable and non-tangible consumer products are not included in the scope of the study. Industrial products, on the other hand, have not been included in the scope of the study as they are associated with materials and parts, capital items, supplies and business services. However, it should be emphasized that consumer products may also encompass items considered industrial products in the industrial design literature. In the classification of form, the approach of generative design, which relies on additive and subtractive methods for optimal performance and aims to create forms resembling those found in nature, is not suitable for prismatic and sheet form. Therefore, three-dimensional forms have been included within the scope of the study, while the prismatic and sheet categories have been excluded. The categorization of three-dimensional forms into solid and hollow shapes refers to shell structure and solid structure. Frame structures with load-bearing properties and allowing for natural forms, as well as hybrid structures consisting of two or more structures, have been included in the scope of the study. When it comes to frame structures, attention should be paid to the distinction between hollow-section and solid-section structures. Generative design is not suitable for hollow frame structures based on profile usage due to its operational algorithm. The operational system is suitable for solid frame structures.

Membrane, plate, space frame systems, and suspended tension systems have been excluded from the scope of the study due to their intended purposes in product design and the operational mode of the algorithm.

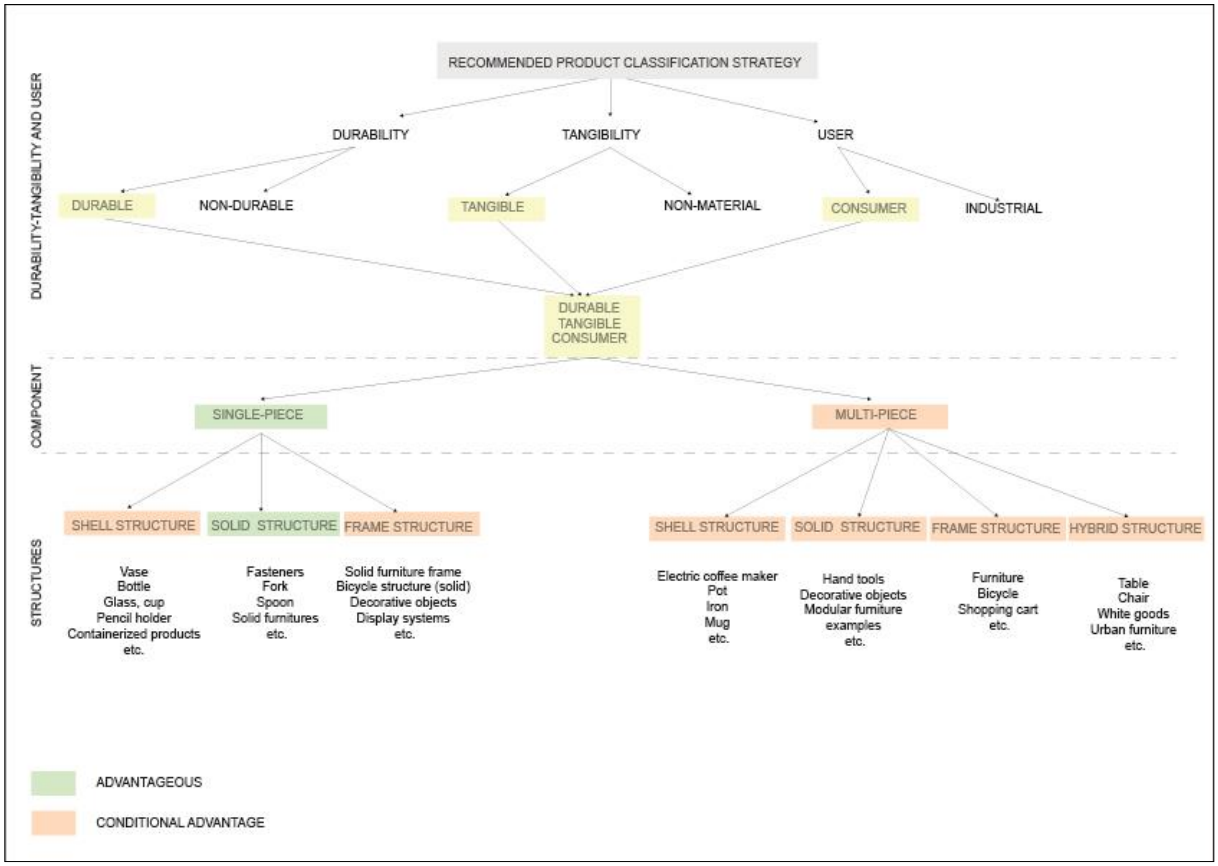


***Figure 9.*** *Decision-tree based classification proposal*

Figure 9 displays the headings included in the product classification strategy for generative design. As seen in Figure 9, after distinguishing between single and multiple-component products in durable and tangible consumer products, product examples related to the types of structures within the scope of the research are provided. This classification proposal allows for a more specific inference about the status of the identified product in the generative design approach, moving from a general category based on the number of components and the type of structure to a more specific deduction.

## 7. PILOT STUDY

### 7.1. Method

The operational method of the generative design algorithm and the classification example developed based on the literature were applied and interviews with two expert designers. The designers conducted form generation trials using generative design for both single-piece and multi-piece products consisting of shell, solid, and frame structures. The participants are designers with a Bachelor's degree in Industrial Design, having completed a four-year program, and at least three years of industry experience. It was ensured that both participants had experience in digital product visualization and held a degree in Industrial Design. Observations were conducted during the implementations, and post-implementation interviews were held with the participants. Prior to the implementation, the researcher provided a one-hour training on the working principles of generative design. A 120-minute implementation was conducted for the product designs determined for each of the three categories. The implementation were conducted on separate computers and workstations under the same conditions in the workspace designated by the researcher. The classification suggestion was not shared with the participants prior to the implementation to avoid the risk of biasing their decisions. The researcher took observational notes throughout the implementation process. After the implementation, individual interviews were conducted with the participants, followed by a group interview. The interview questions were prepared in advance,

and the interviews lasted a total of ninety minutes. The observation and interview notes were analyzed descriptively. Findings related to the classification suggestion were obtained.

### 7.1. Findings

Findings were obtained within the scope of the applied research. For the single-piece and solid structure example, a spoon was selected and applied as a case study. With the algorithm's operational approach suited to single-piece and solid structures, the designers were able to obtain form alternatives close to their desired outcomes and conduct a more controlled design process.

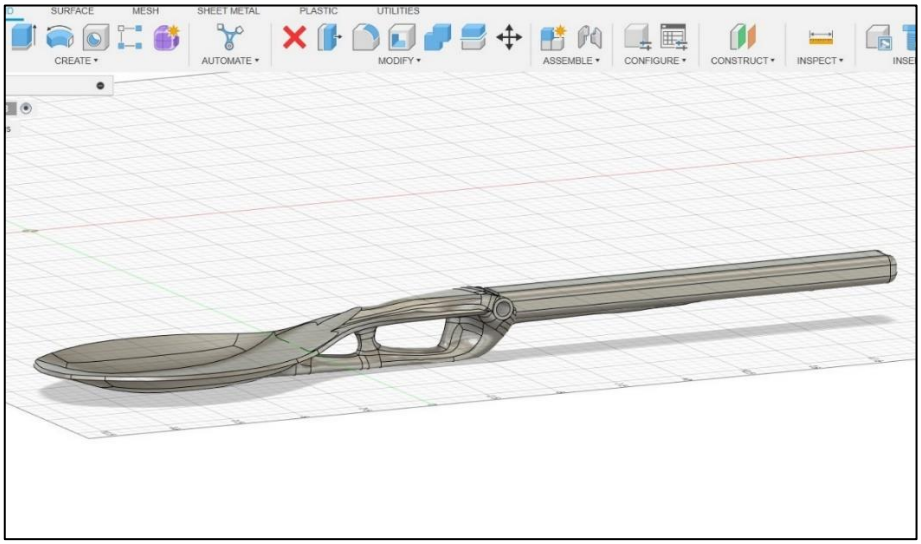


***Figure 10***. *Generative form experimentation related to the spoon*

For the frame structure example, a chair was selected and applied as a case study. For the chair example, the expert designers' feedback indicated that considering the individual components separately in multi-part chairs would lead to more accurate results. Another suggestion presented is to address the carrier structure and the surfaces that interact with the body through two separate generative design applications. A chair that is not made of a single piece can also be categorized under the hybrid structure category, considering the structure of the components carrier structure and body related parts. According to the designers who applied the method, generative design may be more advantageous in terms of time management for a chair made of a single piece. Insights can be drawn regarding products with a single-piece frame structure based on the chair example.

***Figure 11.*** *An example of the form experimentation stages of a chair*

In the coffee pot example, where the shell structure is considered, the designers conducted separate trials for the body and the handle. However, they observed that the algorithm created hollows on the shell surface forming the body, and they stated that the generated forms were not functionally appropriate.

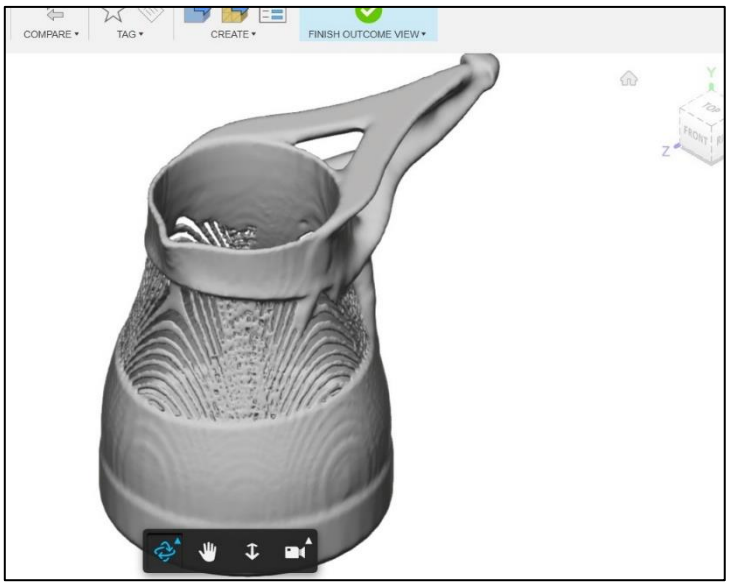


***Figure 12.*** *An example of a coffee pot, illustrating the voids formed within a shell structure*

The designers noted that generative design produced non-functional forms in shell structures serving as the reservoir. However, they stated that generative design could be used for products where voided structures do not negatively impact functionality. In this regard, expert designers have provided the following examples: body-conforming medical products, surfaces that serve as secondary layers in products, or pencil holders made from perforated surfaces.

## 8. DISCUSSION AND CONCLUSION

Drawing upon the applications and perspectives of expert designers, the following inferences have been made. The category highlighted in green indicates the segment in the industrial design process where generative design offers the greatest advantages in terms of performance-based form generation. The categories highlighted in orange indicate segments where the advantage situation may vary depending on the circumstances. For example, the creation of two products with a single-piece shell structure through the generative design approach does not necessarily indicate equal advantages. A pencil case with voids on its surface serves its function, whereas a cup with voids on its surface would become non-functional. The success of industrial product design is not solely determined by producible form alternatives. There are many variables that affect the success of an industrial product. The proposed product classification is created not directly based on the product name, user group, or industry, but rather to shed light on various studies and can be developed depending on variables.

While numerous studies highlight the prominent advantages of generative design, such as generating alternative forms, time saving, efficient resource utilization, and optimization, there is a gap in the literature regarding the variability of these advantages on a product-specific basis. In this study, a classification strategy based on form, product and structure is proposed for the generative design approach, utilizing the operational system of Autodesk Fusion 360 Generative Design.

Fusion 360 Generative Design generates alternative forms resembling natural shapes through a rational, data-driven operating system. Under current conditions, the working algorithm generates solid and single-piece product alternatives. These alternatives are generated based on material and manufacturing method

selection, applied loads, as well as fixed and constrained geometries. While it stands out for generating a greater number of alternatives in a shorter time compared to traditional design processes, not every alternative offered by the program is functionally usable. The most significant reason for this is the program's ability to maintain the rational constraints set by the designer while producing forms that do not compromise on structural performance. The algorithm, which operates through optimization and mimics natural processes, removes unnecessary parts and creates voids while considering the strength conditions. In other respects, for some parts, additions are made to enhance strength in the object. This process may not be feasible for every product.

The study, which examines the applicability of generative design through product structures, demonstrates that generative design is most advantageous in products with single-piece and solid structures. This category may include various products such as forks, spoons, fasteners, machine parts, solid furniture items, decorative products, and more. In shell structures, the feasibility of generative design varies depending on functional conditions. For instance, generative design may offer advantages in the design of products or product components where lightweight is emphasized and the formation of voids on the surface is desired. An example of this would be a hollow surface coating acting as a secondary component on the surface of a product or a pencil holder composed of hollow surfaces. However, in shell designs that do not allow for any hollow structures and serve as containers or protective layers for the function of the product, the use of generative design may not be suitable. In products containing an electronic system or in the shell design of a water heater, the hollow forms created by generative design may not be functionally suitable.

In multi-component products, designers can benefit from generative design when they need to see alternative forms for the overall shape of the product. This scenario can be utilized to explore alternative options for the general silhouette, independent of rational reality. Alternatively, the designer can disassemble multi-component products and initiate distinct generative design processes for each component. This approach may yield more precise results compared to the former. However, the designer must meticulously organize the relationships between the components and pay close attention to time management. The advantages that generative design can provide in frame structures depend on the circumstances. While generative design is suitable for solid-section frames, it may not be suitable to a hollow-section frames, under current conditions.

The aim of this study is to propose a strategy that is more comprehensive and can shed light on new research, rather than specialized product categories based on the working system, formal classification, and types of structures inherent to generative designs. Generative design can be effectively utilized in the earlier stages of the design process with the innovations brought by artificial intelligence tools. With every advancement in generative design systems, the strategy proposed in this study can be further developed.

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# Sequences of Threshold Spaces Formed by the Gecekondu in the City

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**Abstract**

The development of cities is shaped by crises arising from the dynamics that bring them into existence. In order to resolve these crises and to ensure that cities follow healthier development processes, it is necessary to develop unique insights and ways of doing about the formation of cities. With this understanding, this article analyses the gecekondu in terms of its creative formations in the context of urban spatial production, and examines it through the threshold spatial systems it creates in the city. In the first part of the article, which is structured in two main sections, the research on gecekondu is deepened and the necessity of addressing its creative aspects in the context of urban spatial production is explained. With the argument that the creativity of gecekondu can be read in the context of the thresholds it creates in the city, the commonalities between two are identified and a conceptual framework for reading gecekondu through thresholds is developed. In the second section, the thresholds created by gecekondu in the city are examined in physical and socio-cultural contexts, and visual and conceptual mappings are conducted to reveal formation areas, forms of relation, action patterns, and spatial attributes. The mappings, carried out in the context of three sections the thresholds in gecekondu from different perspectives. Finally, the original aspects and the creative formations that gecekondu can inspire within the context of urban spatial production are discussed, and the potential contributions that can inspire urbanization, urban planning, and policy-making processes are evaluated.

## 1. INTRODUCTION

The development of cities is shaped by crises arising from the very dynamics that bring them into existence. Factors such as migration problems, economic imbalances and lack of social integration lead to structural and functional crises in cities. In order to resolve these crises and to ensure that cities follow healthier development processes, it is necessary to develop unique insights and ways of doing about the formation of cities. Seeing urban crises as an opportunity not only to solve current problems but also to create more resilient, inclusive and vibrant urban structures is critical for cities to evolve to meet the needs of the future. With this understanding, this paper identifies a problematic area in the context of urbanization processes where the increasing need for labor in cities as a result of industrialization has accelerated migration from rural areas to cities. In the face of the housing crisis that emerged within these processes, it examines the urban production realized by the gecekondu. The rapid, temporary and low-cost solutions developed by the gecekondu as a spontaneous formation in the face of urban crisis offer a productivity that opens different perspectives in terms of urban planning and architecture. Halil Dincel and Nevnihal Erdoğan emphasize that gecekondu settlements do not only produce negative spaces, but that their potentials should also be utilized. In their study, they stated that these settlements produce flexible and open spaces that are open to changing demographic, economic, social and cultural conditions and can be shaped according to these changes. They also stated that gecekondu settlements offered an alternative solution to the housing problem that the country's housing policy, production, technology and scientific level could not foresee (Dincel and Erdoğan, 1989). Thus, gecekondu settlements are not only a temporary means of shelter, but also a formation that has developed critical interventions in urban crisis management and social adaptation processes. Despite the negativities it brings with it such as lack of

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infrastructure, environmental problems, unhealthy living conditions, and security issues, it constitutes urban spatial production references for existing in and adapting to the city through the unique and creative physical, social and cultural formations it has developed. This article, which explores these references, aims to go beyond simply evaluating gecekondu as marginal and problematic structures, and aims to reveal how these settlements can make creative and harmonious contributions to the urban fabric. However, this is far from being an affirming analysis of the gecekondu. The study, which does not ignore the non-productive and depressing negative aspects of gecekondu, builds a broad and comprehensive perspective by emphasizing the importance of exploring the potential and positive aspects of these areas that can contribute to urban integration and development processes. Thus, it encourages a reassessment of the role of gecekondu settlements in urban transformation and development processes.

Communities migrating to cities to create labour force with industrialisation, faced with the problem of housing, have established temporary, unplanned settlements in many cities around the world. These settlements, which are generally addressed under the title of 'gecekondu' in the international literature, are expressed with different concepts in the local context. It has been observed that unplanned settlements were formed under the names of colonias proletarias in Mexico, barriadas in Peru, favelas in Brazil, villas miseria in Argentina, gourbivilles in Tunisia, sarija in Iraq, bidonville in Morocco, bustee in India and gecekondu in Turkey (Karpat, 2022:36). Gecekondu, which first appeared in Cumhuriyet newspaper in 1947, is derived from the combination of the words 'night' and 'konmak' (Nişanyan, 2020:309). According to the Turkish Language Association, gecekondu means 'a dwelling built in haste without the knowledge and consent of the landowner on land or plots belonging to others or to the public in violation of zoning and building laws; a dwelling house'. It is also metaphorically defined as 'hastily built, makeshift structure' (TDK, 2023).According to the Gecekondu Law No. 775 dated 1966, it is defined as 'unauthorised structures built on land or plots that do not belong to the owner without the consent of the owner, without adhering to the legislation and general provisions regulating zoning and construction works' (Gecekondu Law, 1966). In this direction, it is possible to summarise gecekondu settlements as unplanned and unauthorised, makeshift, in-between and temporary spatial formations created by migration from rural to urban areas, which are built quickly and in a short time by individuals on their own initiative to meet the need for shelter in the city.

Gecekondu is a comprehensive subject that has been analysed in the context of different disciplines and a large literature has been built on it. The formation, development and change of gecekondu, the problems of integration of gecekondu with the city, the effects of urban transformation on gecekondu and the rent problem have been the focal points of research in this field. Especially the recent studies deal with gecekondu settlements as depressed areas that are the target of urban rent and labelled with crime and poverty. However, discussing the gecekondu only as a marginalised, illegal settlement and the anomaly it creates in the city risks overlooking the creative spatial formations it creates. As a product of a collective power that shapes the space with its resistance and struggle to exist in the city, the gecekondu settlement has created a creative spatial production practice that is shaped by complex patterns of co-operation and develops unusual and unique forms of interaction with the physical, social and cultural structures of the city. Although there are similar examples in the world, it is important to evaluate the gecekondu as a local spatial production practice specific to the spatial, temporal, social, cultural, ideological and economic contexts in which it developed, and to reveal its unique aspects that can inspire urbanisation, urban planning and policy-making processes, in order to structure a local and global reference research on the formation of cities.

The existence of the gecekondu in the city has created resistance in line with its struggle for survival and opened thresholds at various levels. The thresholds encountered by different actors and different elements in the city, while functioning as areas of social and economic conflict, have also paved the way for the formation of new ways of communication and interaction between these actors. This process has been effective in shaping the socio-economic fabric of cities by revealing opportunities for restructuring and adaptation within the urban structure. In this sense, the threshold spatial systems formed by the gecekondu in the city have constituted the creative source of its spatial production. In order to reveal the unique aspects of the gecekondu in the context of urban spatial production, researching it in the context of the threshold space formations it creates provides a perspective framework that enables cross-sections at

different scales. However, in order to develop a perspective on gecekondu in the context of the threshold spaces it creates, it is necessary to define gecekondu and threshold spaces and to reveal the relationships between them. With this understanding, this study defines gecekondu and threshold spaces, evaluates them in relation to each other and reveals the qualitative and operational relations between them. In this way, it establishes a concept set for defining the threshold space systems formed by gecekondu settlements. Using this set of concepts, it analyses the gecekondu and examines it in the context of physical and socio-cultural thresholds. In order to analyse the contexts in which the thresholds are formed, the forms of relationships they create, the patterns of action they harbour and the spatial qualities they produce, it forms an overview through three different cross-sections at three different scales: housing spaces, communal spaces and neighbourhoods.

## 2. METHOD

In this study, it is aimed to develop a comprehensive perspective on the threshold space system formed by the concept of gecekondu settlement. Accordingly, in order to define the concepts of gecekondu and threshold space in the first stage and to reveal the relationality between these two phenomena, studies on gecekondu and threshold space in national and international literature were examined in detail. The literature review was conducted through the National Thesis Center, Web of Science, TÜBİTAK ULAKBİM, Gazi University Proquest Public Available Content Database, JSTOR and Elsevier E-Books databases. In the National Thesis Center, 21 theses in the field of Architecture, 23 theses in Urban Regional Planning and 23 theses in Sociology were examined. In Web of Science, gecekondu research is discussed under the titles of “gecekondu, squatter settlements, slum”. These concepts were examined in the fields of Architecture, Urban Studies, Regional Urban Planning, Sociology. In the field of Architecture, 6 articles on gecekondu, 12 articles in Urban Studies, 14 articles in Regional Urban Planning and 4 articles in Sociology were analyzed. 31 articles on squatter settlements were analyzed in Architecture, 72 articles in Urban Studies, 11 articles in Regional Urban Planning and 3 articles in Sociology. 32 articles on slum in Architecture, 66 articles in Urban Studies, 13 articles in Regional Urban Planning and 17 articles in Sociology. Gecekondu research in Elsevier E-Books is examined under the titles of “gecekondu, squatter settlements, slum”. Forty-six articles on gecekondu, 44 articles on squatter settlements and 22 articles on slum were analyzed. The gecekondu research in Tubitak Ulakbim was analyzed under the titles “gecekondu, squatter settlements, slum”. These concepts were analyzed in the fields of architecture, sociology and urban studies. Ten articles on gecekondu were analyzed in architecture, seven articles in sociology and three articles in urban studies. 14 articles on squatter settlements were analyzed in the field of architecture. 7 articles about slum were analyzed in the field of architecture. In Proquest Public Available Content Database, gecekondu research is examined under the titles of “gecekondu, squatter settlements”. 18 articles related to gecekondu were analyzed. Squatter settlements was examined in the field of Architecture and Urban Planning. There are 5 articles on squatter settlements in Architecture and 4 articles in Urban Planning. In JSTOR, gecekondu research is discussed under the titles of “gecekondu, squatter settlements, slum”. These concepts were analyzed in the fields of Architecture and Architecture History, Urban Studies and Sociology. Regarding gecekondu 33 articles in Architecture and Architecture History, 42 articles in Urban Studies and 4 articles in Sociology were analyzed. 25 articles on squatter settlements were analyzed in Architecture and Architecture History, 23 articles in Urban Studies. 13 articles on slum in the field of Architecture and Architecture History, 41 articles in the field of Urban Studies. In the second stage, the studies examined in the literature on the concept of gecekondu were analyzed and evaluated using Vosviewer software, one of the bibliometric analysis methods. The bibliometric analysis method aims to gain an in-depth understanding of the structure, development process and current trends of research areas through the examination of scientific publications and citations. VOSviewer, which is used in this context, enables data analysis with visual mapping method based on the frequency analysis of the concepts mentioned in the keywords and abstracts of the studies in the literature (Dereli, 2024). However, since the number of studies on threshold space in the literature is not sufficient, VOSviewer analysis could not be performed. Therefore, “conceptual content analysis” was used to analyze the threshold concept. In the third stage, content analysis or thematic analysis method was used to evaluate the concept phrases in the conceptual maps created on gecekondu and threshold space by associating them together.

In sample selection, purposive sampling technique and maximum variation sampling method, which is one of the sub-methods of this technique, are used to examine examples of different situations related to the subject. Purposive sampling technique is the process of selecting the units or situations to be examined within the scope of the research, not randomly, but for a specific purpose. In this technique, the researcher selects situations that can answer the research questions and provide information about these questions (Dede, Demir, Aydın, Güngör, Bukova Güzel, Karakırık, 2015:209). In the maximum variation sampling method, it is defined as "revealing the common or divergent aspects and patterns between different situations determined consistently with the purpose of the research and thus describing the problem in a broader framework" (Büyüköztürk, Akgün, Demirel, Karadeniz and Çakmak, 2015:93). In this context, the criteria determined for the selection of gecekondu settlement areas;

-How his relationship with nature
-How it follows a path in its placement on the topography
-According to which parameters the space is created
- What construction methods and what kind of materials are used
-How the infrastructure problem is solved
-How property rights are created
-How space is used at private, public and urban scales
-How it interacts with the rest of the city around the headlines.

By focusing on specific spatial and social characteristics of gecekondu areas, certain differences were taken into account in the selection of the sample in order to examine the concrete equivalents or change processes of the concepts defined in the literature in the field. In this context, factors such as the fact that Istanbul receives migration due to industrialization, Ankara attracts migration due to the gravitational pull of being the capital, and the need for housing in Amasya, where there is no industrialization, leads to the construction of gecekondus were taken into consideration.

The methods followed to obtain spatial data are as follows: First, archival research was conducted and Turkish movies about gecekondu life were analyzed. Secondly, we focused on the gecekondu neighborhoods in the Mamak district of Ankara province on the grounds that 90% of the district's population lived in gecekondus in the 1990s and there were traces of rural life (such as vineyards, gardens and poultry farming). Third, fieldwork was conducted in the central district of Amasya, one of the medium-sized cities, in order to examine gecekondu areas that have not been shaped by the impact of industry.

In this context, it is thought that the method developed in this context will form a basis for evaluating how gecekondus produce space in line with which behaviors and what kind of spaces they produce afterwards. In addition to the gecekondu examples in this article, it is estimated that the use of the similar method in other gecekondu examples will produce different results, reveal different originalities and creative formations, make various contributions to the production of urban space and offer different possibilities. Thus, it is envisaged that each study to be presented with different examples will generate new discussions on what new forms of space production can be.

## 3. GECEKONDU AND THRESHOLD SPACE

When the treatment of gecekondu in the literature is examined[1], it is seen that in national studies; gecekondu formation and transformation, urban transformation and its effects in gecekondu areas, urban integration problems, socio-cultural, spatial, economic and morphological analyses of gecekondu and comparisons with other housing types are made, theoretical discussions are produced in relation to the issues of common space, right to housing, right to the city, resistance, memory and nostalgia, and analyses are created in the context of cinema. In international studies, similar to national studies, urban transformation and its effects are questioned in the context of gecekondu and similar settlements,

[1] These examinations were carried out from National Thesis Centre, Web of Science, TÜBİTAK Ulakbim, Proquest Public Available Content Database of Gazi University, JSTOR and Elsevier E-Books databases.

morphological and socio-cultural analyses are made, gecekondu and other housing types are compared, theoretical discussions related to the right to the city, gecekondu, liminality, immigration, resistance, memory, poverty and nostalgia are developed. In addition, gecekondu and similar settlements are discussed in the context of rural-urban dichotomy, cultural heritage value, housing policies, gecekondu and similar settlements in third world countries are compared, vertical gecekondu, transformation of gecekondu, production of gecekondu space and spatial behaviours are discussed and gecekondu are included in the context of common space discussions.

When we look at the development of the gecekondu house over the years; it is seen that it first emerged in the early 1900s as illegal construction on vacant and uncontrolled lands and that these structures were in the nature of 'shacks' rather than dwellings, as mentioned by Tansı Şenyapılı (Şenyapılı, 2004: 95). The outbreak of World War II between 1940 and 1950 had serious effects on the country's economy. The economic depression caused by the war and the beginning of mechanisation in agriculture with the Marshall Aid changed the balance in rural areas. With the migration to the cities, a housing deficit emerged and the migrants who settled in the city through 'fellow townsman' relations built gecekondu with the materials they found through collective labour. Gecekondu, whose visibility in the city increased day by day, started to be covered in the press. In her Altındağ interviews in Zafer Newspaper published in 1949, Adviye Fenik described the profiles of the people living in gecekondu, their daily lives, their relations with the city, the neighbourhoods they lived in and the spatial characteristics of the houses(Fenik,1949). In the 1950s, the multi-party system was adopted and no action was taken to prevent the increase in squatting in cities. This was because the gecekondu, as it was, both met the cheap labour force of industrialising cities and solved the housing problem in itself.

According to Tekeli, gecekondu both kept the low-wage working class together by cheapening urbanisation and cheapened the production of life and labour by lowering the standard of living. Thus, it became a functional construction for industrial capital (Tekeli, 1996: 17). In the 1960s-1970s, the increase in job opportunities in the cities and the development of industrialisation accelerated migration, increasing the number of gecekondu settlements and leading to the transformation of these settlements into neighbourhoods. According to İbrahim Yasa's research on gecekondu settlements in Ankara during this period, the gecekondu family was located on the threshold between rural and urban identities, maintaining some village characteristics, gradually accepting the urban characteristics it found appropriate, carrying a small sample of its field in the village to its gecekondu settlement but hoping to see itself as a worker in the factory (Yasa, 1970). In the gecekondu settlement research conducted by Charles Hart in Zeytinburnu, Istanbul during this period, it was mentioned that the gecekondu settlement created a permanent formation as a settlement unit specific to Turkey, that it was a necessary act of keeping a dwelling due to the lack of a housing solution for migrants in the city, and that the residents of the gecekondu settlement, who insisted on settlement by resisting government and opposition pressures, had an urban approach in terms of interest, taste and work (Hart, 1969: 100-101). By the 1970s, the gecekondu had become a commodity that was built and sold.

The first generation of gecekondu were replaced by decent, low-density neighbourhoods with infrastructure. With the growth of cities, the remaining gecekondu in the centre were taken over by construction companies and gecekondu owners started to move to the peripheries of the developing city. According to Tahire Erman, gecekondular, who started to be otherised in this way, were classified as 'Peasant Other' in the 1950s and 60s, 'Exploited/Disadvantaged Other' in the 1970s, 'Others' in the 1980s and 90s, and 'Gecekondulu as Subject Against Gecekondulu as Disadvantaged Other' in the late 1990s and 2000s (Erman, 2004). In the post-1980 period, liberal economic policies started to be implemented in the country and legal regulations were made on gecekondu. With these practices, the gecekondu became a market and turned into a commodity used for financial gain, moving away from its identity in the first period. İlhan Tekeli, Yiğit Gülöksüz and Tarık Okyay categorised the interest groups in gecekondu that have become commodities as: those with a single gecekondu, those with multiple gecekondu, gecekondu speculators or intermediaries, gecekondu tenants, shopkeepers and those who carry out their professions in gecekondu neighbourhoods, landowners whose land is taken over by gecekondu dwellers, industrialists who benefit from the labour of gecekondu dwellers, etc. (Tekeli, Gülöksüz and Okyay, 2020: 225-227). In the 1990s, ethnic, sectarian and gender-based divisions in

gecekondu settlements deepened and conflicts started to occur within these settlements themselves (Erman, 2004). By the 2000s, gecekondu had become a 'varoş' and was perceived as a formation that embodies violence, poverty, anarchy and social threat. Another development in this period was urban transformation practices. With this practice, gecekondu started to be destroyed by transforming them into mass housing estates and low-rise gecekondu settlements were replaced by multi-storey mass housing estates.

As research in the literature reveals, gecekondu settlement is an illegal, makeshift, urban spatial formation that varies according to the period, physical, social and cultural context in which it was built, and that is spontaneously formed and marginalised. Gecekondu, which describes a formation that emerges on the peripheries of the city, in intermediate or residual areas, expresses a content that encompasses a wide variety of characterised constructions. In addition to being discussed in the literature as closely related or related to various concepts, it is also discussed and explained in terms of certain actions and qualities. The presentation of the concepts related to the gecekondu with a visual network of relations constitutes a reference in terms of revealing its ties with the threshold space and analysing the threshold space strings it forms in the city. With this understanding, the space-defining concepts related to the gecekondu are shown in the chart below and the concepts that are common with the threshold space are emphasised and expressed(See Figure 1).

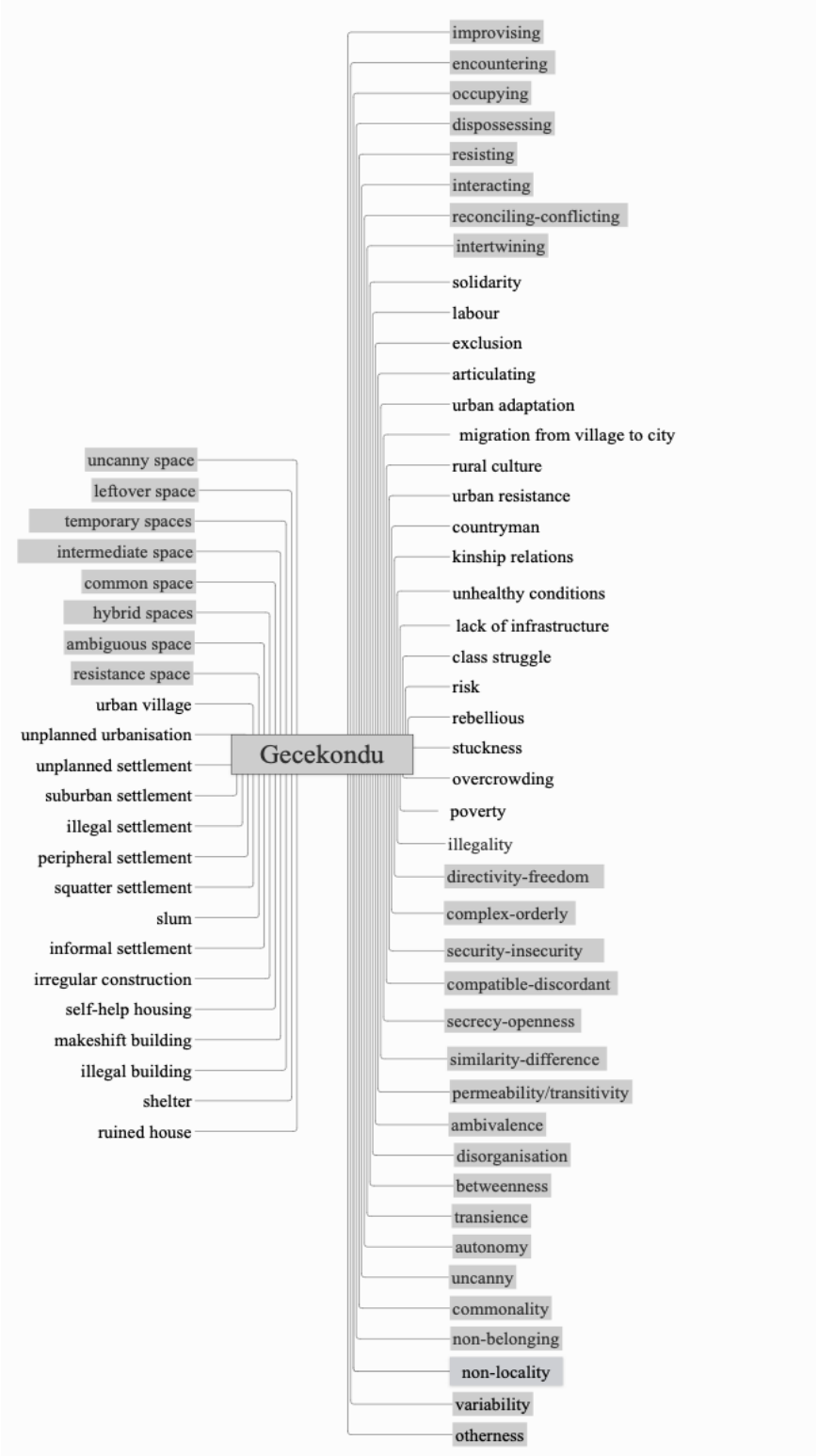



***Figure 1.*** *Gecekondu and Related Concepts*

When the treatment of threshold space in the literature is analysed[2], it is seen that it is investigated both in the context of architecture and the city. Although the researches and discussions on the subject generally focus on the urban context, there has been an increase in the researches in the field of architecture in the 2000s and perspectives have started to diversify. In the national studies in the literature, it is seen that the

[2] These examinations were carried out from National Thesis Centre, Web of Science, TÜBİTAK Ulakbim, Proquest Public Available Content Database of Gazi University, JSTOR and Elsevier E-Books databases.

subject is addressed in the context of historical cities reshaped by urban transformation, coincidental situations in daily life, encounters, instant events, search for alternative spaces and structural elements that define borders such as walls. In international studies, threshold space is analysed in contexts such as building facades, cultural spaces such as museums and exhibition spaces, commercial spaces (such as restaurants and cafes), private buildings (such as residences), public buildings, settlements with traditional architecture, streets, low-income settlements and migrant settlements.

It is possible to categorise the studies on the subject in architectural and urban contexts. The works of Till Boetger have a wide place in the threshold space discussions in the architectural context. Boetger defines the threshold space as a fragile and unstable spatial region and carries out analyses under a number of headings to reveal the design parameters that constitute the threshold space. He identifies these headings as open-closed, delimitation, sequence, geometry, topography, materiality and furnishings, and analyses a wide range of examples from the Acropolis to the Pantheon, from Japanese houses to passages, and from Mies Van Der Rohe and Le Corbusier buildings(Boetger,2014:61-117). Pierre Von Meiss, on the other hand, discusses the threshold space through the roles it plays in spatial production. According to Meiss, the threshold assumes three basic roles: utilitarian, protective and semantic. In these roles, the threshold is both a barrier and a transition point that fulfils the function of separation and connection between two different spaces (Von Meiss, 1990: 149). Alban Janson and Florian Tigges, on the other hand, discuss the threshold space in terms of borders by addressing dichotomies such as inside and outside, public and private. According to them, the threshold is a structure that enables the transition from one space to another by crossing these boundaries. In this context, intermediate spaces that play a role in entrances and exits, intersections of nested spaces, supermarket checkouts, counters in libraries or banks, various control barriers and turnstiles constitute examples of threshold spaces (Janson and Tigges, 2014:331-334).

Looking at the threshold space debates in the urban context, the works of Stavros Stravrides draw attention. Stravrides defines threshold space as ‘the emergence of a potential spatiality of emancipation’ (Stavrides, 2016: 12). He uses spatial freedom to refer to other spatial formations that mobilise action and collective dreams outside of existing spatial orders. While discussing threshold space in the urban context, Stavrides refers to Michael Foucault's work on ‘heterotopia’, Walter Benjamin's ‘flaneur and porosity’, Pierre Bourdieu's ‘Kabyle household’, Arnold Van Gennep's ‘rituals of passage’, Victor Turner's ‘thresholdness’, Marc Augé's ‘no-places’ and George Simmel's ‘bridges and gates’. In addition, Marxist thought and the debates of David Harvey, Michael Hardt and Antonio Negri on the commons in urban space have also been influential in Stavrides' development of his understanding of threshold space. He has made threshold readings in social housing, migrant settlements, occupied city squares and urban encounter spaces. Catherine Dee, on the other hand, considers threshold space as a spatial component that connects different spaces and provides transition. She categorises thresholds in four groups: topographic thresholds, vegetation thresholds, built thresholds and water thresholds. According to Dee; small transitional spaces between larger spaces or paths, spaces in between, spaces on the edge, landscapes connecting one place to another, entrance spaces and passages, end, beginning, resting and waiting places constitute threshold spaces (Dee, 2004:170). Aldo Van Eyck designed more than 700 playgrounds in Amsterdam between 1947-78 and the theoretical readings on these spaces also provide important content about threshold space(Van Eyck,2019:74). Georges Teyssot refers to Eyck's playgrounds as threshold or in-between space in his article.For Eyck, these spaces are based on spatial dialectics; they are spaces that open a space between opposites such as interior and exterior, home and city, here and there, public and private, part and whole, in order to create a place, an event (Teyssot, 2008). Van Eyck's student Hertzberger, on the other hand, defines intermediate/threshold spaces as spaces that provide the key to transition and connection between regions with different characteristics, and as a place in itself, create spatial conditions for meeting and dialogue between areas at different levels (Hertzberger, 1991: 32). Till Boettger defines it as a transitional space in which spatial boundaries are crossed during the act of crossing, which both connects and separates spaces and constitutes a preparatory phase for the space that comes after it (Boettger, 2014:49).

As can be understood from the definitions in the literature, threshold spaces are intermediate spaces that construct encounter and transition in the interaction between the changing characteristics of space and the opposition/reciprocity of experiences. By creating breaks in ordinary spatial orders, it enables the

discovery of new spatial formations. In the literature, threshold space, which is handled as closely related or related to various concepts, is explained through various operational and qualitative contents. In order to conceptualise threshold space and to make the conceptual and spatial dimensions of the subject visible, the concepts related to threshold space in the literature and the architectural and urban formations in which this subject is discussed are examined. Thus, the conceptual contents of the threshold space are shown in the chart and the concepts that are common with the gecekondu are emphasised and expressed. At the same time, the architectural and urban contexts in which the threshold space corresponds have been revealed(See Figure 2,Figure 3).

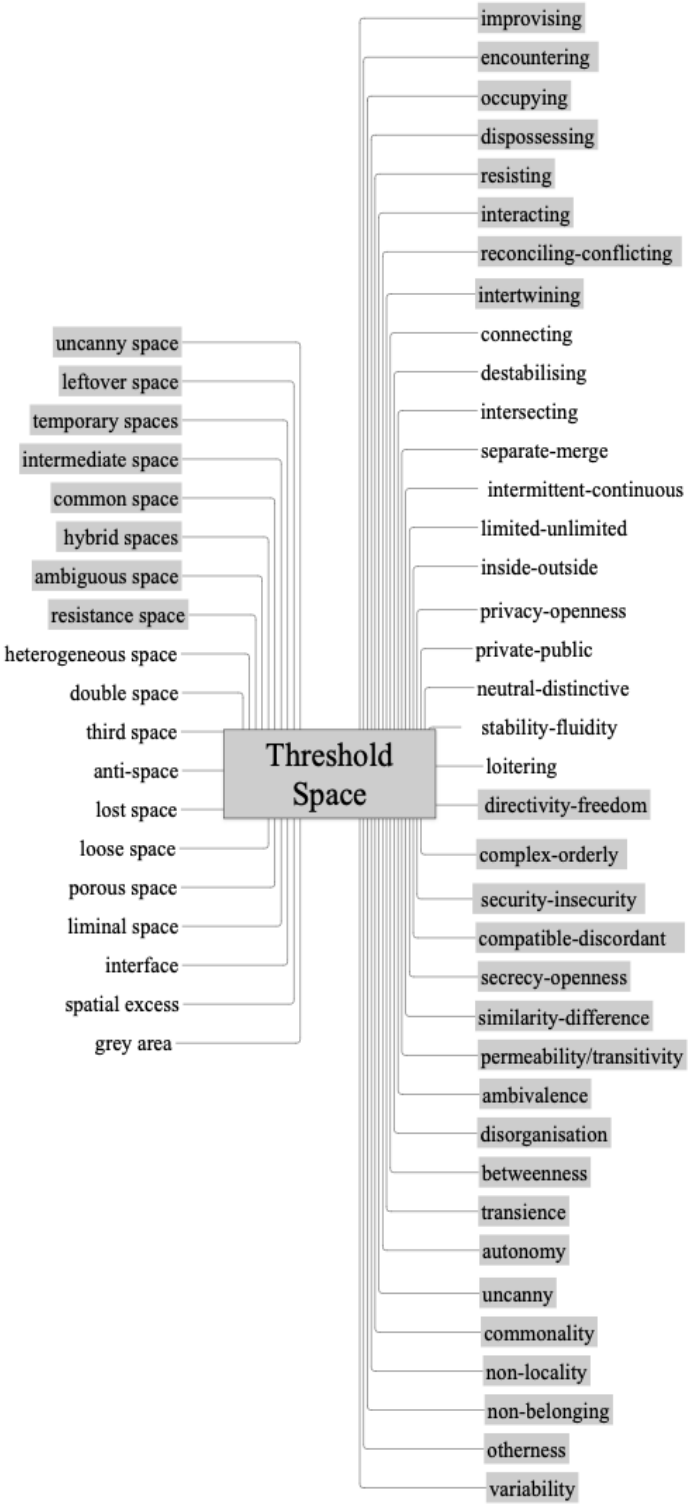



***Figure 2.*** *Threshold Space and Related Concepts*

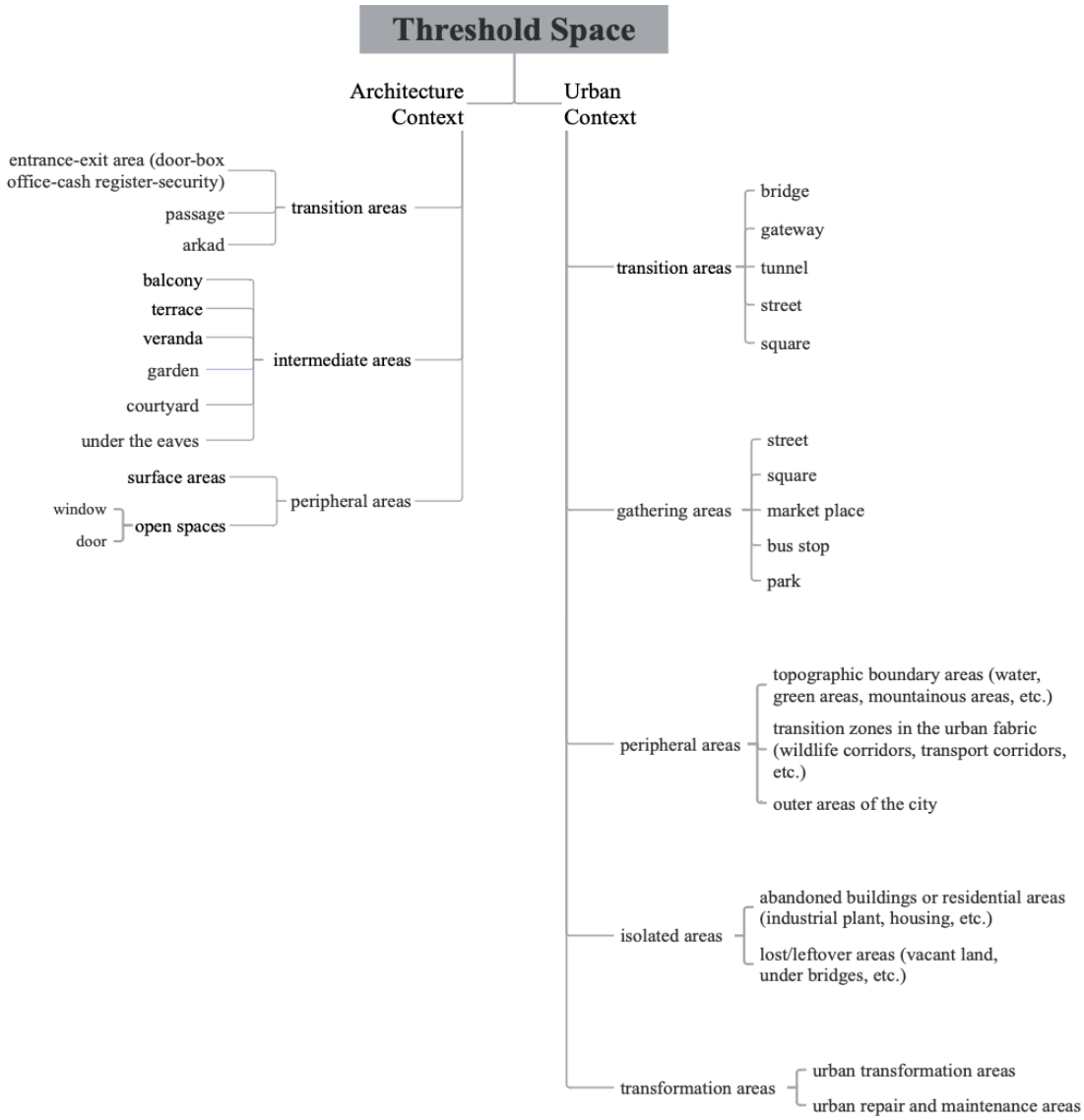



***Figure 3****. Threshold Space and Architectural-Urban Formation Contexts*

When threshold space and gecekondu formations are evaluated in relation to each other, space-defining concepts such as uncanny space, leftover space, temporary space, intermediate space, common space, hybrid space, ambiguous space, resistance space and action-defining concepts such as improvising, encountering, occupying, dispossessing, resisting, interacting, reconciling-conflicting, intertwining. It has been observed that qualifying concepts such as complex-orderly, directivity-freedom, compatible-discordant, security-insecurity, secrecy-openness, similarity-difference, permeability/transitivity, ambivalence, disorganisation, betweenness, transience, autonomy, uncanny, commonality, non-locality, non-belonging, otherness, variability are concepts that emerge in both gecekondu and threshold space studies. These concepts play a key role in discussing the relations between gecekondu and threshold spaces. In addition, it is seen that the gecekondu is a formation that creates a series of threshold spaces in architectural and urban contexts. Gecekondu, which emerges in isolated areas and peripheral areas in the urban context and is included in the urban fabric, creates spatial formations that develop spontaneously improvised, changing, temporary and communal in the architectural context. The gecekondu, which is a place of exclusion from the city and of non-belonging and marginalisation, constitutes an ambiguous structure shaped by processes of reconciliation and conflict over ownership. While its temporariness, uncertainty, potential for rapid reproduction and occupation, and its autonomous stance make it an uncanny formation for the urbanites, gecekondus also feel uncanny in the city by seeing themselves open to intervention and under threat.

The gecekondu settlement, which opens a space of resistance in order to exist with the need for shelter, becomes a place of encounter for both the gecekondu and the urbanite within the duality of rural and urban areas. On the one hand, the gecekondu, which constantly changes and transforms itself, changes the city on the other hand, and emerges as a temporary formation that constitutes a driving, dynamic force in the evolution of the city. In this context, analysing the gecekondu settlement in the context of the threshold space strings it creates in the city provides data to discuss the impact of its spatial production on the city and its power to transform the city. It also enables to reveal the unique spatial productions created by the gecekondu and to trace the transfer of these productions to urban life. With this understanding, this study, which conceptually and visually maps the threshold spatial systems in the gecekondu, analyses the unique urban spatial formations created by the gecekondu in terms of areas of association, forms of association and relationship qualities. Such a research, on the one hand, enables a re-evaluation of the gecekondu by creating different spatial cross-sections of the gecekondu on an expanding trajectory from housing to the city, and on the other hand, it constructs a specialised understanding of threshold space through the local context created by the gecekondu in the context of threshold space debates. This conception creates a view of the formation of contemporary cities in the context of local dynamics and enables a discussion on the use of threshold space as a tool in urban spatial production(Figure 4).

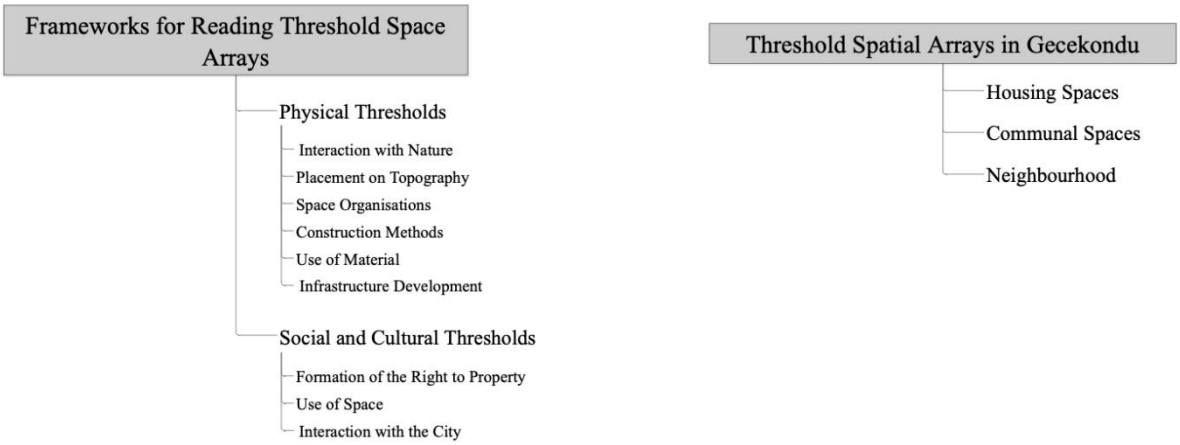



***Figure 4.*** *Threshold Spatial Arrays Formed by the Gecekondu*

## 4. THRESHOLD SPATIAL ARRAYS IN GECEKONDU

The analysis of threshold space formations in the gecekondu has been carried out through literature and archive review, as well as data obtained from field research through observation, interview and photography techniques. The analyses have been made on three different scales, namely housing spaces, communal spaces and neighbourhoods, within the framework of physical thresholds and social and cultural thresholds. The maps, produced in the form of diagrams consisting of visual and conceptual contents, describe the thresholds formed in each section in terms of formation areas, forms of association, action patterns and spatial qualities. Physical thresholds are analysed in terms of interaction with nature, topography, spatial arrangements, construction procedures, material use and infrastructure formation, while social and cultural thresholds are analysed in terms of the formation of property rights, use of space and interaction with the city[3].

[3] Archives, films made on the subject (Sultan, Canım Kardeşim, Gelin, Düğün, Düttürü Dünya, Diyet, Derdim Dünyadan Büyük, Bitmeyen Yol, Gülen Adam, Taşı Toprağı Altın Şehir, Çiçek Abbas, Züğürt Ağa and Veda Busesi), Pinteres, Salt Research, Babak Pourbager photo archive, interviews and plans, observations and photographs obtained during field investigations were used. The field surveys were carried out on the basis of the gecekondu samples of Savadiye Mahallesi, Helvacı Mahallesi, Üçler Mahallesi, Beyazıtpaşa Mahallesi in Amasya; Ekin Mahallesi, Harman Mahallesi, Gülveren Mahallesi, Boğaziçi Mahallesi, Kutludüğün Mahallesi, Fahri Korutürk Mahallesi, Yeni Bayındır Mahallesi, Peyami Safa Mahallesi, Türközü Mahallesi, Üreğil Mahallesi, Başak Mahallesi in Ankara Mamak district. The gecekondu highlighted within the scope of the research have been realised through examples that have not deteriorated within the system and have not lost their characteristics of being a gecekondu.

### 4.1. Physical Thresholds in Gecekondu

*Interaction with Nature*

The interaction of the gecekondu with nature has opened thresholds for mutual development and co-existence and has been shaped by the tendency to repeat rural life practices in the urban context. As a result of the repetition of agricultural and animal production practices such as fruit-vegetable and small cattle breeding and sustainable living practices such as the use of natural materials and rainwater collection in the gecekondu, the development of cyclical processes that include natural production in shelter and common spaces and use nature has been in question. In the neighbourhoods, which are generally formed with low-rise construction on the periphery of the city, a settlement form that incorporates nature into the settlement of the space, interferes little with the surrounding vegetation, and determines the boundaries of the surrounding area with permeable and temporary materials is observed. The construction of gecekondu settlements through occupation and without any planning has led to the emergence of temporary, permeable spatial formations that are dispersed, compromising, containing complex orders in the establishment of gecekondu-nature interaction.

Interaction with nature is observed in intermediate areas, transition areas and peripheral areas in housing spaces, while in communal spaces, in addition to these areas, it is seen that a relationship is established in vague areas and gathering areas. At the neighbourhood scale, transitional areas, peripheral areas and isolated areas are the contexts where interaction with nature is established. While the forms of interaction defined as improvising, interacting, intertwining, reconciling and articulating are seen at all scales, there are also forms of interaction such as encountering and dispossession in communal spaces. In addition to these, occupation emerges as a form of association in the formation of the neighbourhood. In housing spaces and communal spaces, it is seen that there is a relationship with nature during activities such as growing fruits and vegetables and animals, performing daily chores such as hanging laundry, cooking, resting, and playing games. In addition, actions such as collecting rainwater, which arise due to the lack of infrastructure in housing spaces, draw attention in terms of establishing sustainable relations with nature. In addition to special events such as weddings organised in communal spaces, interaction with nature is also established in social events such as meetings and aid distributions. At the neighbourhood scale, actions such as low intervention to nature and the construction of the settlement space intertwined with nature, and the creation of borders with temporary/permeable materials ensure the establishment of strong relationships with nature. In line with the actional patterns developed at different scales, it is possible to say that the qualities of transience, permeability/permeability, directivity-freedom, variability, compatibility can be observed at all scales in the interaction of spaces with nature, while the qualities of limitation in housing spaces, limitation and betweenness in common spaces, and disorganisation, complex-orderly in the neighbourhood emerge(See Table 1).

***Table 1.*** *Interaction with Nature in the Formation of Physical Thresholds in Gecekondu(1-(Kartal,1989); 2- (Kütük, 2022); 3- (Aksoy, 1978); 4- (Ankara Mamak Municipality, 2007); 5-(Pourbager, 2017); 6-(Akad,1973a))*

**Physical Thresholds / Interaction with Nature**

| | Housing Spaces | Communal Spaces | | Neighbourhood |
|---|---|---|---|---|
| | | Small Groups | Large Participation Groups | |
| Spatial Formations |    |    |    |    |
| Formation Areas | intermediate areas<br>transition areas<br>peripheral areas | intermediate areas<br>transition areas<br>peripheral areas<br>vague areas | transition areas<br>gathering areas<br>peripheral areas | transition areas<br>peripheral areas<br>isolated areas |
| Forms of Relation | improvising<br>interacting<br>intertwining<br>reconciling<br>articulating | improvising<br>interacting<br>intertwining<br>reconciling<br>articulating<br>encountering<br>dispossessing | improvising<br>occupying<br>dispossessing<br>intertwining<br>interacting<br>reconciling<br>articulating<br>encountering | improvising<br>interacting<br>intertwining<br>occupying<br>articulating<br>reconciling |
| Action Patterns | •growing fruit and vegetables<br>•raising small cattle and cattle<br>•play the game<br>•rest<br>•to hang laundry<br>•collect rainwater<br>•create firewood | •growing fruit and vegetables<br>•raising small cattle<br>•play the game<br>•rest<br>•to hang laundry<br>•eat food<br>•to receive guests | •organising social events (meetings, distributing aid, etc.)<br>•organising special events (weddings, circumcisions, etc.) | •to interfere less with nature<br>•to intertwine the use of nature and space<br>•demarcation (temporary, with permeable materials) |
| Spatial Attributes | transience<br>permeability/transitivity<br>compatibility<br>directivity-freedom | transience<br>compatibility<br>limitation | transience<br>permeability/transitivity<br>variability<br>betweenness | transience<br>disorganisation<br>directivity-freedom<br>complex-orderly |

*Placement on Topography*

The placement of gecekondu settlements on the topography has created thresholds that allow for positioning and developing forms of intervention depending on the characteristics of the geographical area. For example, in a threshold analysis conducted by the Ankara Metropolitan Municipality of the gecekondu settlements on the Yeni Mamak-Samsun road in Ankara, 26% of the total area was found to be above 30% slope (Ankara Metropolitan Municipality). According to Şenyapılı's research, while gecekondu settlements were initially established on high slopes, later they were also established on flat areas around the zoned neighbourhoods on the main roadside and their street textures were shaped by the orientation of the topography (Şenyapılı, 2004:245-246). According to the information obtained from the interview with Celal Özdemir about Ankara, the foundations of the gecekondu dwellings were dug with the cooperative method, using picks and shovels (Özdemir, 2022). Thus, it can be said that the intervention to the topography was at a minimum level and that the structures were built in harmony with the natural shaping of the topography.

While topographical settlement is observed in intermediate areas and transition areas in housing spaces, it is seen that in communal spaces, in addition to these areas, relationships are established in peripheral areas, gathering areas and vague areas. At the neighbourhood scale, transition areas, peripheral areas, isolated areas and gathering areas are the contexts where topographical settlement is addressed. While

forms of association defined as improvising, occupying and connecting are seen at all scales, forms of association such as dispossession are also in question in communal spaces and neighbourhood formation. In housing spaces, communal spaces and neighbourhood formation, space creation in disadvantaged areas is common. In housing spaces, it is observed that a relationship with topography is established in actions such as settling in accordance with the topography, facing the view, taking advantage of the elevation difference, playing games, and creating specialised spaces. In communal spaces, the slope of the topography is used in actions such as carpet and street washing, creating terraced gardens, organising specialised spaces such as tea gardens and bakeries. This slope also plays a role in the realisation of actions such as waiting and gathering of individuals.On the neighbourhood scale, actions such as settling in accordance with the topography, facing the view, not blocking each other's view, creating specialised areas, taking advantage of the elevation difference, directing the water with small channels according to the slope of the land are observed. In line with the actional patterns developed at different scales, it is possible to say that the qualities of temporariness and variability in the placement of spaces on the topography can be observed at all scales, and that the qualities of intermittence, open-closed, indecision in housing spaces, open-closed in communal spaces, open-closed, complex-orderly in the neighbourhood, directivity-freedom, complex-orderly, intermittence and indecision emerge(See Table 2).

***Table 2**. Placement on Topography in the Formation of Physical Thresholds in Gecekondu(2- (Kütük, 2022);4- (Ankara Mamak Municipality, 2007); 7- (Tibet, 1978); 8-(Erakalın,1965))*

Physical Thresholds / Placement on Topography

| | Housing Spaces | Communal Spaces | | Neighbourhood |
|---|---|---|---|---|
| | | Small Groups | Large Participation Groups | |
| Spatial Formations |  |  |  |  |
| |  |  |  |  |
| |  |  |  |  |
| Formation Areas | intermediate areas<br>transition areas | intermediate areas<br>transition areas | transition areas<br>gathering areas<br>peripheral areas<br>vague areas | transition areas<br>peripheral areas<br>isolated areas<br>gathering areas |
| Forms of Relation | improvising<br>occupying<br>connecting | improvising<br>occupying<br>connecting | improvising<br>occupying<br>dispossessing<br>connecting | improvising<br>occupying<br>dispossessing<br>connecting |
| Action Patterns | •creating space in disadvantaged areas<br>•to settle in accordance with the topography, facing the view<br>•to take advantage of the grade difference<br>•play the game<br>•creating specialised areas (hearth, rest area, etc.) | •creating space in disadvantaged areas<br>•play the game<br>•creating specialised areas (tea garden, bakery, etc.)<br>•to take advantage of the grade difference<br>•create terraced gardens<br>•to utilise my skills (washing carpets, streets, etc.) | •creating space in disadvantaged areas<br>•creating specialised areas (tea garden, bakery, etc.)<br>•waiting<br>•gathering | •creating space in disadvantaged areas<br>•to settle in accordance with the topography, facing the view<br>•not blocking each other's view<br>•creating specialised areas (football pitch, assembly area, etc.)<br>•utilising the difference in elevation<br>•directing the water with small channels according to the slope of the land |
| Spatial Attributes | transience<br>betweenness<br>open-closed<br>ambivalence<br>variability | transience<br>variability<br>open-closed | transience<br>variability<br>complex-orderly | transience<br>variability<br>directivity-freedom<br>complex-orderly<br>betweenness<br>ambivalence |

*Space Organisations*

In order to adapt to the changing needs of the gecekondu dwellers and to be produced rapidly, the spatial arrangements in the gecekondu have formed thresholds where rural spatial practices and urban practices meet.According to Tansı Şenyapılı's analyses, the one-room gecekondu built with adobe in Istanbul and Ankara in the 1950-60 period were planned as an interval, a sofa and a room. On the other hand, the wooden-baghdadi shanties built in Istanbul have a plan scheme of an interval, a sofa and two rooms (Şenyapılı, 2004:190). At the same time, it was stated that the spaces were expanded or the rooms were divided within themselves with the additions made to the rooms depending on the situations such as the improvement of the economic opportunities of the gecekondus, the expansion of the family, the marriage of children and living with the family or the provision of rental income (Şenyapılı, 1986). In the field studies, it is observed that the first gecekondu plans have rural traces in the spatial setup and contain similar spatial constructions in some gecekondu neighbourhoods. In communal spaces, it is seen that the continuity of the interior space continues on the street with the equipment such as armchairs and tables that the users integrate into the street, and thus permeable, transitional, limited and ambiguous spaces are produced. These spatial formations, which are located in the public-private space dichotomy and intertwined with the rest of the street, become a part of daily life on the street. At the same time, it is

possible to say that these areas are used for more than one function, and spatial continuity is ensured through instantaneous or repetitive actions. In events such as street weddings, it can be said that temporary spatial transformations are observed at the threshold and spatial breaks occur.

While spatial arrangements are observed in intermediate areas, transition areas and peripheral areas in housing spaces, it is observed that relationships are established in intermediate areas, transition areas and gathering areas in communal spaces. At the neighbourhood scale, intermediate areas, transition areas, gathering areas, peripheral areas and isolated areas are the contexts established by spatial arrangements. While improvisation is a form of association seen at all scales, there are forms of association defined as reconciling-conflicting , intertwining, destabilising, intersection in housing spaces; encounter, interaction, intertwining, occupation, dispossession, separation-unification in communal spaces; and occupation at the neighbourhood scale. It is observed that spatial arrangements were made during activities such as playing games, resting and doing daily chores in shelter and communal spaces. Actions such as using found and old furniture in sheltering spaces, creating new spaces by adding/subtracting rooms, leaving some spaces such as WC, barn outside the dwelling, using a room for more than one function, transforming some rooms for commercial purposes, not separating the wet volume, solving rainwater with the roof slope, raising cattle and sheep, growing fruits, vegetables and receiving guests draw attention as spatial situations that reveal threshold formations. In communal spaces, gathering, washing clothes, cooking, hanging vegetables and fruits to be dried on the walls, shopping, organising social activities and special events on the streets, creating common use areas, swimming in places such as rivers and stream beds, and washing clothes are actions that are associated with spatial arrangements. When the spatial arrangements made at the neighbourhood scale are examined, spatial arrangements are shaped by actional approaches such as positioning relative to each other, creating space through improvisation, settling in accordance with the topography, facing the view, intertwining nature and space use, determining boundaries, using vague areas. In line with the actional patterns developed at different scales, the qualities of compatible-discordant, similarity-difference, complex-regular, ambivalence, betweenness, variability and transience are observed in housing spaces; directivity-freedom, permeability/permeability, limited-unlimited, transience, variability, privacy-openness, non-locality and private-public qualities are observed in communal spaces. In the neighbourhood, it is possible to say that the qualities of directivity-freedom and complex- orderly emerge(See Table 3).

***Table 3.*** *Spatial Organisations in the Formation of Physical Thresholds in Gecekondu(2- (Kütük, 2022); 9-(Google Earth,2002);10-( Pinterest, 2024);11-(Ökten, 1988), 12- (Akad,1974))*

**Physical Thresholds / Spatial Organisations**

| | Housing Spaces | Communal Spaces | | Neighbourhood |
|---|---|---|---|---|
| | | Small Groups | Large Participation Groups | |
| Spatial Formations |    |    |    |    |
| Formation Areas | intermediate areas<br>transition areas<br>peripheral areas | intermediate areas<br>transition areas<br>gathering areas | intermediate areas<br>transition areas<br>gathering areas | intermediate areas<br>transition areas<br>gathering areas<br>peripheral areas<br>isolated areas |
| Forms of Relation | improvising<br>reconciling-conflicting<br>intertwining<br>destabilising<br>intersecting | improvising<br>encountering<br>interacting<br>occupying<br>intertwining<br>dispossessing<br>separating-uniting | improvising<br>encountering<br>interacting<br>occupying<br>intertwining<br>dispossessing<br>separating-uniting | improvising<br>occupying |
| Action Patterns | •found, using old furniture<br>•creating new spaces (adding/subtracting rooms)<br>•leaving some spaces outside the dwelling (WC, barn, etc.)<br>•using a room for more than one function<br>•to convert some chambers for commercial purposes<br>•not separating the wet volume<br>•resolving rainwater with roof slope<br>•raising small cattle and cattle<br>•growing fruit, vegetables<br>•play the game<br>•rest<br>•doing daily chores (preparing food, washing dishes, etc.)<br>•receiving guests | •play the game<br>•rest<br>•doing daily chores (chopping fruit, vegetables, etc.)<br>•gathering<br>•laundry<br>•cooking<br>•dry fruit, vegetables<br>•creating specialised areas (by adding seats, tables, etc.)<br>•shopping<br>•to chat on your feet | •organising social events (meetings, distributing aid, etc.)<br>•organising special events (weddings, circumcision weddings, etc.)<br>•creating common areas (fountain, common wc etc.)<br>•gathering<br>•play the game<br>•to chat on your feet<br>•using river and stream beds (swimming, washing clothes, etc.) | •being positioned in relation to each other (according to relations of kinship and fellow countrymen)<br>•creating space by improvisation (parcelisation, street etc.)<br>•to settle in accordance with the topography, facing the view<br>•to intertwine the use of nature and space<br>•demarcation (temporary, with permeable materials)<br>•vague areas to use (car park, garden, etc.) |
| Spatial Attributes | compatible-discordant<br>similarity-difference<br>complex-orderly<br>ambivalence<br>betweenness<br>transience<br>variability | directivity-freedom<br>permeability/transitivity<br>limited-unlimited<br>transience<br>variability<br>private-public<br>privacy-openness<br>non-locality | permeability/transitivity<br>limited-unlimited<br>transience<br>variability<br>disorganisation<br>non-locality<br>complex-orderly<br>neutral-distinctive<br>private-public<br>intermittent-continuous | complex-orderly<br>directivity-freedom |

*Construction Methods*

The way the gecekondu relates to construction methods is shaped in the context of thresholds formed by the use of different construction methods together for reasons such as functionality and economy, rather than adopting a single construction method. Şenyapılı, in his research on gecekondu, mentions the construction methods such as adobe, timber, masonry, stone, Tekin Kurucu in Istanbul and İbrahim Öğretmen in Ankara (Şenyapılı, 2004:190).In the field study, it was observed that timber, adobe, masonry and reinforced concrete systems were used. In some of the examined examples, mudbrick-masonry, masonry-concrete, masonry-concrete-steel systems, as well as in makeshift shanties, it has been determined that different methods that cannot be classified are used together and the structural

relationship between these uses exhibits an eclectic approach. In the shanties where rural traces are observed, it was determined that traditional traces were observed and the ceilings of some gecekondu examples were made with the traditional wooden ceiling method. It was also observed that structural elements such as doors and windows were added with temporary solutions in these gecekondu.

While construction methods are observed in intermediate areas, transition areas and peripheral areas in housing spaces, it is seen that in communal spaces, in addition to these areas, relationships are established in gathering areas. At the neighbourhood scale, intermediate areas, transition areas, peripheral areas and gathering areas are the contexts established through construction procedures. While improvising, destabilising, connecting and separating-uniting forms of association are seen at all scales, there are also forms of association such as intersecting and intertwining in housing spaces and neighbourhoods. In housing spaces, it is possible to construct spaces through collective labour, to use different construction methods together, and to create eclectic spaces. In communal spaces, on the other hand, creating specialised areas, joining historical buildings, creating procedures for the unusual use of existing materials, creating common areas, joining to the existing structure, and temporarily transforming the space are realised through the construction procedures used. In the neighbourhood, on the other hand, constructing a space through collective labour, using different construction procedures together, and creating common spaces include observations that can be considered in the context of the threshold. In line with the actional patterns that develop at different scales, it is possible to say that complex-orderly, compatible-discordant, neutral-distinctive, similarity-difference, transience, variability, instability and betweenness qualities emerge at all scales in the relationship of spaces with construction procedures(See Table 4).

***Table 4.*** *Construction Methods in the Formation of Physical Thresholds in Gecekondu (2- (Kütük, 2022); 4- (Ankara Mamak Municipality, 2007); 13-(Samsun Canik Municipality, 2017))*

**Physical Thresholds / Construction Methods**

| | Housing Spaces | Communal Spaces | | Neighbourhood |
|---|---|---|---|---|
| | | Small Groups | Large Participation Groups | |
| Spatial Formations |  | | | |
| Formation Areas | peripheral areas<br>intermediate areas<br>transition areas | intermediate areas<br>transition areas | intermediate areas<br>transition areas<br>gathering areas<br>peripheral areas | intermediate areas<br>transition areas<br>gathering areas<br>peripheral areas |
| Forms of Relation | destabilising<br>improvising<br>connecting<br>separating-uniting<br>intersecting<br>intertwining | destabilising<br>improvising<br>connecting<br>separating-uniting | destabilising<br>improvising<br>connecting<br>separating-uniting | destabilising<br>improvising<br>connecting<br>separating-uniting<br>intersecting<br>intertwining |
| Action Patterns | •constructing a space by improvisation<br>•using different building methods together (rural-urban, masonry-concrete construction, etc.)<br>•creating eclectic spaces | •creating specialised areas (entrance, veranda, etc.)<br>•articulation with historical buildings<br>•to create a procedure for the unusual use of existing material | •creating specialised spaces (sitting, chatting, etc.)<br>•creating common spaces (market, gathering, etc.)<br>•to articulate with the existing structure<br>•temporarily transforming the space (with light, portable materials) | •constructing a space by improvisation<br>•using different building methods together (rural-urban, masonry-concrete construction, etc.)<br>•creating common spaces (market, gathering, etc.) |
| Spatial Attributes | complex-orderly<br>compatible-discordant<br>neutral-distinctive<br>similarity-difference<br>transience<br>variability<br>ambivalence<br>betweenness | complex-orderly<br>compatible-discordant<br>neutral-distinctive<br>similarity-difference<br>transience<br>variability<br>ambivalence<br>betweenness | complex-orderly<br>compatible-discordant<br>neutral-distinctive<br>similarity-difference<br>transience<br>variability<br>ambivalence<br>betweenness | complex-orderly<br>compatible-discordant<br>neutral-distinctive<br>similarity-difference<br>transience<br>variability<br>ambivalence<br>betweenness |

*Use of Material*

The gecekondu's relationship with the use of materials is shaped in the context of thresholds formed by the combination of materials used in rural and urban areas and different materials suitable for reuse, with an approach similar to construction methods. Şenyapılı states that the first shanties were mostly built using adobe and wood, the roof was covered with mud or tin, there was no flooring, and the doors and windows were collected from demolished constructions (Şenyapılı, 2004:184). İbrahim Öğretmen, on the other hand, states in his research that stone, brick, adobe, tile and tin are used in gecekondu (Öğretmen, 1957:26). During the field survey, it was determined that: brick, mortar brick, stone, chipboard, briquette, adobe on the wall; wood, wallpaper, concrete, nylon, chipboard, plywood, plasterboard on the ceiling; concrete, ceramic coating, laminate parquet, wood on the floor; interlocking cobblestone, soil, paledyen (broken marble) on the garden floor; corrugated sheet, onduline, alaturka and Marseille type tiles on the roof. The diversity in the use of materials in the gecekondu can be summarised as a result of factors such as repeating rural construction practices in the urban context, material selection based on economic and functional factors, and material additions to the gecekondu at different times.

While the use of materials is observed in intermediate areas, transition areas and peripheral areas in housing spaces, in communal spaces and neighbourhood scale, in addition to these areas, relationships are also established in gathering areas. While improvisation, intertwining and separation-uniting are observed at all scales, destabilisation and intersection are also observed in housing spaces and neighbourhoods. In housing spaces, patterns of action such as using different materials together and reusing old materials are observed. It is observed that the materials used in communal spaces, areas where actions such as sitting, resting and gathering take place are portable and lightweight, while the materials used in rural usage practices are also used in the first gecekondu settlements. In the neighbourhood, using different materials together, creating common areas and organising social and private activities with lightweight, portable materials constitute remarkable observations in the context of the threshold. In line with the developing actional patterns, it is possible to say that complex-orderly, compatible-discordant, neutral-distinctive, similarity-difference, transience, variability, instability qualities can be observed at all scales in the relationship of spaces with the use of materials, and that intermittent-continuous qualities emerge in housing spaces and in the neighbourhood(See Table 5).

***Table 5.*** *Use of Material in the Formation of Physical Thresholds in Gecekondu(2- (Kütük, 2022); 4- (Ankara Mamak Municipality, 2007); 6- (Akad,1973a); 12- (Akad,1974))*

Physical Thresholds / Use of Material

| | Housing Spaces | Communal Spaces | | Neighbourhood |
|---|---|---|---|---|
| | | Small Groups | Large Participation Groups | |
| Spatial Formations |    |    |    |    |
| Formation Areas | peripheral areas<br>intermediate areas<br>transition areas | peripheral areas<br>intermediate areas<br>transition areas | intermediate areas<br>transition areas<br>gathering areas<br>peripheral areas | intermediate areas<br>transition areas<br>gathering areas<br>peripheral areas |
| Forms of Relation | destabilising<br>improvising<br>separating-uniting<br>intersecting<br>intertwining | improvising<br>separating-uniting<br>intertwining | improvising<br>separating-uniting<br>intertwining | destabilising<br>improvising<br>separating-uniting<br>intersecting<br>intertwining |
| Action Patterns | •using different materials together (country-urban, brick-biriket etc.)<br>•reuse old materials | •using different materials together (country-urban, plastic-wood etc.)<br>•creating specialised areas (with temporary, portable materials) | •using different materials together (rural-urban, plastic-wood etc.)<br>•creating common areas (temporary, with portable materials)<br>•organise social events (with light, portable materials)<br>•organise special events (with light, portable materials) | •using different materials together (rural-urban, plastic-wood etc.)<br>•creating common areas (temporary, with portable materials)<br>•organise social events (with light, portable materials)<br>•organise special events (with light, portable materials) |
| Spatial Attributes | complex-orderly<br>compatible-discordant<br>neutral-distinctive<br>similarity-difference<br>transience<br>variability<br>ambivalence<br>intermittent-continuous | complex-orderly<br>compatible-discordant<br>neutral-distinctive<br>similarity-difference<br>transience<br>variability<br>ambivalence | complex-orderly<br>compatible-discordant<br>neutral-distinctive<br>similarity-difference<br>transience<br>variability<br>ambivalence | complex-orderly<br>compatible-discordant<br>neutral-distinctive<br>similarity-difference<br>transience<br>variability<br>ambivalence<br>intermittent-continuous |

*Infrastructure Development*

Infrastructure formation in gecekondu presents a content that gradually systematises over time and enables the formation of common space practices in gecekondu life. It is seen that these services, which include electricity, water supply, sewerage and communication, produce various thresholds in gecekondu life. The lack of infrastructure in the first gecekondu settlements and the fact that these services were left to the gecekondus' own efforts for a while paved the way for each gecekondu to access the same service at different times. In a 2013 study conducted in Altındağ district, it was observed that the infrastructure rate in gecekondu neighbourhoods was 16%, while it was 70% in other neighbourhoods of the same district (Bektaş and Yücel, 2013). Kemal Karpat's study on gecekondu settlements in Baltalimanı found that before 1974, 2% of the houses had running water and 11% had electricity (Karpat, 2022:116). The lack of mains water service paved the way for the use of common fountains to solve the water problem in the neighbourhood. A similar situation was experienced in the sewerage system, and the insufficiency of this system led to the establishment of common toilets, as mentioned by Fenik in his Altındağ interviews (Fenik, 1949). Communication services constitute another service heading in gecekondu life that was later made accessible to everyone. Yasa stated that three of the five telephones in the neighbourhood were located in the houses, one in the neighbourhood grocery store and one in the yoghurt factory. He mentioned that the grocery store and yoghurt factory were preferred for telephone calls (Öğretmen, 1957:28). Thus, the lack of infrastructure has led to the emergence of social and spatial formations that provide interaction between people living in gecekondu settlements, develop an organisational structure and struggle or resist against the infrastructure needs demanded, and produce solutions with their own means in the process until the infrastructure deficiency is eliminated.

While the formation of infrastructure is commonly observed in intermediate areas, transition areas and peripheral areas in housing spaces and communal spaces, in communal spaces and neighbourhood scale, it is seen that relationships are established in gathering areas in addition to these areas. While improvising, interacting, encountering, separating-uniting are observed at all scales, there are also forms of relating such as occupying and dispossessing in communal spaces, and connecting and resisting in housing spaces and neighbourhood. The binding feature of the lack of infrastructure is effective in the realisation of actions such as storing, gathering, communicating and organising at all scales. In housing spaces, actions such as creating infrastructure through collective labour, producing alternative solutions, leaving some spaces outside the dwelling, not separating the wet area, solving rainwater with the slope of the roof, leaving the installation elements outside are also associated with the formation of infrastructure. In communal spaces, in addition to these, actions such as creating a common space and directing the water with small channels according to the slope of the land are encountered. In line with the actional patterns developed at all scales, it is possible to say that transience, variability, complex-orderly can be observed in the infrastructure formation of the spaces, neutral-distinctive, compatible-discordant, intermittent-continuous in the housing spaces; while in the common spaces and neighbourhood scale, qualities such as disorganisation, directivity-freedom also emerge(See Table 6).

***Table 6.*** *Infrastructure Development in the Formation of Physical Thresholds in Gecekondu(2- (Kütük, 2022); 5-(Pourbager, 2017; 10-( Pinterest, 2024); 11-(Ökten, 1988); 12- (Akad,1974); 13-(Saltresearch,2024); 14- (Fenik,1949); 15- (Eğilmez, 1973); 16-(Akad,1973b))*

**Physical Thresholds / Infrastructure Development**

| | Housing Spaces | Communal Spaces | | Neighbourhood |
|---|---|---|---|---|
| | | Small Groups | Large Participation Groups | |
| Spatial Formations |  15 |  12 |  16 |  13 |
| |  11 |  |  14 |  13 |
| |  2 |  5 |  0 |  13 |
| |  5 |  2 |  5 |  13 |
| Formation Areas | intermediate areas<br>transition areas<br>peripheral areas | intermediate areas<br>transition areas<br>peripheral areas | transition areas<br>gathering areas | transition areas<br>gathering areas<br>peripheral areas |
| Forms of Relation | interacting<br>improvising<br>encountering<br>separating-uniting<br>connecting<br>resisting | interacting<br>improvising<br>occupying<br>dispossessing<br>encountering<br>separating-uniting | interacting<br>improvising<br>occupying<br>dispossessing<br>encountering<br>separating-uniting | interacting<br>improvising<br>encountering<br>separating-uniting<br>connecting<br>resisting<br>dispossessing<br>occupying |
| Action Patterns | •to create infrastructure through collective labour<br>•to produce alternative solutions (line, well, etc.)<br>•leaving some spaces outside the dwelling (WC etc.)<br>•not separating the wet volume<br>•solving rainwater with roof slope<br>•leaving the installation elements outside<br>•store<br>•gather<br>•communicate<br>•organise | •creating a common space (fountain, WC, etc.)<br>•directing the water with small channels according to the slope of the land<br>•using the installation elements for different functions (hanging laundry, etc.)<br>•to produce alternative solutions (drawing lines, making wells, etc.)<br>•leaving some spaces outside the dwelling (WC etc.)<br>•storage<br>•gather<br>•communicate<br>•organise<br>•wait | •to create infrastructure through collective labour<br>•creating a common space (fountain, WC, etc.)<br>•directing water through small channels according to the slope of the land<br>•gather<br>•wait<br>•communicate<br>•store<br>•organise | •to create infrastructure through collective labour<br>•creating a common space (fountain, WC, etc.)<br>•to produce alternative solutions<br>•organise |
| Spatial Attributes | neutral-distinctive<br>compatible-discordant<br>transience<br>variability<br>complex-orderly<br>intermittent-continuous | neutral-distinctive<br>compatible-discordant<br>disorganisation<br>transience<br>variability | transience<br>variability<br>complex-orderly<br>disorganisation<br>directivity-freedom | transience<br>variability<br>complex-orderly<br>disorganisation<br>directivity-freedom |

### 4.2. Social and Cultural Thresholds in Gecekondu

*Formation of the Right to Property*

The relationship between the gecekondu and the formation of property rights is shaped in line with the situations that create property uncertainty and the thresholds opened by situations that cause property conflicts. According to the information obtained from the interview with Celal Özdemir, the location of the dwelling to be established in the city by the migrant coming from the countryside is determined by the relations of kinship and fellow countrymen. Other gecekondus are positioned according to the spatial orientation of the squat built before them. Thus, spontaneous parcelisation and street texture are formed (Özdemir, 2022). In later times, according to Article 28 of the Law No. 6188 published in the Official Gazette in 1953, it was decided to demolish the shanties and it was decided that the shanties under construction would be demolished immediately and the shanties that had become housing would be demolished within 15 days (Law on Encouraging Building Construction and Unauthorised Buildings, 1953). This practice, which was continued with many subsequent decisions, paved the way for the demolition and reconstruction of gecekondu. Thus, the ownership status of the gecekondu house, which was under the threat of demolition at any time, became uncertain and was positioned on the threshold between residentialisation and dispossession. With the amnesties and rights granted in the following years, the ownership status of gecekondu changed. According to Alpar and Yener's research, gecekondu are now divided into tenants and homeowners, while gecekondu belonging to homeowners are grouped as detached with title deed, with share deed, without title deed and with allocation certificate. While this ownership status in gecekondu changed depending on variables such as length of stay in the city, income status, occupation, it affected the number of storeys and thus the structural status of the gecekondu (Alpar and Yener, 1991:108-110). The right to property is an issue to be addressed not only in housing spaces but also in communal spaces. The use of vague areas, the use of the facades of houses to write graffiti, electrical panel surfaces, billboards, security shutters of shops and roofs shows that the understanding of property has spread to common spaces (Doyduk, 2019).

While the formation of property rights is observed in intermediate areas, transition areas and peripheral areas in housing spaces, it is seen that in communal spaces, in addition to these areas, a relationship is established in vague areas. At the neighbourhood scale, transitional areas, gathering areas, peripheral areas and isolated areas are the contexts associated with the formation of property rights. While improvisation and occupation are seen at all scales, interwining and dispossession in housing and communal spaces; at the scale of housing and neighbourhood, there are also forms of association such as resistance, reconciling-conflicting, connection and interaction. In housing spaces, actions such as determining ownership according to temporary social relations, setting boundaries, building a new one in place of the demolished squat, and using common areas are seen in the formation of ownership. In communal spaces, actions such as using common areas, writing graffiti, using vague areas, creating privatised areas, and using public property are encountered. At the neighbourhood scale, property is formed through actions such as determining ownership according to temporary social relations and setting boundaries. In the formation of the right of ownership of spaces in line with the actional patterns developed at different scales, the qualities of limited-unlimited, permeability/transitivity, complex-orderly, transience, non-belonging, and variability are observed in housing and communal spaces. It is possible to say that complex-regular and autonomy qualities emerge in the neighbourhood(See Table 7).

***Table 7.*** *Formation of the Right to Property in the Formation of Social and Cultural Thresholds in Gecekondu(1-(Kartal,1989); 2- (Kütük, 2022); 9-(Google Earth,2002); 13-(Samsun Canik Municipality, 2017))*

Social and Cultural Thresholds/Formation of the Right to Property

| | Housing Spaces | Communal Spaces | | Neighbourhood |
|---|---|---|---|---|
| | | Small Groups | Large Participation Groups | |
| Spatial Formations |  | | | |
| Formation Areas | intermediate areas<br>transition areas<br>peripheral areas | intermediate areas<br>transition areas<br>peripheral areas | transition areas<br>peripheral areas<br>vague areas | transition areas<br>peripheral areas<br>isolated areas<br>gathering areas |
| Forms of Relation | improvising<br>occupying<br>dispossessing<br>resisting<br>reconciling-conflicting<br>intertwining<br>connecting<br>interacting | improvising<br>occupying<br>dispossessing<br>intersecting<br>intertwining | improvising<br>occupying<br>dispossessing<br>intertwining<br>connecting | improvising<br>occupying<br>resisting<br>reconciling-conflicting<br>interacting<br>connecting |
| Action Patterns | •determining ownership according to temporary social relations (relatives, fellow countrymen, slumlord, etc.)<br>•to determine the boundary (with temporary, permeable materials)<br>•building a new one instead of the demolished slum<br>•using shared spaces (stacking materials, adding space, etc.) | •using common areas (stacking materials, adding space, etc.)<br>•writing graffiti<br>•use vague areas (parking, creating a garden, etc.)<br>•creating specialised areas (airing wool, washing carpets, etc.) | •using communal areas (stacking materials, creating a market area, weddings, etc.)<br>•writing graffiti<br>•using vague areas (parking, creating a garden, etc.)<br>•creating an area of resistance (action, protest, etc.)<br>•using public property (hanging objects on electricity poles, etc.) | •determining ownership according to temporary social relations (relatives, fellow countrymen, slumlord, etc.)<br>•demarcation of boundaries (with temporary, permeable materials) |
| Spatial Attributes | limited-unlimited<br>open-closed<br>inside-outside<br>private-public<br>permeability/transitivity<br>transience<br>variability | limited-unlimited<br>permeability/transitivity<br>complex-orderly<br>transience<br>non-locality<br>non-belonging<br>variability | limited-unlimited<br>permeability/transitivity<br>complex-orderly<br>transience<br>non-locality<br>non-belonging<br>variability | complex-orderly<br>autonomy |

*Use of Space*

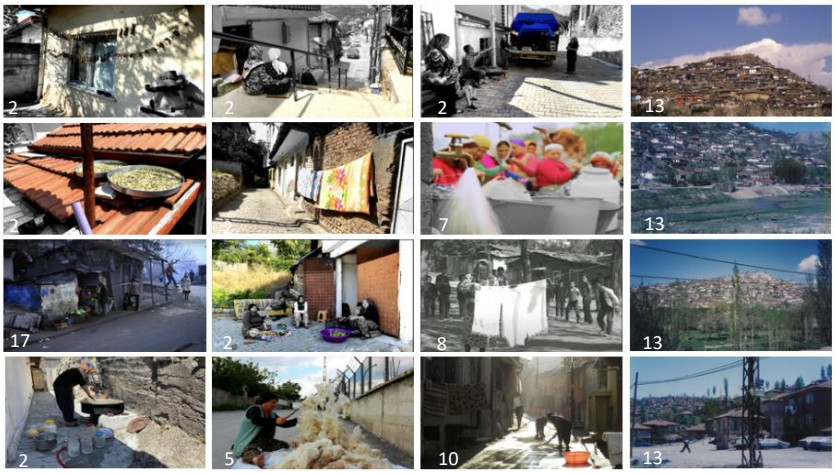
The use of space in gecekondu settlements includes spatial formations that are shaped by the thresholds that emerge during the use of communal spaces that come to the forefront in gecekondu settlements. In this context, social, cultural and commercial space utilisation practices in communal spaces need to be examined. As a result of the observations made, it is possible to divide social activities into two as activities that do not affect the space and activities that transform the space. Social activities that do not affect the space are spaces that develop spontaneously in daily life, do not produce a permanent space, are formed instantly and consumed quickly. Such spaces may include activities such as sitting, meeting, gathering, playing games. On the other hand, social activities that transform the space are defined as temporary formations in which the different functions that the user ascribes to it in addition to its fixed function are realised together with spatial transformation. In the field study on this subject, henna night and circumcision wedding organisations were encountered;in addition, a market area was encountered in the data obtained from the archives. Commercial activities, on the other hand, provide an assessment of the activities of peddlers, street markets, coffee houses, shops and hawkers in gecekondu settlements.

While the use of space is observed in intermediate areas, transition areas and peripheral areas in housing spaces, in communal spaces, in addition to these areas, it is seen that relationships are established in peripheral areas and gathering areas. While improvising and occupying are observed at all scales, in communal spaces, forms of association such as interacting, dispossessing, encountering, separating-

uniting, intertwining, reconciling-conflicting, connecting are observed. Spatial uses such as resting, playing games, doing daily chores, drying vegetables and fruits, cooking, hanging laundry, receiving guests, raising cattle and sheep, growing fruits and vegetables, and storing materials are encountered in housing spaces. In communal spaces, organising social activities, organising special events, gathering, chatting on foot, using river and stream beds, waiting, washing streets, carpets, etc., shopping, airing quilts, carpets, etc. stand out as prominent actions in the gecekondu. At the neighbourhood scale, actions such as organising and forming resistance against the rights demanded also emerge. While permeability/transitivity, transience, transience and variability are observed at all scales in the installation of space in line with the actional patterns that develop at different scales, it is possible to say that the qualities of neutral-distinctive, compatible-discordant, complex-orderly in housing spaces; non-locality, non-belonging, limited-unlimited, directivity-freedom and disorganisation in communal spaces; and autonomy, commonality in the neighbourhood also emerged(See Table 8).

***Table 8***. *Use of Space in the Formation of Social and Cultural Thresholds in Gecekondu (2- (Kütük, 2022); 5-(Pourbager, 2017); 7- (Tibet, 1978); 8-(Erakalın,1965); 10-( Pinterest, 2024); 13-(Saltresearch,2024); 17-(Sinan,1982))*

Social and Cultural Thresholds/Use of Space

| | Housing Spaces | Communal Spaces | | Neighbourhood |
|---|---|---|---|---|
| | | Small Groups | Large Participation Groups | |
| Spatial Formations |  | | | |
| Formation Areas | intermediate areas<br>transition areas<br>peripheral areas | gathering areas<br>transition areas<br>peripheral areas | gathering areas<br>transition areas<br>vague areas | intermediate areas<br>transition areas<br>gathering areas<br>peripheral areas<br>isolated areas |
| Forms of Relation | improvising<br>occupying | improvising<br>interacting<br>occupying<br>dispossessing<br>encountering<br>separating-uniting<br>intertwining<br>reconciling-conflicting<br>connecting | improvising<br>interacting<br>occupying<br>dispossessing<br>encountering<br>separating-uniting<br>intertwining<br>reconciling-conflicting<br>connecting | improvising<br>resisting<br>interacting<br>occupying<br>dispossessing<br>encountering<br>separating-uniting<br>intertwining |
| Action Patterns | •rest<br>•play the game<br>•doing daily chores (preparing food, washing dishes, etc.)<br>•drying vegetables, fruit<br>•cooking food<br>•hang laundry<br>•to receive guests<br>•raising ovine and bovine animals<br>•growing fruit, vegetables<br>•storing material | •play the game<br>•rest<br>•doing daily chores (chopping fruit, vegetables, etc.)<br>•gathering<br>•laundry<br>•cooking<br>•dry fruit, vegetables<br>•shopping<br>•to chat on your feet<br>•quilt, carpet, etc. Ventilate<br>•washing clothes, carpets, etc. | •organising social events (meetings, distributing aid, etc.)<br>•organising special events (weddings, circumcision, etc.)<br>•gathering<br>•play the game<br>•to chat on your feet<br>•using river and stream beds (swimming, washing clothes, etc.)<br>•waiting<br>•washing street, carpets, etc.<br>•Shopping<br>•hang laundry | •organising social events (meetings, distributing aid, etc.)<br>•organising special events (weddings, circumcision, etc.)<br>•organising against the rights demanded (establishing an association, etc.)<br>•organising resistance (action, protest, etc.) |
| Spatial Attributes | neutral-distinctive<br>permeability/transitivity<br>transience<br>variability<br>compatible-discordant<br>complex-orderly | compatible-discordant<br>neutral-distinctive<br>permeability/transitivity<br>transience<br>variability<br>non-locality<br>non-belonging<br>limited-unlimited<br>disorganisation | permeability/transitivity<br>transience<br>variability<br>directivity-freedom<br>non-locality<br>non-belonging<br>limited-unlimited<br>disorganisation | commonality<br>permeability/transitivity<br>transience<br>variability<br>directivity-freedom<br>limited-unlimited<br>autonomy |

*Interaction with the City*

The last issue in the social and cultural thresholds, interaction with the city, is shaped by the relationship that the gecekondu establishes with the rest of the city and the formations at the threshold that emerge in these relationships. Interviews with Celal Özdemir reveal that the relationship established with the rest of the city in various business lines and the advantages and comforts of being urbanised have an impact on the gecekondu dwellers, and that this has led to a desire to move up in class (Özdemir, 2022). It is possible to say that this situation causes urban life to be included in rural life in the gecekondu. İbrahim Yasa, in his research, defines the gecekondu family as a transitional family with both rural and urban characteristics in terms of social values and habits (Yasa, 1970). Another relationship established with the city is through transport. Transport plays an important role both within the gecekondu itself and in its relationship with the rest of the city. Particularly during the period of transport by minibus, stops that are spatially definite but physically indeterminate, and later defined stops formed by public transport vehicles constitute threshold discussions. Another factor that enables the interaction of gecekondu dwellers with the city is the professions they have developed to make a living. Occupations that create a spatial impact in the city and can be associated with the threshold space are generally located in sectors defined as informal or marginal. According to Oğuz Işık and Melih Pınarcıoğlu's research, the jobs in these sectors are carried out by people who try to exist by developing their own or collective strategies, develop solutions by adapting local traditions to urban conditions, set their own rules to take advantage of legal gaps, and adopt an organisation style with the network relationship they form (Işık and Pınarcıoğlu,2020:50-55).The professions in these sectors are added to the public spaces in the city in line with their own defined work and change the area and its environment.

While interaction with the city is observed in intermediate areas and transition areas in housing spaces, in communal spaces, in addition to these areas, it is also seen that a relationship is established in gathering areas. At the neighbourhood scale, intermediate areas, transition areas, gathering areas, peripheral areas and transformation areas are the contexts where interaction with the city is established. While improvising, encountering, interacting, separating-uniting, reconciling-conflicting are seen at all scales, there are also forms of interaction such as resisting, intersecting in common spaces, intertwining and connecting in housing spaces and neighbourhoods. In housing spaces, actions such as being influenced by urban culture, maintaining some habits from rural culture, surviving among high-rise houses, synthesising urban and rural building styles are encountered. In communal spaces, interaction with the city is established through actions such as creating different lines of work, shopping, playing games, providing transportation, travelling, spending time in social areas, establishing a network between informal jobs, and influencing public spaces. On the neighbourhood scale, action patterns such as creating introverted settlements, transforming, creating a threshold between the countryside and the city, ensuring social diversity, providing cheap labour and housing, and creating a mechanism of resistance appear. In line with the actional patterns that develop at different scales, it is possible to say that in the interaction of spaces with the city, compatible-discordant, neutral-distinctive, similarity-difference, otherness, autonomy can be observed at all scales, while the qualities of betweenness in housing spaces, limited-unlimited in common spaces, non-locality, non-belonging, variability, transience, disorganisation, loitering, permeability/transitivity, security-insecurity and uncannyness emerge in the neighbourhood(See Table 9).

***Table 9.*** *Interaction with the City in the Formation of Social and Cultural Thresholds in Gecekondu (2- (Kütük, 2022); 3- (Aksoy, 1978); 4- (Ankara Mamak Municipality, 2007); 13-(Samsun Canik Municipality, 2017); 17-(Sinan,1982)*

**Social and Cultural Thresholds/Interaction with the City**

| | Housing Spaces | Communal Spaces | | Neighbourhood |
|---|---|---|---|---|
| | | Small Groups | Large Participation Groups | |
| Spatial Formations |  4 |  17 |  2 |  13 |
| |  4 |  2 |  3 |  4 |
| |  4 |  3 |  3 |  4 |
| Formation Areas | intermediate areas<br>transition areas | intermediate areas<br>transition areas | intermediate areas<br>transition areas<br>gathering areas | intermediate areas<br>transition areas<br>gathering areas<br>peripheral areas<br>transformation areas |
| Forms of Relation | improvising<br>encountering<br>resisting<br>interacting<br>separating-uniting<br>reconciling-conflicting | improvising<br>encountering<br>interacting<br>separating-uniting<br>reconciling-conflicting<br>intersecting<br>intertwining<br>connecting | improvising<br>encountering<br>interacting<br>separating-uniting<br>reconciling-conflicting<br>intersecting<br>intertwining<br>connecting | improvising<br>encountering<br>interacting<br>resisting<br>separating-uniting<br>reconciling-conflicting<br>connecting |
| Action Patterns | •being influenced by urban culture (clothing, goods, etc.)<br>•to continue some habits from rural culture (raising cattle and sheep etc.)<br>•to maintain existence among high-rise dwellings<br>•to synthesise urban and rural building forms (construction methods, materials, etc.) | •creating different lines of business (peddling, tailoring, etc.)<br>•shopping<br>•play games<br>•to provide transport (minibus, bus, etc.)<br>•travelling<br>•spending time in social areas (going to a bakery, tea garden, etc.) | •creating different lines of business (peddling, tailoring, etc.)<br>•networking informal jobs<br>•impacting on public spaces (with stalls, mobile cars, etc.) | •to create introverted settlements<br>•transforming (liberated area, uncanny place, etc.)<br>•creating a threshold between the countryside and the city<br>•ensuring social diversity<br>•providing cheap labour and housing<br>•create a resistance mechanism |
| Spatial Attributes | compatible-discordant<br>neutral-distinctive<br>similarity-difference<br>otherness<br>autonomy<br>betweenness | compatible-discordant<br>neutral-distinctive<br>similarity-difference<br>limited-unlimited<br>otherness<br>autonomy<br>non-locality<br>non-belonging<br>variability<br>transience<br>disorganisation<br>loitering<br>permeability/transitivity | compatible-discordant<br>neutral-distinctive<br>similarity-difference<br>limited-unlimited<br>otherness<br>autonomy<br>incongruity<br>non-belonging<br>variability<br>transience<br>disorganisation<br>loitering<br>permeability/transitivity | compatible-discordant<br>security-insecurity<br>neutral-distinctive<br>similarity-difference<br>otherness<br>autonomy<br>uncannyness |

## 5. CONCLUSION

As an unplanned settlement emerging in cities in the context of Turkey, the gecekondu settlement, as an improvised spatial production of a community brought together by the commons, has been able to develop in different contexts, and by establishing cycles of reconciliation-conflict with the dynamics of urban spatial formation, it has created threshold spatial strings that form reciprocity in the city. While developing by articulating with the urban fabric, it has opened thresholds in physical, social and cultural contexts by creating resistance against urban dominant dynamics, and has made visible the possibility of developing multi-directional urban spatial dialogue. In order to create an integrated urban culture, it has created dynamic spaces where social and cultural differences can meet, which are not completely established. Thus, it has also supported urban resilience by creating buffer zones where the tensions arising from the urban crises that triggered its formation can be absorbed. In addition, the fact that an urban community that strengthens development mechanisms with its role in industrial production in the city, solves the burden it will cause to the city on its own, by taking an active role in urban production, with solidarity-based structures, has provided a sample to create models for urban sustainability.

Investigating the gecekondu through the threshold spatial patterns it forms in the city makes visible its effective role in urban production and its structures that have remained in a state of formation, which allows to reveal its dynamic mechanisms based on production. With this understanding, analysing and conceptually and visually mapping the thresholds created by the gecekondu in physical, social and cultural contexts has enabled the creation of interrelated data patterns to convey the spatial production interventions of these settlements. The threshold spatial patterns produced by the gecekondu settlement and its interventions in urban spatial production have enabled to read the specific aspects of the gecekondu settlement, to explain the creative formations in the gecekondu settlement and to reveal the contributions of the gecekondu settlement to urban spatial production.

Aspects specific to Gecekondu;

- Realisation of fast, temporary, variable, low-cost, collaborative collective spatial productions in the face of the spatial crisis
- Producing flexible and open to change spaces that meet the basic needs of the gecekondu dwellers
- Settlement in spatially non-intervened contexts that form boundaries in urban spatial production, such as intermediate areas, transition areas, peripheral areas and isolated areas
- Creating dynamic spatial constructions that are adaptable, articulable and allow change/transformation
- Use of readily available, cheap, sustainable and recyclable materials
- Formation of property rights based on community relations and consensus
- Formation of spatial structures based on collectivities, enabling social participation and supporting social integration
- It is explained as the gecekondu dwellers establishing mechanisms that develop social interaction and will to organise resistance and struggle processes by trying to improve their current living conditions for their needs that cannot be met from the city.

Creative becomings in the Gecekondu;

- The production of hybrid practices as a result of the encounter between rural and urban life practices
- Incorporation of nature into the spatial construction for production in order to establish sustainable cycles
- Evaluating the potential of topography with creative spatial constructions
- The space has an openness and temporariness suitable for addition, change and reproduction for changing needs
- The development of improvised construction procedures and the varied and creative use of reusable materials
- Develop mechanisms that build sustainable cycles in the face of lack of infrastructure
- A change-oriented solution to the property problem through the commons

- Development of collaborative improvised production practices that strengthen social participation in spatial production
- The opening of thresholds in the context of areas that form boundaries in urban interaction is counted as the invention of elements that create circulation in the city, such as the peddler, pedlar and minibus.

Contributions of the gecekondu to urban spatial production;

- Developing creative interventions against the housing problem in the city
- Increasing the crisis management and resilience capacity of the city
- Supporting the physical structure, cultural diversity, social and economic dynamics of the city
- Development of local initiative and co-operation in urban spatial production
- Production of urban space through inclusive and participatory processes
- Formation of settlements with distinctive identities in the city
- Increased environmental adaptive capacity of cities and utilisation of local resources for sustainable urban development
- It is determined as the development of urban spatial production knowledge and skills through learning by doing.

As the findings show, models that can be developed by learning from the unique aspects, creativity and urban spatial production contributions of the gecekondu have the potential to provide inputs for the sustainable integrated development of cities. Identifying the references provided for urban spatial production by a formation such as the gecekondu settlement, which has been tried and experienced in its development and results at various scales, is important in terms of recognising and evaluating its potential to support urban resilience, sustainability, practical knowledge and the integrated development of the city physically, socially and culturally. Taking this potential into consideration in the production of urban models will enable the development of an urban spatial production knowledge that will encourage the integration of local knowledge and experience in urban planning and design processes by creating a local input in the production of contemporary cities.

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