International Journal of Social and Humanities Sciences Research
JSHSR
Uluslararası Sosyal ve Beşeri Bilimler Araştırma Dergisi
Uluslararası Hakemli Dergi- International Refereed Journal
ISSN: 2459-1149

Received-Makale Geliş Tarihi 24.07.2025 *Research Article / Araştırma Makalesi*
Published-Yayınlanma Tarihi 30.09.2025 10.5281/zenodo.17469635
Volume-Cilt (Issue-Sayı), ss/pp 12 (123), 2158-2172

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A Study on Spatial Expansion, Transformation, and Master Planning in Urban University Campus

Kent İçi Üniversite Kampüsünde Mekânsal Genişleme, Dönüşüm ve Master Planlama Üzerine Bir İnceleme

ABSTRACT

Urban university campuses have historically developed as integral components of the urban pattern, establishing strong interactions with economic, spatial, and socio-cultural dynamics over time. Today, the processes of spatial expansion and transformation in these campuses require a strategic planning approach due to increasing student populations, limited land availability, and the necessity of urban integration. This study examines the spatial organization of urban campuses through four key parameters—physical infrastructure, transportation, social amenities, and housing—and aims to contribute to future-oriented planning principles. Methodologically, a university campus located in Istanbul was analyzed as a case study, with assessments based on current conditions, spatial analyses, and field observations. The findings reveal opportunities for new interventions and improvements in the campus's spatial development. In particular, design strategies that enhance spatial cohesion, interventions that facilitate pedestrian accessibility, diversification of social amenities, and integration of housing opportunities with the campus are identified as carrying significant potential for future planning. The results highlight the importance of strengthening the campus not only as an academic environment but also as a social, cultural, and urban entity. The study underscores the necessity of a holistic and flexible master plan approach for urban university campuses and emphasizes the critical role of collaboration between universities, local governments, and the broader community. In this regard, the research contributes to the ongoing discourse on campus–city interaction and offers guidance for strategic planning frameworks applicable to future practices.
Keywords: Adaptive Reuse, Campus - City Relationship, Urban Regeneration, Walkability, Planning Methodology

ÖZET

Kent içi üniversite kampüsleri, tarihsel süreçte kentsel dokunun bir parçası olarak gelişmiş ve zamanla ekonomik, mekânsal ve sosyo-kültürel dinamiklerle güçlü etkileşimler kurmuştur. Günümüzde bu kampüslerin mekânsal genişleme ve dönüşüm süreçleri, artan öğrenci nüfusu, sınırlı arsa olanakları ve kentsel entegrasyon gereklilikleri nedeniyle stratejik bir planlama yaklaşımı gerektirmektedir. Bu çalışma, kent içi kampüslerin mekânsal organizasyonunu dört temel parametre—fiziksel altyapı, ulaşım, sosyal donatılar ve barınma—üzerinden ele almakta ve geleceğe dönük planlama ilkelerine katkı sunmayı amaçlamaktadır. Yöntem kapsamında, İstanbul'da yer alan bir üniversite kampüsü örnek vaka olarak değerlendirilmiş; mevcut durum, mekânsal analizler ve alan gözlemleri aracılığıyla incelenmiştir. Elde edilen bulgular, kampüsün mekânsal gelişiminde yeni düzenleme ve iyileştirme fırsatlarını ortaya koymaktadır. Özellikle mekânsal bütünlüğü artıracak tasarım kararları, yaya erişimini kolaylaştıracak düzenlemeler, sosyal donatıların çeşitlendirilmesi ve barınma olanaklarının kampüsle daha bütünleşik ele alınması, planlama açısından önemli katkı potansiyeli taşımaktadır. Sonuç olarak, kampüsün yalnızca akademik işlevlerle değil, aynı zamanda sosyal, kültürel ve kentsel boyutlarla da güçlendirilmesi gerektiği vurgulanmaktadır. Çalışma, kent içi üniversite kampüslerinde bütüncül ve esnek bir master plan yaklaşımının önemini öne çıkarmakta; üniversite, yerel yönetim ve toplum işbirliğinin kritik rolüne dikkat çekmektedir. Bu çerçevede araştırma, literatürde tartışılan kampüs-kent etkileşimine katkı sağlamakta ve gelecekte uygulanabilecek stratejik planlama yaklaşımları için yol gösterici nitelik taşımaktadır.
Anahtar Kelimeler: Uyarlanabilir Yeniden Kullanım, Kampüs–Kent İlişkisi, Kentsel Dönüşüm, Yürünebilirlik, Planlama Metodolojisi

1. INTRODUCTION

Urban university campuses have historically emerged within the pattern of cities and, over time, established reciprocal interactions with their economic, spatial, and socio-cultural dynamics (Özdemir, 2019; Bott, 2018). The notion of a "university city" should be considered not only in terms of the settlements, production, and service networks that develop around the campus, but also in recognition of the fact that campuses contribute to regional development through knowledge production and the flow of a skilled workforce (Breznitz & Feldman, 2012; Freeland, 2005). Accordingly, the campus–city relationship constitutes a multi-layered subject that must be addressed not only at the architectural and planning scale but also within the contexts of governance and economic policy (O'Mara, 2012; Wiewel, Kunst & Dubick, 2007).

The growth and transformation dynamics of urban campuses differ significantly from suburban campuses. Within dense and fragmented ownership patterns, campus units are often dispersed across different parcels, rendering expansion sequential and "molecular - polycentric" in nature. This condition increases the need for improved accessibility, continuity of open spaces, and functional synergies (Han & Kim, 2007; Sıramkaya & Çınar, 2012). Historical developments in Europe and North America reveal that urban campuses have alternated between centralized and polycentric (molecular) organizational structures (Addie, Keil & Olds, 2015; Özdemir, 2019).

Within this context, the key components of contemporary campus design—education, research, housing, sports and recreation, cultural and social life, and circulation—not only shape institutional productivity but also influence urban livability and inclusivity (Ilgaz, 2014; Kurtoğlu, 2010). Functional zones defined in post-CIAM literature (academic, administrative, residential, and recreational) determine the strategic positioning of an urban campus, while performance criteria such as energy efficiency, accessibility, and noise control have become integral to comprehensive planning (Chang et al., 2019; Nacar, 2023; Sarıalan, 2019; Türeyen, 2002).

In recent years, adaptive reuse has emerged as a decisive strategy in the transformation of urban campuses, particularly in large metropolitan areas. Converting industrial heritage structures into educational facilities offers not only cost- and time-efficient solutions but also advances sustainability goals, while simultaneously triggering socio-economic revitalization in declining urban areas (Elassı, 2023; Fard, 2020; Wong, 2016). Such transformations strengthen spatial continuity at the campus–city interface by generating new pedestrian corridors, public spaces, and mixed-use developments (Bott, 2018; Wiewel, Kunst & Dubick, 2007). Furthermore, studies conducted in the post-COVID-19 period highlight the growing importance of flexible planning and adaptive spatial approaches to enhance the resilience of urban campuses (Amistadi, Bradecki, & Uherek-Bradecka, 2023; Ouf & Imoro, 2024).

Nevertheless, urban campus expansion is often shaped by complex negotiations due to high land values, restrictive zoning regulations, environmental concerns, and the need for stakeholder consensus. Without a long-term, flexible, and phased master plan, piecemeal, project-based expansions risk falling short of producing an integrated academic environment (Han & Kim, 2007). Therefore, the sustainable growth of urban campuses requires a planning framework that reconciles institutional objectives with local government policies and community needs, prioritizes accessibility and pedestrian mobility (Liao & Zhu, 2025), strengthens social amenities, and ensures spatial continuity (Özdemir, 2019; Wiewel, Kunst & Dubick, 2007).

Although there is a considerable body of literature on university campuses in Turkey, most studies focus on themes such as sustainability, energy efficiency, accessibility, social amenities, and environmental performance (Çamayaz, 2023; Gümüşbaş, 2023; Nacar, 2023; Sarıalan, 2019). However, analytical and methodological studies addressing the spatial expansion and transformation processes of urban campuses remain limited. Particularly in metropolitan areas such as Istanbul, where dense urban pattern dominates, the fragmented organization of campuses, their incremental growth strategies, and their interactions with surrounding urban environments have not been sufficiently examined.

This gap makes it difficult to systematically evaluate the impacts of university campuses on urban pattern and to develop forward-looking planning approaches. While much of the literature provides comparative examples from urban campuses in Europe and North America (Addie, Keil & Olds, 2015; Han & Kim, 2007), there is a need for empirical research analyzing the spatial transformation dynamics of urban campuses within the Turkish context.

In this regard, the Avcılar Campus of Istanbul Gelişim University provides a compelling case. Since its establishment, the university has followed incremental growth strategies within a fragmented spatial structure, while interacting directly with surrounding residential areas and transportation corridors. In particular, the campus's relationship with major arterial roads (e.g., Petrol Ofisi Caddesi, Birlik Caddesi), the continuity of pedestrian routes, and the development pressures on adjacent parcels highlight concrete areas where spatial expansion and transformation are manifested. Thus, the central issue is not only the internal spatial organization of Gelişim University but also how the campus can expand sustainably and holistically within its urban context.

In light of the above context and problem definition, this study formulates the following core research question: "How can urban university campuses achieve sustainable expansion and transformation under fragmented spatial organization and external urban pressures? In this context, what kind of example does the Avcılar Campus of Istanbul Gelişim University provide?"

This research question has been framed to encompass not only the internal spatial arrangements of urban campuses but also their broader urban interactions. In particular, the existing density, transportation networks, and housing structures in Avcılar, alongside the campus's fragmented growth patterns, form the unique context of the problem. Based on this, the study proposes the following hypothesis: "Developing an integrated master plan for urban university campuses will help mitigate the challenges arising from fragmented spatial organization, facilitating expansion that is both sustainable and compatible with the urban environment. The case of Istanbul Gelişim University demonstrates the applicability of this approach as a tangible model."

This hypothesis addresses not only physical expansion but also multiple dimensions such as pedestrian accessibility, social amenities, relationships with surrounding parcels, and collaboration with local governments. In doing so, the study adopts an approach that centers planning, spatial continuity, and urban integration in the transformation of urban universities.

2. MATERIALS & METHODS

The methodology of this research was structured around a literature review and a case study analysis. First, a comprehensive review of the literature on the development, spatial organization, and transformation dynamics of urban university campuses was conducted. This review revealed that national and international studies on campuses generally focus on themes such as sustainability (Çamayaz, 2023; Gümüşbaş, 2023), accessibility (Sarıalan, 2019), social amenities and environmental performance (Nacar, 2023), and energy efficiency (Chang et al., 2019). However, studies that analytically address the expansion and transformation processes of urban campuses remain limited (Han & Kim, 2007; Özdemir, 2019). This gap defines a key element of the theoretical framework of this research. The review also highlighted contemporary trends such as adaptive reuse (Elassı, 2023; Wong, 2016) and the integration of campuses with their urban surroundings (Bott, 2018; Wiewel, Kunst & Dubick, 2007), which informed the applied dimension of the study.

The fieldwork component focused on the Avcılar Campus of Istanbul Gelişim University. The spatial structure of the campus and its relationship with surrounding transportation corridors, residential areas, and urban facilities were analyzed through site observations and existing planning data. The use of campus parcels and building blocks was examined and compared with zoning plan decisions in order to identify potential expansion areas. Within this process, the accessibility challenges resulting from the fragmented settlement pattern and the degree of interaction among different centers of the campus were assessed.

Another methodological component involved a comparative analysis with campus settlement models defined in the literature. Considering the main characteristics of molecular - polycentric, linear, centralized, and dispersed organizational forms, the spatial structure of Istanbul Gelişim University was evaluated within this framework (Ilgaz, 2014; Sıramkaya & Çınar, 2012). This comparison provided insights into the current positioning of the campus and its prospective development trajectories.

In the final stage, the findings were interpreted within the perspective of a future-oriented master plan. Key components such as accessibility, social amenities, housing, and transportation were assessed through a holistic planning approach, and parameters that could support the sustainable growth of the campus were identified. Thus, the methodology rests on a dual analytical framework: it is grounded both in theoretical insights from the literature and in empirical observations from the field. Figure 1 summarizes the methodological approach of this study.

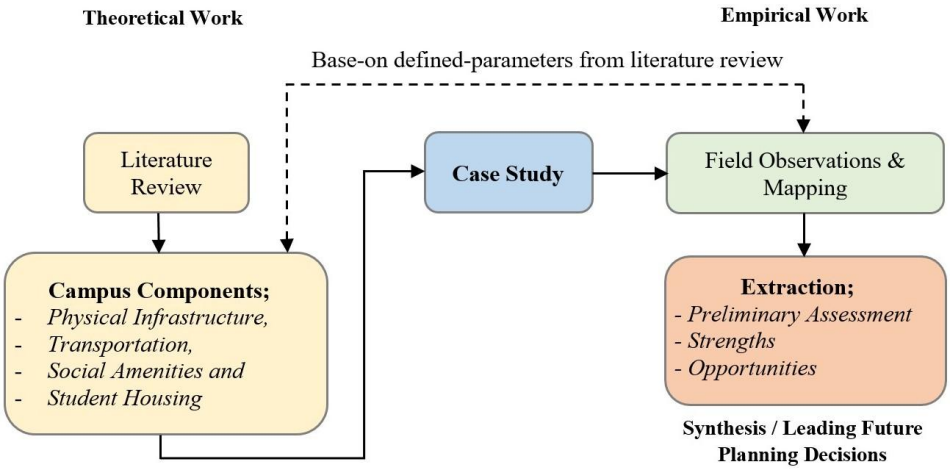


Figure 1. Methodological Framework of the Study Showing the Sequential Research Steps and Their Alignment With Theoretical, Empirical, and Synthesis Stages (Figure created by the author).

3. LITERATURE REVIEW: ADAPTIVE REUSE AND EXPANSION IN URBAN UNIVERSITIES

Universities have historically emerged within the pattern of cities, at times transforming the settlements in which they are located and laying the groundwork for the formation of "university towns" (Gattupalli, 2023; Özdemir, 2019). Accordingly, urban campuses are regarded not only as educational spaces but also as catalysts of environmental, social, and economic development. Depending on their relationship with the city, university campuses can be classified into different categories such as satellite campuses, gated campuses, and urban campuses (Ilgaz, 2014). Particularly in Europe, since the 19th century, the renewed significance of urban campuses has enabled universities to integrate with the urban context and assume active roles in regional development (Özdemir, 2019). A similar pattern can be observed in Turkey, where universities have gradually evolved into dispersed units composed of multiple buildings within city centers, as exemplified by Ankara University and Istanbul Technical University (Erkman, 1990; Özdemir, 2019).

Urban campuses evolve in reciprocal interaction with the surrounding urban pattern, exerting direct influences on housing, transportation, and social life. In this sense, campuses shape not only academic functions but also multi-dimensional aspects of urban environments, including housing, mobility, social activities, and cultural production (Ilgaz, 2014; Kurtoğlu, 2010; Sıramkaya & Çınar, 2012). Therefore, analyzing the processes of adaptive reuse and spatial expansion in urban campuses constitutes a critical field of inquiry, offering insights not only into institutional development but also into the broader transformation of cities.

3.1. Adaptive Reuse

In the post-pandemic period, the conversion of abandoned buildings into university campuses has become one of the prominent design and planning approaches at the urban scale. Projects of this kind, often spearheaded by universities, generate significant transformation dynamics, particularly in urban decline areas, and reshape the sociocultural and economic pattern of their surroundings (Gravagnuolo et al., 2024). Adaptive reuse projects not only introduce new spatial configurations but also enable the development of mixed-use environments that act as catalysts for economic ventures, employment opportunities, social progress, and local growth (Elassı, 2023; Gravagnuolo et al., 2024).

Universities, through their knowledge production and research activities, function as key actors that enhance regional competitiveness and support economic development (Freeland, 2005; Lambert-Chan, 2008). In this regard, they contribute directly to local development processes by engaging actively not only with the private sector but also with public institutions (Wiewel, Kunst & Dubick, 2007). The collaboration between universities and local communities effectively turns campuses into laboratories for testing new ideas and achieving socio-economic objectives (Breznitz & Feldman, 2012).

The accessibility and spatial positioning of campuses within urban settings are critical to the success of these transformation processes. Open campuses, in particular, are known to generate stronger interactions with the urban environment compared to gated campuses. In this context, studies focusing on security, spatial configuration, mobility models, settlement patterns, and sustainability criteria highlight the multi-dimensional nature of campus–city relationships (Mohammed & Ukai, 2021). A study on the University of

Chicago demonstrated that campuses function as entrepreneurial ecosystems, producing outputs that foster entrepreneurship and innovation (Miller & Acs, 2017).

The adaptive reuse approach is not limited to physical spatial transformations; it also represents the continuity of the historical role that universities have played in driving economic and social change. Notably, after World War II, research universities in the United States emerged as transformative actors in response to both economic decline and urban social crises. Between the 1950s and 1980s, universities assumed crucial roles in addressing social problems associated with economic stagnation and urban crises, redefining themselves not only as educational institutions but also as integral components of urban transformation (O'Mara, 2012).

3.2. Expansion of Urban Campuses

Urban universities are not only centers of academic knowledge production but also spatial entities that contribute culturally, socially, and economically to society. Through their libraries, museums, exhibition halls, and institutes, universities establish intellectual relationships with communities while simultaneously offering cultural opportunities to their cities (Özdemir, 2019). Their central locations provide not only academic collaborations but also broader opportunities for social and institutional interaction. However, the expansion and transformation processes of urban campuses are often confronted with physical, spatial, and managerial constraints (Han & Kim, 2007).

Current debates on the accessibility of urban campuses highlight that the insufficiency of social spaces constitutes a significant planning issue. In particular, the limited availability of recreational areas restricts opportunities for student social interaction (Kurtoğlu, 2010). In this context, issues such as pedestrian–vehicle separation, walkability, and the reinterpretation of spatial relationships are of critical importance (Horoz, 2021; Özdemir, 2019; Sıramkaya & Çınar, 2012; Yürekli, 2023). Literature also demonstrates that walkable campus environments positively affect not only ease of access but also users' physical activity levels and health indicators (Wang, Narcisse, & McElfish, 2023). Furthermore, techniques such as "mapping" enable the reassessment of existing campus structures, contributing to the measurement of spatial flexibility and the enhancement of adaptive capacity (Elassı, 2023). In recent years, the proliferation of micro-mobility solutions (such as shared bicycles and scooters) within university campuses has not only diversified transportation systems but also strengthened campus–city integration (Gkartzonikas & Dimitriou, 2023). Similarly, research shows that active mobility behaviors are shaped not only by physical environmental conditions but also by students' social habits, socio-economic characteristics, and the spatial positioning of the campus (Cunha & Cadima, 2024).

Globally, many universities have expanded their campuses by repurposing abandoned buildings or industrial structures. Such projects provide eco-friendly and cost-effective solutions while also being considered part of sustainable urban regeneration (Elassı, 2023; Wong, 2016). The University of Kassel in Germany, Brown University and Amherst College in the United States, and the universities of Milano-Bicocca and Turin in Italy are notable examples of campus expansions that have transformed urban pattern (Bott, 2018). Similarly, the Keele Campus of York University, initially located in the suburbs, eventually became part of downtown Toronto through urban growth (Addie, Keil & Olds, 2015). Other examples, such as the Norwich University of the Arts in the United Kingdom, Bergen University College in Norway, and Georgia State University in the United States, also highlight how campuses can be repositioned within diverse urban contexts (Fard, 2020; Simmons, 2001).

The expansion processes of urban campuses are shaped not only by spatial but also by managerial and societal dynamics (Angel, 2023). High property values, zoning restrictions, and local community opposition complicate the long-term expansion strategies of campuses (Han & Kim, 2007). Many universities, such as Boston University and New York University, have expanded through individual projects rather than developing a master plan, leading to fragmented spatial organization. Additionally, the growing student population in urban campuses has intensified the demand for housing. Unlike suburban campuses with large tracts of land, urban campuses are typically dispersed among private properties, making public–private collaboration critical in planning housing and social amenities. Likewise, the symbiotic relationships universities establish with innovation corridors and knowledge-based districts play a significant role in shaping the urban development dynamics of campuses (Pancholi et al., 2020).

Urban campuses often generate “micro-cities” together with surrounding neighborhoods, and these micro-cities integrate into the larger urban structure through housing, transportation, recreation, and commercial areas (Gattupalli, 2023). Therefore, campus expansion processes emerge as a complex developmental dynamic shaped not only by universities but also by the involvement of local governments and entrepreneurs.

3.3. A Methodological Proposal for Developing a Campus Master Plan

As emphasized in the literature review and methodology sections, a holistic approach is required to understand the spatial transformation of urban university campuses and to generate forward-looking development scenarios. In this context, preliminary examinations conducted on the case study campus contribute to defining the components necessary for a long-term, applicable campus master plan.

From the perspective of a master plan, fundamental components can be classified under four categories: physical infrastructure, transportation, social amenities, and housing. The literature on campus planning and adaptive reuse similarly highlights that not only academic buildings but also spaces that support social life and networks of accessibility must be taken into account (Ilgaz, 2014; Özdemir, 2019; Kurtoğlu, 2010; Sıramkaya & Çınar, 2012). In this way, the campus ceases to function merely as an educational space and evolves into a dynamic living environment that integrates with the city.

The proposed method focuses both on analyzing the current situation and on producing planning scenarios for the future. First, campus components are examined through spatial mapping, field observations, and the assessment of user experiences. Next, variables such as transportation connections, the adequacy of social amenities, housing opportunities, and infrastructure capacity are evaluated to identify the strengths and weaknesses of the campus. In the final stage, a framework that considers the interrelationships among these components is developed, and strategies are defined to guide the campus’s long-term development.

This approach also allows for the evaluation of different campus planning models found in the literature (such as linear, molecular–polycentric, or network-based settlement patterns), while at the same time supporting the development of a planning vision tailored to the specific context of each campus (Sıramkaya & Çınar, 2012). Accordingly, the components and analytical framework presented in Table 1 are derived from insights synthesized through the literature review, ensuring that the proposed method is firmly grounded in existing scholarly work. Therefore, the method proposed here not only applies to the case study but also serves as a model that can shed light on the future spatial development of urban campuses more broadly.

Table 1. Proposed Methodology For Developing a Campus Master Plan Based-on Literature Review (Table created by the author).

Components	Method of Analysis	Evaluation Criteria	Expected Output	References (linked)
Physical Infrastructure	*Field observations, review of existing plans, spatial and morphological analysis*	*Functionality of buildings, sustainability, accessibility*	*Strengths and weaknesses of infrastructure capacity*	*Özdemir (2019); Ilgaz (2014); Han & Kim (2007); Sıramkaya & Çınar (2012)*
Transportation	*Mapping, pedestrian–vehicle separation analysis, surveys*	*Walkability, public transport connections, accessibility*	*Effectiveness of transport network and improvement strategies*	*Kurtoğlu (2010); Sıramkaya & Çınar (2012); Horoz (2021); Yürekli (2023); Wang et al. (2023); Gkartzonikas & Dimitriou (2023); Cunha & Cadima (2024)*
Social Amenities	*Field observations, spatial analysis, user experience*	*Adequacy of recreational, cultural, and sports facilities*	*Recommendations for spaces supporting social life*	*Kurtoğlu (2010); Ilgaz (2014); Özdemir (2019); Sıramkaya & Çınar (2012)*
Housing	*Mapping, student dormitory capacity analysis, surveys*	*Number of dorms, capacity, accessibility, affordability*	*Student housing strategies and new settlement proposals*	*Han & Kim (2007); Pancholi et al. (2020); Gattupalli (2023)*

4. CASE STUDY: ISTANBUL GELISIM UNIVERSITY AVCILAR CAMPUS

Istanbul Gelişim University (IGU) is a foundation university established in 2007 in Avcılar, a district of Istanbul, in an urban setting. Since its foundation, the campus structure has evolved in relation to the main transportation axis, Petrol Ofisi Avenue, and in parallel with the growing demand from students. Over time, the campus has been enriched with new functions and spatial arrangements in terms of physical infrastructure, mobility, social amenities, and housing components.

This study approaches the IGU Avcılar Campus as a representative case for discussing spatial expansion and adaptive reuse processes in urban universities. In light of recent global and local dynamics, the campus's development is evaluated from a "master plan" perspective. The aim is to make visible the reciprocal interaction between the current campus structure and its urban environment, while also providing a framework that can contribute to long-term planning decisions.

The analysis is structured around four key parameters defined in Table 1: (i) campus buildings, parcel layout, and existing physical capacity (physical infrastructure); (ii) pedestrian mobility, vehicular traffic, and access patterns (transportation); (iii) the quality and prevalence of sports, recreational, and cultural uses (social amenities); and (iv) student housing opportunities and their relationship with the surrounding residential pattern (housing). This structure systematically integrates findings from field observations and spatial analyses, enabling a holistic discussion of development areas and opportunities for improvement.

4.1. Physical Infrastructure

The Avcılar Campus of Istanbul Gelişim University has distinguished itself since its establishment with a "molecular - polycentric" settlement pattern, composed of buildings distributed across multiple parcels. This organizational model allows each unit to sustain internal coherence and functional continuity, while simultaneously creating opportunities for design strategies aimed at strengthening coordination and spatial integration across units. The campus can be described as a continuously evolving environment, shaped by incremental interventions that respond to institutional requirements as well as urban dynamics.

Recent years have seen a number of ongoing transformation efforts across the campus. These include the reconfiguration of building entrances to improve accessibility and visibility, the redefinition of garden areas as multifunctional outdoor spaces that encourage social interaction, and the reorganization of main foyer areas to enhance circulation flows and accommodate flexible uses. Although modest in scale, such interventions collectively contribute to building a stronger campus identity, demonstrating how the environment evolves through cumulative adjustments rather than singular large-scale projects.

The current condition of the campus infrastructure is presented in Table 2, which summarizes the distribution of buildings, functional capacity, and spatial relationships. The analysis shows that the campus building stock maintains close adjacency with surrounding parcels. Vacant plots—some undeveloped and others used temporarily as parking areas—serve as strategic reserves for phased growth and functional diversification. These areas also represent opportunities to enhance open–green space continuity and to introduce new communal nodes that support interaction and campus life.

Table 2. Current Condition Analysis of Istanbul Gelişim University Avcılar Campus, Focusing On Campus Buildings and Transportation Components (Visuals created by Zahraa Taha and Ali Hussein Alali).

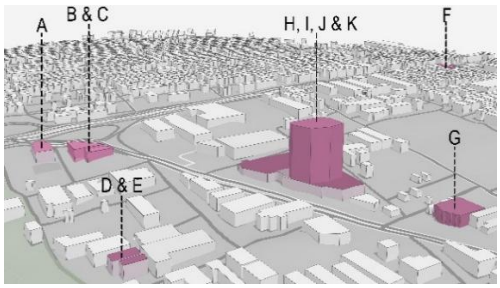
Visuals						
						
A block	B & C block	D block	E block	F block	G block	K block
						

Table 3 integrates parcel-based assessment with street-level visual documentation, providing a more comprehensive understanding of the campus's relationship with its surrounding urban pattern. The current land use component highlights how the campus building stock is in close adjacency with surrounding parcels and shows that development potential is strongly conditioned by existing land uses. Undeveloped parcels or those temporarily functioning as parking areas can be interpreted as strategic reserves, offering opportunities for phased growth, functional diversification, and the reinforcement of continuous open–green spaces and shared-use focal points.

Table 3. Integrated Parcel and Street-View Analysis of Istanbul Gelişim University Avcılar Campus (Visuals created by Zahraa Taha and Esma Nur Gündüz).

a. Current Land Use	b. Street Views
	*1.Petrol Ofisi Avenue* *2.Marmara Street* *3.Oğul Street*  *4.Sofu Street* *5.Hakan Öner Street* *6.Birlik Avenue* 

The inclusion of directional arrows within the current land use diagram establishes direct links between mapped parcels and the street-view photographs, which illustrate the physical and environmental characteristics of six adjacent streets. This combined approach allows for a more contextualized evaluation of the challenges and opportunities in integrating the campus with its surroundings. The immediate juxtaposition of industrial and logistics activities with educational facilities remains a key concern, as it necessitates careful spatial harmonization to ensure accessibility, environmental quality, and safety for campus users.

This integrated approach—combining parcel-level data with street-level observations—supports a planning framework that links immediate, micro-scale interventions with long-term strategic goals. It thus consolidates the campus's spatial identity while reinforcing its functional integration with the surrounding urban environment.

4.2. Transportation

In the examined university campus in Istanbul, transportation is addressed both in terms of internal campus connections and its integration with the surrounding urban mobility network. One of the campus's primary axes, Petrol Ofisi Avenue, has created physical barriers following recent road modifications, which hinder uninterrupted access between buildings. This condition underscores the need for a safe and integrated circulation system for pedestrian movement. Enhancements to pedestrian infrastructure would not only strengthen the internal spatial cohesion of the campus but also reinforce its integration with the broader urban pattern.

Field observations carried out as part of the case study identified ten primary pedestrian axes, which are illustrated in Figure 2. These axes constitute the fundamental framework of pedestrian circulation across the campus and its surrounding neighborhoods. While some of these axes, such as Bahriye Üçok Street and Sofu Street, are already heavily used by students in their daily commutes, others represent potential corridors that could guide future spatial integration. Supporting these ten axes through landscaping, lighting, and safety improvements would significantly enhance pedestrian comfort and continuity, while also facilitating a stronger connection between the campus and adjacent residential areas.

On the southeastern side, the Meşrutiyet Avenue corridor functions as a natural pedestrian route due to its adjacency to residential zones, reinforcing its role as one of the most important of these ten axes. In particular, Bahriye Üçok Street and Sofu Street stand out as critical daily commuting paths for students; improvements here would further consolidate the pedestrian network and ensure safer and more accessible circulation.

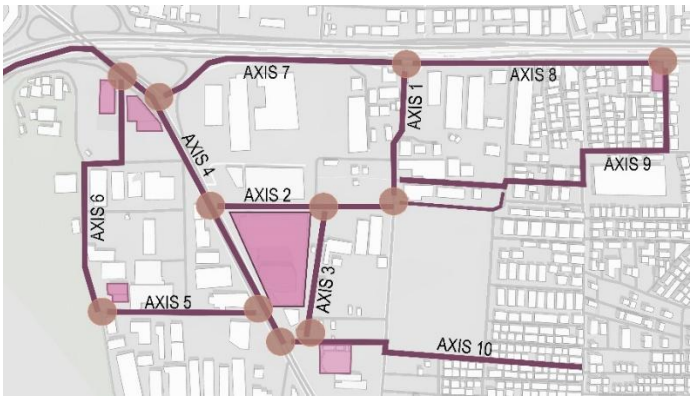


Figure 2. Preliminary Analysis of the Surrounding Roads (Pedestrian Circulation Axes) of Istanbul Gelişim University Avcılar Campus (Figure created by Zahraa Taha and the author).

From the perspective of vehicular traffic, Oğul Street emerges as a focal point of planning, as it provides direct access to the K Block student entrance while accommodating both heavy pedestrian and vehicle flows (see Figure 2). Periodic traffic congestion, caused by nearby logistics activities and port-related routes, highlights the need for a more balanced transportation organization in the campus surroundings. Moreover, the absence of defined bicycle lanes and parking areas represents an important opening for the development of sustainable mobility options.

Overall, the campus transportation system demonstrates significant potential for improvement in terms of both pedestrian and vehicular accessibility. Strengthening integration with public transportation, encouraging micro-mobility solutions, and expanding pedestrian-priority arrangements—particularly along the ten identified pedestrian axes—stand out as key strategies that can guide the transportation dimension of the future campus master plan.

4.3. Social Amenities

Social amenities in university campuses not only support academic productivity but also play a critical role in enhancing students' quality of life and strengthening the university's interaction with its surrounding environment. Evaluations conducted on the examined campus indicate that there is clear potential for sports, recreation, and cultural facilities, yet these areas are not currently being utilized at full capacity.

On Birlik Avenue, the site allocated in the zoning plan for open and closed sports facilities is presently being used for alternative purposes, which limits the existing social amenity capacity. Conversely, the new sports complex under construction by the Istanbul Metropolitan Municipality in the same area represents a strong opportunity that could be integrated into the university's social life. At the same time, reconsidering nearby logistics and industrial uses in conjunction with campus amenities holds the potential to make the campus experience safer and more functional for students.

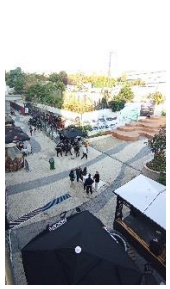
Next to A block *-basketball field-*	Next to A block *-landscape-*	Next to E block *-courtyard-*	Next to G block *-garden-*	Next to H block *-football field-*	Next to J block *-courtyard-*	Next to K block *-terrace-*
						

Figure 3. Key Outdoor Social and Recreational Spaces Within Istanbul Gelişim University Avcılar Campus (Image credit: the author).

Within the campus itself, the diversification and improvement of recreational and shared spaces is of particular importance. As illustrated in Figure 3, examples such as the basketball field near Block A, landscaped green areas around Blocks A, D–E, G, and J, and the rooftop terrace adjacent to Block K highlight the existing but underutilized outdoor amenities. Enhancing these areas through improved landscaping, seating arrangements, and small-scale social interaction nodes along pedestrian routes would help foster a more cohesive and engaging campus life.

Overall, strengthening the social amenity capacity would transform the campus from being merely a place of education into an open and inclusive living environment that integrates with the local community. Such interventions would also enhance the campus's attractiveness in its urban context, directly contributing to long-term planning objectives.

4.4. Student Housing

In urban university campuses, the diversity of housing opportunities directly influences students' quality of life and their level of integration with the campus. Evaluations of the examined campus indicate that on-campus dormitory capacity is limited, whereas the surrounding residential pattern provides a substantial share of student accommodation. In particular, the housing stock along Meşrutiyet Avenue offers rental apartments for students, thereby creating a strong interaction zone between the campus and its immediate urban context.

To better understand this relationship, Figure 4 illustrates the broader regional context of student housing. The map highlights the corridor extending from Küçükçekmece to Büyükçekmece, showing how the university is positioned within this larger urban continuum. It also identifies surrounding districts such as Beylikdüzü and Esenyurt, which are preferred by students due to their relatively more affordable rental housing. Major highway connections are also depicted, emphasizing the role of regional accessibility in shaping students' housing choices and daily mobility patterns.

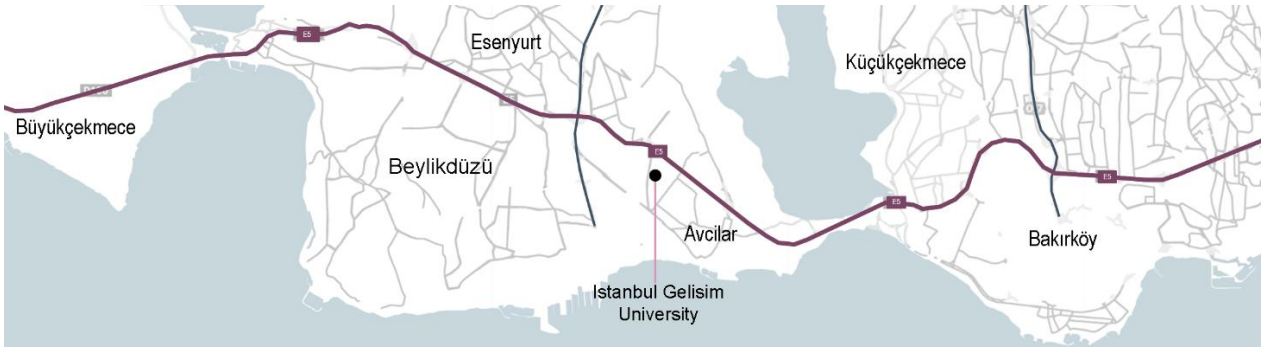


Figure 4. Regional Map Showing Istanbul Gelişim University's Location Within the Corridor From Küçükçekmece to Büyükçekmece, Along With Nearby Student Housing Areas (Figure created by Zahraa Taha).

This spatial configuration not only allows students to become more closely integrated with urban life but also strengthens the reciprocal relationship between the campus and its surrounding neighborhoods. However, along key commuting routes—particularly Bahriye Üçok Street and Sofu Street—enhanced safety measures, improved lighting, and upgraded landscaping would represent important steps toward improving accessibility and living standards.

Incorporating housing considerations into the campus master plan would not only provide students with safer and higher-quality living environments but also contribute to the planned and sustainable transformation of surrounding residential areas. Integrating new on-campus dormitory projects with social amenities and security enhancements would enable the development of long-term and comprehensive solutions to address student housing needs.

5. FINDINGS

The analysis of the urban university campus in Istanbul demonstrates that its spatial organization and existing infrastructure reflect common trends and challenges observed in many inner-city campuses. A key outcome of this study is summarized in Table 4, which links the four components defined in the literature - Physical Infrastructure, Transportation, Social Amenities, and Housing - to the methods actually applied in the case study, and evaluates each component through a qualitative preliminary assessment (using the indicative scale of Strong / Moderate / Limited / Weak), together with identified strengths and future opportunities.

From the perspective of physical infrastructure, the campus's polycentric structure presents opportunities for establishing stronger spatial and functional connections across different areas. The configuration of parcels and current land use not only shapes the campus's potential for expansion but also reveals certain contextual constraints that must be considered in future planning efforts.

Table 4. Case-Study Evaluation of Istanbul Gelişim University Avcılar Campus. Summary of Four Key Components With Applied Methods, Preliminary Assessments, Strengths, and Future Opportunities. (Table created by the author).

Components	Performed Methods		Prelimin. Assessm. *(Indicative)*	Strengths	Future Opportunities
Physical Infrastructure	*Field observations*	√	*Moderate (needs more integration)*	*Polycentric structure supports potential inter-unit integration.*	*Enhancing open–green continuity, harmonizing with industrial surroundings.*
	Review of existing plans	X			
	Spatial and morphological analysis	X			
Transportation	Mapping	√	*Moderate–Low (pedestrian network fragmented)*	*Identification of ten pedestrian corridors highlights opportunities for improved walkability.*	*Better management of vehicular traffic, improved integration with public transit and micro-mobility.*
	Pedestrian–vehicle separation analysis	X			
	User survey	X			
Social Amenities	*Field observations*	√	*Low (needs more landscaping areas)*	*Potential for enriching campus life with sports, recreational, and cultural facilities.*	*Increased diversity and accessibility of recreational and cultural spaces.*
	Spatial analysis	X			
	User experience	X			
Housing	*Mapping*	√	*Moderate (reliance on off-campus residences)*	*Strong interaction with surrounding housing market.*	*Improved dormitory capacity and coordinated development with surrounding residential areas.*
	Student dormitory capacity analysis	X			
	User experience	X			

In terms of transportation, improving pedestrian accessibility and regulating vehicular traffic emerge as critical priorities for the campus's overall functioning. The analysis identified ten pedestrian axes that structure accessibility across and around the campus. While some of these corridors are well integrated with surrounding residential areas, others remain underutilized or face interruptions, highlighting specific routes where interventions in safety, landscaping, and lighting could significantly enhance both campus circulation and city-wide connectivity.

With respect to social amenities, there is clear potential for diversifying sports, recreation, and cultural facilities to enrich campus life and strengthen the university's interaction with its surrounding environment. Regarding housing, the reliance of many students on off-campus residences underscores the need for closer coordination with the local housing market and points to opportunities for integrating new dormitory facilities with planned improvements in accessibility and social amenities.

Taken together, these findings highlight the importance of approaching the campus's long-term development through a comprehensive master plan shaped by the participation of multiple stakeholders.

At the same time, the study's limitations must be acknowledged. The current evaluation relies primarily on field observations and qualitative assessments, while other methods indicated in Table 4—such as spatial–morphological analysis, pedestrian–vehicle separation studies, user experience surveys, and detailed housing and mobility assessments—have not yet been applied. These approaches require more extensive data collection, including student and staff surveys, pedestrian density and mobility tracking, as well as longitudinal assessments of housing and social amenities.

The qualitative preliminary assessment presented in Table 4 reflects the author's interpretive evaluation based on these field observations. While it provides an initial overview of relative strengths across the four components, it does not substitute for evidence-based measurement. Future research should complement this preliminary scoring with user-participation methods such as structured student and staff surveys, focus-group discussions, and quantitative mobility and housing analyses to establish a more robust and empirically validated assessment framework.

Addressing these methodological gaps through a dedicated research program would allow for the systematic application of the remaining methods in Table 4 and enable the development of a multi-layered master plan. Each of the four components—Physical Infrastructure, Transportation, Social Amenities, and Housing—could then be analyzed in greater depth, providing a stronger evidence-based foundation for future campus planning.

6. CONCLUSION

This study examined the processes of spatial expansion and transformation in urban universities through the case of a university campus in Istanbul, testing both the research question and the hypothesis formulated at the beginning of the article. The research question focused on identifying the parameters that shape urban campuses and how these parameters can be guided within the framework of a long-term master plan. The hypothesis proposed that addressing the four parameters - Physical Infrastructure, Transportation, Social Amenities, and Housing - in a systematic and integrated manner would contribute to the development of a sustainable campus master plan.

Building on the literature-derived framework presented in Table 1, these four parameters were applied in the case-study analysis, enabling a structured examination of the existing conditions of the Avcılar Campus. The subsequent assessment, presented in Table 4, linked each parameter to the methods that were actually performed, while also offering a preliminary evaluation of current performance and highlighting specific opportunities for future development. This sequential process demonstrates how a literature-informed methodological framework can be operationalized to produce context-sensitive findings. The analyses reveal that:

- Physical Infrastructure: The campus's molecular–polycentric structure offers opportunities for stronger spatial integration across different areas, yet certain physical conditions continue to limit the continuity of pedestrian-oriented connections.
- Transportation: The identification of ten pedestrian axes in the transportation analysis highlights the central role of circulation systems as both structural backbones and potential growth corridors, indicating where improvements in safety, landscaping, and accessibility could support a more walkable and cohesive campus environment.
- Social Amenities: There is a clear need to diversify sports, recreational, and cultural facilities to enrich campus life and foster stronger interaction between the university and the surrounding urban context.
- Housing: The continued reliance of students on off-campus accommodation underscores both the limited capacity of on-campus dormitories and the potential for innovative collaboration models between the university and the local housing market.

Taken together, these findings underline that the long-term development of urban campuses must be approached through a comprehensive master plan that integrates internal spatial organization with the surrounding urban context. Such a plan, guided by the four identified parameters, can provide a coherent framework for achieving both functional and environmental sustainability.

The study's primary contribution lies in demonstrating how a literature-based methodological framework can be applied to a real-world case, thereby enriching the limited analytical and methodological research on urban university campuses in Turkey. At the same time, the study acknowledges its reliance on observation-based methods and recognizes that several analytical tools identified in the literature - such as user surveys, focus-group studies, quantitative pedestrian-mobility and accessibility measurements, and scenario-based master-plan simulations - remain to be implemented.

Future research that systematically applies these methods to each of the four parameters will enable more detailed and evidence-based evaluations of campus development needs. By articulating this progression - from the conceptual framework (Table 1) to the empirical assessment (Table 4) - the study not only provides a reference point for the examined campus but also establishes a methodological roadmap for advancing research on the spatial transformation of urban university campuses.

Acknowledgement

The author extends sincere gratitude to Architect Zahraa Taha, Architect Esma Nur Gündüz, and Architect Ali Hussein Alali for their valuable contributions in producing various materials of this article and for their support in conducting this research. All completed their undergraduate studies in Department of Architecture at Istanbul Gelişim University, and their contributions to this work were developed during this period.

Declaration of Conflict of Interest

The author declared no potential conflict of interest with respect to the research, authorship, and/or publication of this article.

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