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GASTRONOMIC HUBS AS URBAN CATALYSTS; A RESEARCH-BASED DESIGN APPROACH

KENTSEL KATALİZÖR OLARAK GASTRONOMİ MERKEZLERİ; ARAŞTIRMA TABANLI BİR TASARIM YAKLAŞIMI

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Abstract

This study presents the "Food-Focused Community Center" model as an architectural alternative and an urban catalyst to the traditional shopping center (mall) typology, which often persists as an isolated, introverted "closed box" within the modern urban pattern. The disconnection between commercial spaces, social interaction, and local production in contemporary cities is identified as a fundamental problem. The research investigates the potential of transforming introverted commercial environments into public focal points that repair urban disruptions when a food-oriented program is structured through the criteria of permeability, modularity, and programmatic hybridization. A "Research-Based Design" methodology was adopted, where an experimental laboratory setting utilized capstone design outcomes as empirical typological datasets. Within the scope of a Case Study focused on the dense residential pattern along the Fevzi Çakmak Street corridor in Avcılar Ambarlı-directly complementing the adjacent historic Köyiçi core-ten design prototypes (Pr 1–Pr 10) were evaluated across four fundamental parameters: Permeability, Mass and Tectonics, Modularity, and Programmatic Hybridization. Supported by comparative ground-floor plan layouts and tectonic section diagrams, the findings indicate that micro-plazas and level-access entrances designed as direct extensions of the street effectively ensure urban continuity. Furthermore, rational gridal systems provide high spatial adaptation capability, while the integration of production workshops and market functions renders local craftsmanship visible, transforming standard commercial volumes into active community hubs. As a result, the proposed model serves as an urban catalyst and a "Sustainable Urban Metabolism" prototype that supports local production cycles and social interaction through multi-scalar transitions. In the context of contemporary "de-malling" discussions in the literature, the study offers a robust methodological framework for reconfiguring introverted commercial structures into public generators. Future research is suggested to focus on the typological transformations of these architectural models across varying urban morphologies and their tectonic integration with digital fabrication technologies.

Keywords: Food-Focused Community Center, Architectural Typology, Urban Permeability, Modularity, Programmatic Hybridization.

Özet

Bu çalışma, modern kentsel doku içinde sıklıkla yalıtılmış ve içe dönük birer "kapalı kutu" olarak varlığını sürdüren geleneksel alışveriş merkezi (AVM) tipolojisine mimari bir alternatif ve kentsel bir katalizör olarak "Gıda Odaklı Topluluk Merkezi" modelini sunmaktadır. Günümüz kentlerinde ticari alanlar, sosyal etkileşim ve yerel üretim arasındaki kopukluk temel bir problem olarak tanımlanmaktadır. Araştırma; gıda odaklı bir program geçirgenlik, modülerlik ve programatik hibritleşme kriterleri üzerinden kurgulandığında, içe dönük ticari mekânların kentsel kesintileri onaran kamusal odak noktalarına dönüşme potansiyelini incelemektedir. Metodoloji olarak, deneysel bir laboratuvar kurgusunda lisans bitirme tasarımı çıktılarının ampirik tipolojik veri setleri olarak kullanıldığı "Araştırma Tabanlı Tasarım" yaklaşımı benimsenmiştir. Bitişik konumdaki tarihi Köyiçi çekirdeğini doğrudan tamamlayan Avcılar Ambarlı'daki Fevzi Çakmak Caddesi koridorunun yoğun konut dokusu odağında yürütülen Örnek Olay Çalışması kapsamında, on farklı tasarım prototipi (Pr 1 – Pr 10) dört temel parametre üzerinden değerlendirilmiştir: Geçirgenlik, Kütle ve Tektonik, Modülerlik ve Programatik Hibritleşme. Karşılaştırmalı zemin kat plan şemaları ve tektonik kesit diyagramlarıyla desteklenen bulgular; sokağın doğrudan bir uzantısı olarak tasarlanan hemzemin girişlerin ve mikro meydanların kentsel sürekliliği etkin bir şekilde sağladığını göstermektedir. Ayrıca, rasyonel gridal sistemler yüksek mekânsal adaptasyon kabiliyeti sunarken, üretim atölyeleri ile pazar işlevlerinin entegrasyonu yerel zanaatkarlığı görünür kılarak standart ticari alanları aktif topluluk merkezlerine dönüştürmüştür. Sonuç olarak önerilen model, çok ölçekli geçişler yoluyla yerel üretim döngülerini ve sosyal etkileşimi destekleyen kentsel bir katalizör ve "Sürdürülebilir Kentsel Metabolizma" prototipi işlevi görmektedir. Çalışma, literatürdeki güncel "de-malling" (AVM'sizleştirme / açık sisteme dönüştürme) tartışmaları bağlamında, içe dönük ticari yapıların kamusal jeneratörler olarak yeniden yapılandırılmasına yönelik güçlü bir metodolojik çerçeve sunmaktadır. Gelecekteki araştırmaların, bu mimari modellerin farklı kentsel morfolojilerdeki tipolojik dönüşümlerine ve dijital üretim teknolojileriyle olan tektonik entegrasyonuna odaklanması önerilmektedir.

Anahtar Kelimeler: Gıda Odaklı Topluluk Merkezi, Mimari Tipoloji, Kentsel Geçirgenlik, Modülerlik, Programatik Hibritleşme.

1. INTRODUCTION

In the formation of the modern urban pattern, commercial spaces are not merely economic units but are typologies situated at the core of urban morphology and social life. Historically, food-oriented marketplaces have functioned as public focal points where producers, consumers, and local residents converge. Global examples such as Chelsea Market (New York), Mathallen (Oslo), and Mercado Central (Valencia) have demonstrated how industrial heritage and food culture can trigger urban vitality through architectural continuity (Yildirim & Ciritci, 2025). Due to their structural flexibility, these structures are defined as "Gastronomic Hubs". However, in such transformation projects, the risk of traditional markets transforming into "fortress-like" structures-detaching from the neighborhood pattern due to gentrification and negatively impacting the quality of life for local residents-must not be overlooked (Guimarães, 2019).

This public vitality aligns directly with long-standing commercial traditions, particularly the Ottoman/Turkish bazaar heritage. Historically, spatial typologies such as the bedesten, arasta, and open-air marketplaces served as the socio-spatial backbone of urban settlements, functioning not only as commercial nodes but as primary catalysts for civic interaction, community bonding, and neighborhood identity. These traditional commercial spaces established an organic, highly porous interface with the street, ensuring seamless physical and visual continuity between trade and daily public life.

Since the late 20th century, both globally and across Türkiye, commercial spaces have increasingly detached from this neighborhood-scale street culture, evolving into massive shopping malls. This shift introduced "closed box" structures into the urban fabric, severing physical and social ties with their immediate surroundings. These structures transformed into simulated interiors that replace urban reality, as described by Crawford (1992). Yiwei and Manfredini (2022) emphasize that within contemporary ultra-modern paradigms, this introverted configuration exhibits an ambivalent character that hinders spatial integration and disrupts urban continuity. Taşkın Erten (2011) defines this process as the "privatization of public space," noting that malls create pseudo-public areas-strictly controlled by management-that replace traditional urban squares. Rather than referring exclusively to abandoned building stock, the concept of "Dead Malls" in contemporary urban discourse signifies a broader spatial crisis: the socio-urban obsolescence and spatial isolation imposed by introverted commercial typologies that sever urban continuity (Atmaca, 2023).

In response to the homogenizing and introverted nature of conventional shopping malls, this research presents the "Food-Focused Community Center" model, which centers on local production. Borysenko (2025a) states that within the context of the crisis faced by physical trade centers, recreational communication areas and public functions have become fundamental structural elements in typological transformation. Furthermore, Favargiotti et al. (2024) define food hubs not just as commercial areas, but as strategic tools that mobilize the spatial, ecological, and cultural potentials of a place at the neighborhood (proximity) scale. At this juncture, the roles of local shopkeepers and small-scale businesses in constructing neighborhood social life form the social foundation of the project regarding the sustainability of community practices (Steigemann, 2019).

The disconnection between the food supply chain and social interaction spaces in modern cities has created a significant void in architectural typology. While traditional neighborhood markets remain vulnerable to climate conditions due to their open-air nature, modern shopping malls offer spaces that isolate the user from the outside world. Sorkin (1992) argues that this new urban pattern marks the "end of public space". Chiodelli and Moroni (2015) emphasize that the mall typology erodes the public sphere, leading to morphological disruptions in the urban pattern that weaken social interaction. The transformation of low-income areas into "retail deserts" and the restricted access to quality food deepen spatial injustice in such neighborhoods (Schuetz et al., 2012). The morphological

gaps created by these idle or introverted commercial configurations necessitate "De-malling" strategies in contemporary urban repair discussions, aiming to re-open closed commercial volumes to the street network (White et al., 2025). Specifically, Atmaca (2023) highlights that repurposing such dead commercial voids with functions aimed at public benefit, such as education or community centers, is critical for urban sustainability.

In high-density residential patterns like Avcılar Ambarlı, the imbalance between these introverted commercial environments and open street life has led to the disappearance of "in-between spaces" where neighborhood residents can congregate. Contextually, the organic settlement fabric and cultural layers of Ambarlı Köyiçi at the historic core of this territory have been previously evaluated regarding morphological transformation patterns, heritage conservation, and regional risk parameters, establishing the necessity of holistic public space continuity (Yıldırım, 2025). Building upon this regional background, Fevzi Çakmak Street serves as a vital commercial and pedestrian corridor linking the historic village core to the coastal promenade and main arterial transportation networks. Consequently, addressing the contemporary spatial crisis along Fevzi Çakmak Street necessitates a dedicated architectural intervention-a Gastronomic Hub-that directly complements the macro-scale urban regeneration strategies of Ambarlı by functioning as a porous, localized public generator.

In current architectural production, the urban permeability of commercial buildings often remains in the shadow of cost-oriented decisions. Unlike traditional markets, these "junkspaces," as emphasized by Koolhaas (2001), are identityless voids sustained only by air-conditioning systems. Recent research by Erdoğan et al. (2023) scientifically demonstrates that contemporary consumers are moving away from these closed spatial configurations, with an increasing longing for open/semi-open urban spaces that possess a traditional bazaar imagery. However, as proposed by Borysenko (2025b), the attractiveness of modern trade centers is no longer measured solely by their commercial capacity, but by the "non-commercial" qualities they offer. At this juncture, the fundamental problem is how a food-oriented center can be designed as a "community center" that integrates with its surrounding pattern.

In this context, the research seeks an answer to the following primary question: Can the 'Food-Focused Community Center' typology, structured with a hybrid program, constitute an urban and social alternative to the traditional mall structure within the framework of permeability, tectonic language, modularity, and programmatic flow criteria?

Building upon theoretical discussions in the literature, such as "junkspace" (Koolhaas, 2001) and the "increasing importance of non-commercial qualities" (Borysenko, 2025b), the hypothesis of this research is based on the reconfiguration of a food-oriented community center through urban and architectural strategies. In this regard, it is envisioned that the proposed model will integrate with the street through urban permeability (porosity) strategies at the ground level to break the introverted configuration criticized by Koolhaas (2001). Furthermore, the design aims to adopt modular and flexible structural systems borrowed from industrial heritage to mobilize the spatial potentials highlighted by Favargiotti et al. (2024). Finally, it is posited that by providing a programmatic hybridization that unites production and consumption on the same spatial plane, this approach can resolve the urban disconnection created by existing introverted commercial structures. This architectural intervention is expected to transform the typology from a mere shopping area into a public focal point that triggers social interaction at the neighborhood scale and sustains local food culture.

The primary aim of this study is to discuss, both theoretically and practically, the "Gastronomic Hub" model as an alternative to the traditional shopping mall typology, which remains spatially and socially isolated from its surroundings in the contemporary urban pattern. The research aims to demonstrate how a food-oriented program, mediated through specific architectural tools-namely permeability, modularity, and hybridization-can trigger public life and establish a sustainable urban metabolism at the neighborhood scale.

The methodology of the research is grounded in a "Research-Based Design" approach. The process consists of two main stages: In the first stage, theoretical criteria derived from five global historic gastronomy centers (such as Chelsea Market and Mathallen)-focusing on structural continuity, contextual relationship, and spatial organization-were established as a baseline. In the second stage, this theoretical framework was tested through design prototypes based on four fundamental parameters: Permeability, Mass and Tectonics, Flexibility and Modularity, and Programmatic Hybridization.

This analytical process was supported by comparative matrices that quantified qualitative observations and graphical analysis methods presenting the performance of the evaluated experimental models collectively. This approach ensured the transformation of design outcomes into a typological dataset, providing a robust empirical foundation for the proposed architectural model.

2. THEORETICAL FRAMEWORK: HISTORICAL REFERENCES AND TYPOLOGICAL CRITERIA

The architectural configuration of the proposed model is based on typological continuities that have proven their rationality throughout history. Unlike today's introverted commercial structures, this section examines the theoretical foundations of marketplaces that establish strong bonds with their surroundings through the axes of industrial flexibility, urban logistics, and contextual harmony. This holistic approach establishes the theoretical legitimacy of the objective analysis criteria used in evaluating the design prototypes developed within the scope of the research. By bridging historical precedents with contemporary needs, the framework provides a robust basis for transforming qualitative architectural values into measurable design parameters.

2.1. Industrial Heritage and the Principle of Spatial Continuity

The typological development of historical marketplaces was shaped by the spatial flexibility offered by the 19th-century Industrial Revolution. The common denominator of examples such as Chelsea Market, Mathallen, and Groot Vleeshuis is the "uninterrupted space" configuration initially designed for production or storage. This structural continuity provides a capacity for "spatial adaptation," allowing the building to adjust to various functional scenarios over time, such as the transition from a production site to a gastronomic center. Indeed, Bianco (2024) emphasizes that in the transformation of Europe's historic covered markets into gastronomic focal points, the spatial breadth provided by cast iron and steel structures serves as a fundamental tool for urban regeneration. Such adaptive reuse practices reclaim industrial heritage not merely as physical building stock but as an integral part of urban memory and cultural sustainability (Seçer Kariptaş & Kariptaş, 2024).

This inherent spatial flexibility shares deep conceptual ties with traditional bazaar and marketplace typologies, where structural adaptability and spatial continuity historically allowed trade areas to expand, reconfigure, or accommodate diverse public gatherings over time. While the flexibility offered by industrial heritage forms a rational baseline for contemporary marketplace designs, Bazazzadeh et al. (2021) highlight that the typological flexibility of industrial buildings is the most significant criterion in sustainable reuse practices. In this context, Mısırlısoy (2021) states that adapting typological genetic codes to modern needs while preserving them plays a critical role in the continuity of social memory. Large-span roofing systems, as seen in structures like Mercado Central, define a fluid circulation scheme at the ground level free from structural obstacles. This organizes not only commercial units but also vast volumes that trigger public interaction; supporting this spatial organization with pedestrian flow nodes ensures the reintegration of dormant industrial structures into urban life (Jiao et al., 2025).

Furthermore, flexible design approaches, such as the "box-in-a-box" logic proposed by De Gregorio et al. (2023), offer a sustainable preservation strategy that allows the integration of hybrid programs without disrupting the physical integrity of the historic structure (Mısırlısoy, 2021). Öztürk (2025) also demonstrates, through the example of the Eskişehir Haller Youth Center, how an original structural system designed as a fruit and vegetable wholesale market can be preserved while

integrating new functions without disturbing the spatial layout, thereby sustaining its authentic identity. Consequently, the structural configuration in these buildings becomes a design tectonic that manages the dynamic and multi-layered nature of the marketplace, forming the theoretical starting point for the spatial modular grid intervals utilized in the design prototypes.

2.2. Urban Focal Point and Integration with Transportation Networks

Historical marketplaces are situated at strategic points integrated into the city's logistical and social arteries. Examples such as Mathallen and Mercado Central nourish urban vitality through direct connections established with transportation networks (rivers, railways, and pedestrian axes). These structures function as "Transit-Oriented Development" (TOD) nodes where diverse user groups intersect, acting as catalysts that transform their surroundings. In this context, TODs are not merely infrastructures providing accessibility; they are urban community centers that encourage social interaction and a sense of belonging (Cervero et al., 2017). According to the '3V Approach' developed by Salat and Ollivier (2017), the transformation of transportation nodes into successful urban spaces depends on synchronizing economic value with spatial quality at these junction points.

The integration of commercial spaces with transportation nodes does more than just increase accessibility; as highlighted by Mazzetto et al. (2025), it creates strategic 'mobility hubs' that enhance urban livability and social well-being. Furthermore, Fahlbusch et al. (2025) state that the multi-functional nature of modern mobility hubs increases urban resilience by combining transportation services with urban logistics and energy systems.

This contextual relationship is a fundamental design parameter for the Avcılar Ambarlı district, the application area of this study. The macro-scale position of the region-situated at the strategic intersection of the E-5 highway, the Metrobus rapid transit corridor, the Ambarlı port facilities, and the Marmara coastal band-endows it with significant potential as an urban focal point. Within this multi-layered mobility network, Fevzi Çakmak Street operates as the primary commercial and pedestrian spine that directly feeds local urban life. As emphasized by Aydın et al. (2022), mobility hubs designed at such strategic junction points trigger the use of different transportation and service modes by citizens through the socio-economic advantages they offer. The 'Transit-Oriented Communities' (TOC) vision, mentioned in the WSP (2025) report, supports the potential of the marketplace to be not just a commercial area but a social center rising upon transportation networks.

As a modern reflection of the "city-integrated market" model observed in historical references, it is a typological necessity for buildings to set back from main arteries to create public entrance plazas and to possess a permeable circulation layout that allows urban pedestrian axes to pass through the structure. Establishing pedestrian-priority connections through commercial spaces along key corridors like Fevzi Çakmak Street increases spatial permeability, enabling the formation of urban generators that trigger social interaction.

2.3. Spatial Organization and Contextual Adaptation Strategies

The success of a new architectural intervention depends on its ability to read the "rhythm" of the existing urban morphology and establish a respectful dialogue with the surrounding pattern. In this context, urban porosity is not merely a visual similarity but a fundamental organizational strategy that utilizes urban voids-such as plazas, courtyards, and passages-as structural elements (Castel Branco and da Costa, 2024). As observed in successful examples like Santa Caterina, contextual adaptation is the redefinition of boundaries between public and private spheres through soft transitions and active edges.

This porous spatial organization echoes the morphogenetic logic of traditional Ottoman/Turkish bazaar cultures, where organic street networks, recessed shopfronts, covered passages, and semi-open courtyards established continuous public interfaces between shopkeepers and pedestrians. When examined at the block scale, the role of voids and fragmented masses within such traditional patterns is critical in establishing urban rhythm (Reinoso Bellido et al., 2021). In this idealized approach, rather than presenting a monolithic and dominant mass against the existing residential pattern, the

building is expected to balance the scale through micro-plazas and fragmented volumes that ensure urban continuity. At this point, design transcends an intuitive approach and transforms into a holistic choice that reinterprets the structural principles of the urban pattern through a modern language (Weilacher, 2018).

Especially in dense urban areas, permeable structures where interior and exterior spaces interpenetrate form the basis of an open urban design that encourages social interaction (Christiaanse & Jabłońska, 2022). This strategy accepts the dynamic flows and functional interfaces required by the modern city as architectural inputs while preserving local identity (Hein, 2021). Consequently, contextual adaptation is less about the physical presence of the building and more about how urban voids, active frontages, and spatial boundaries are organized.

3. METHODOLOGY: DESIGN PROTOTYPING AND ANALYTICAL PROCESS

This section details the technical implementation stages of the "Research-based Design" methodology, where theoretical data is integrated into practical design processes (Groat & Wang, 2013). The research process was conducted within an analytical laboratory setting at the Istanbul Gelişim University Department of Architecture, where an urban problem was tested through design prototypes. In this context, the experimental environment was structured not merely as a place where knowledge is transmitted but as a space where production and research are intertwined (Corbo, 2026). The operational reliability and the conceptual capacity of using capstone design frameworks as qualitative visual datasets for local spatial strategies in the Ambarlı region have been methodologically tested and validated in preceding research (Yıldırım, 2025). This approach is based on principles that combine intuitive design processes with evidence-based research data, treating urban design as a scientific discipline (Christiaanse & Jabłońska, 2022).

The methodological process is structured through a cyclical model covering pre-design analysis, the design process, and the evaluation of results (Roggema, 2017). The Ambarlı Neighborhood in Avcılar, located at the intersection of Istanbul's dense residential pattern and logistical axes, was selected as the application area. The strategy of research through design accepts the architectural form not just as an aesthetic output but as a spatial experiment of urban data (Hauberg, 2011). To establish a comprehensive contextual baseline for this empirical environment, a multi-scalar spatial and logistical analysis was synthesized in Figure 1. This location analysis maps the macro and mezzo-scale spatial dynamics of the territory, illustrating: (1) the primary regional transportation connections including the E-5 highway and the Metrobus rapid transit line; (2) the organic settlement fabric of the historic Ambarlı Köyiçi core; (3) the targeted project site of approximately 3,000 m² along Fevzi Çakmak Street and its direct physical continuity with the Marmara coastal promenade; and (4) the surrounding functional distribution alongside active pedestrian circulation flows. Operating as a strategic urban spine within this spatial matrix, Fevzi Çakmak Street holds strong potential as a localized public focal point. The rational gridal system, presented as a technical constraint during the design process, ensured both the resolution of the structural system through an industrial language and the production of flexible functional areas with large spans required in the interior.

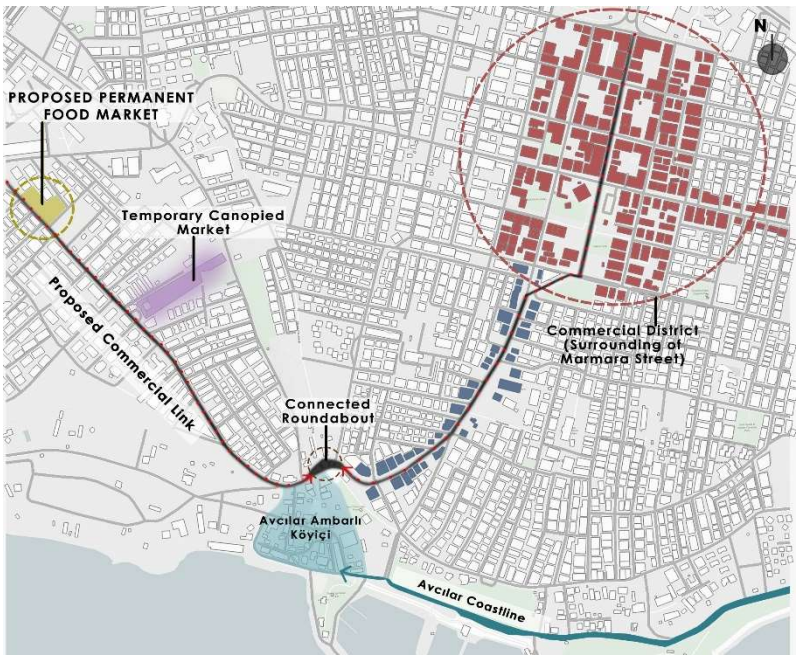


Figure 1. Macro and mezzo-scale location analysis of the study area in Avcılar Ambarlı: Transportation connectivity, spatial relationship between Fevzi Çakmak Street, historic Ambarlı Köyiçi, and coastal promenade (Illustrated by Azra Özer).

In the ground floor configuration, a porosity strategy was prioritized, aiming to prevent the building from remaining detached from the street and inviting urban flow inside through micro-plazas in accordance with the principle of public continuity. To define the character of the market area during the design phase, the distinction between temporary open markets and fixed retail units-which are frequently confused in the literature-was used as a technical dataset. Unlike temporary marketplaces that are set up on specific days of the week and consist only of a roof covering, this study targeted fixed retail units consisting of permanent shop units serving continuously and defined within a permanent architectural shell. This distinction forms the primary architectural rationale for the structural permanence in the design prototypes and the modular configuration of standard operational units.

Within the scope of this programmatic hybridization, these commercial units were integrated with local production workshops (maker spaces) and social activity areas. Consequently, the circulation scheme was transformed from a purely shopping-oriented flow into an experience and production-oriented flow.

The selection of the 10 representative prototypes from the larger cohort of 34 projects was not based on subjective grading, but on a strict structural screening. Projects that failed to implement a fully coordinated and functional gridal system were excluded to ensure that the analyzed typological dataset reflects architecturally viable and technically resolved models. These selected design prototypes (Pr 1 - Pr 10) constitute the primary dataset used to test the theoretical hypotheses. The analytical process was completed by transforming the portfolio, report, and technical drawing data of these experimental models into comparative matrices across four fundamental parameters-permeability, mass-tectonics, flexibility-modularity, and hybridization-and graphically visualizing the resulting performance data.

4. CASE STUDY: ANALYSIS OF ARCHITECTURAL TYPOLOGIES

In this section, ten different design prototypes, considered representative outputs of the experimental process, are subjected to a detailed analysis in light of the criteria defined within the methodological framework. Although the selected experimental models (Pr 1–Pr 10) developed diverse architectural reflexes for the same urban void in Avcılar Ambarlı, they converge on common spatial objectives such as ground floor permeability, the use of modular grids, and programmatic hybridization. Prior

to the analytical process, visual data summarizing the massing form, tectonic character, and urban stance of each experimental model are presented in Appendix A (See Figure A1 and Figure A2). To complement this three-dimensional visual inventory with rigorous technical documentation, the ground-floor spatial configurations, street-level circulation passages, and structural grid alignments of the prototypes are mapped in Figure 2. Furthermore, the vertical tectonic relationships, massing voids, and interior spatial flow schemes are illustrated through comparative section diagrams in Figure 3. Together, these technical drawings provide the fundamental spatial and structural baseline for verifying the qualitative and quantitative evaluations that follow.

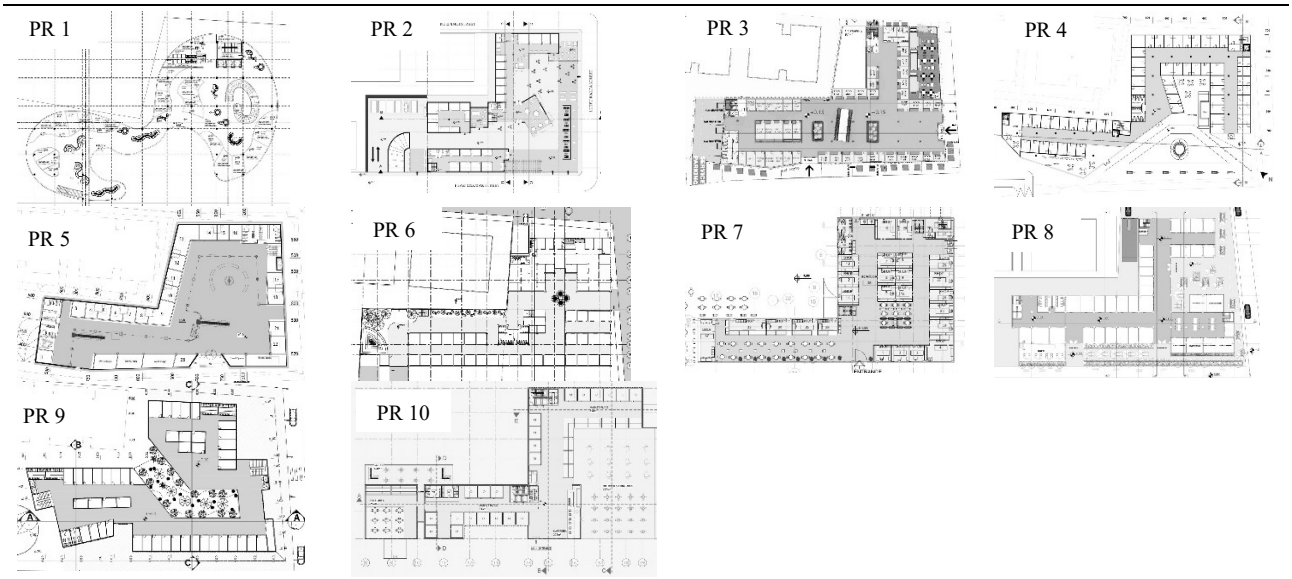


Figure 2. Comparative ground floor plan schematics of the analyzed design prototypes (Pr 1–Pr 10) illustrating spatial permeability, street-level access, and modular structural grid layouts.

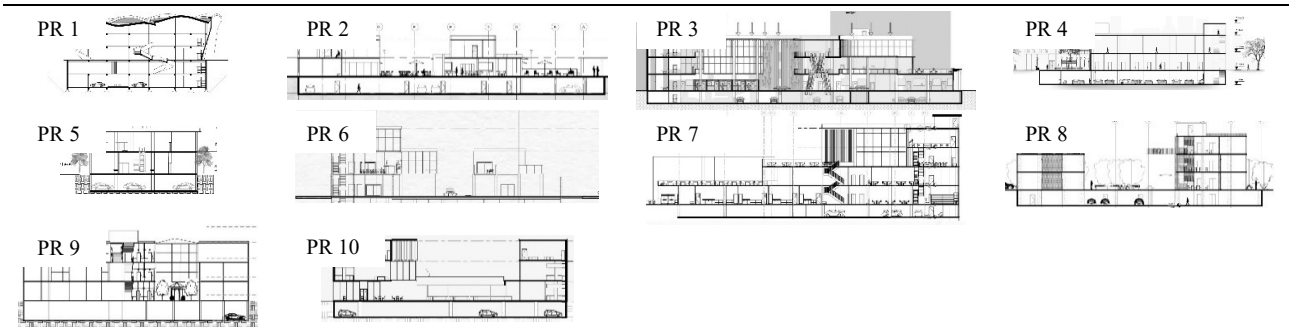


Figure 3. Tectonic section and spatial flow diagrams of the analyzed design prototypes (Pr 1–Pr 10) highlighting vertical hybridization, massing voids, and semi-open public spaces.

To transform qualitative architectural data into a comparable and structured evaluation, a standardized scoring system was adopted for the matrices in Tables 1, 2, 3, and 4. Each typological variant was evaluated based on three core indicators under each main parameter, rated as High (3 pts), Medium (2 pts), or Low (1 pt). The sum of these indicators constitutes the Cumulative Performance Score (CPS), ranging from a minimum of 3 to a maximum of 9 points. These scores are classified into specific success bands-8–9 points (High), 5–7 points (Medium), and 3–4 points (Low)-representing the overall performance level of the prototypes and forming the empirical basis for the comparative analysis graph presented in findings & discussion section.

The analyses involve transforming the data obtained from the portfolios, reports, and technical drawings of each design prototype into these comparative matrices across four fundamental parameters. Accordingly, the study first examines 4.1. Permeability (Porosity) Strategies regarding the physical and visual relationship with the street (Table 1), followed by 4.2. Massing and Tectonic Decisions and the scale dialogue established with the surrounding pattern (Table 2). The technical and flexibility dimensions are evaluated under 4.3. Flexibility and Modularity through rational grid systems (Table 3), and finally, the functional richness is assessed via the 4.4. Programmatic Hybridization and Spatial Flow parameter (Table 4). Supported by both the 3D massing visualizations (Figure A1 and Figure A2) and integrated technical plan/section schematics (Figure 2 and Figure 3), this systematic reading aims to produce a robust typological dataset for the design standards of gastronomic hubs.

4.1. Permeability (Porosity) Strategies

Within the scope of this study, architectural permeability is defined as the level of physical, visual, and social interaction established between the building and the urban pattern. To liberate the designed prototypes from the closed-box effect characteristic of traditional shopping malls, integration with street life at the ground level was established as a primary design objective. In this context, the experimental models were analyzed based on three criteria: physical relationship with the street (level access), the configuration of micro-plazas, and visual transparency, which allows the interior space to be perceived from the outside (see Table 1).

Table 1. Analysis matrix of permeability (porosity) strategies (Source: Author).

Project ID / Design Parameters	**Pr 1**	**Pr 2**	**Pr 3**	**Pr 4**	**Pr 5**	**Pr 6**	**Pr 7**	**Pr 8**	**Pr 9**	**Pr 10**
Physical Connection to Street (At-grade Access)	2 (M)	3 (H)	2 (M)	3 (H)	1 (L)	2 (M)	1 (L)	3 (H)	1 (L)	3 (H)
Micro-Plaza / Entrance Square Configuration	3 (H)	3 (H)	2 (M)	3 (H)	1 (L)	1 (L)	1 (L)	3 (H)	1 (L)	3 (H)
Visual Permeability (Transparency)	3 (H)	3 (H)	2 (M)	2 (M)	3 (H)	3 (H)	2 (M)	1 (L)	1 (L)	3 (H)
Cumulative Score	8	9	6	8	5	6	4	7	3	9
Performance Band	High	High	Medium	High	Medium	Medium	Low	Medium	Low	High

The grading of the qualitative data presented in Table 1 is based on three fundamental levels. Accordingly, a 'High' rating signifies that the relevant criterion forms the main backbone of the design, where the ground floor is largely open or the street is physically rendered as a direct extension of the building. A 'Medium' rating indicates that the criterion exists within the design but is constrained by structural boundaries such as elevation differences or load-bearing elements. A 'Low' rating shows that the criterion remains secondary, with the building exhibiting a more introverted character or maintaining a minimal physical connection with the street. This grading system schematically reveals the extent to which the design prototypes approach the goal of urban continuity.

An examination of Table 1 shows that specific prototypes systematically established a high level of physical relationship (level access) at the street level. Specifically, experimental models Pr 2, Pr 4, Pr 8, and Pr 10 configured the ground floor as a direct extension of the street, incorporating the user into the interior flow without encountering structural obstacles. Regarding the use of micro-plazas as an urban threshold, design prototypes Pr 1, Pr 2, Pr 4, Pr 8, and Pr 10 stand out significantly within the cohort. In these experimental models, the entrance squares defined by setting the mass back from the main artery functioned as both social stopping points for neighborhood residents and urban generators that facilitate infiltration into the building.

In terms of the visual permeability criterion, design prototypes Pr 1, Pr 2, Pr 5, Pr 6, and Pr 10 maximized transparent surfaces in their facade designs, ensuring that the gastronomic activity within the interior is perceived by the urban space. This triggered the building's transformation into an urban catalyst that is visually integrated into the social life of the neighborhood rather than being just a commercial area. Across all analyzed variants, these spatial porosity strategies-including level access points, micro-plazas, and continuous circulation arcades-are holistically documented in the comparative ground floor plans (Figure 2), confirming how the entire cohort physically opens its ground floor spatial structure to the surrounding urban fabric. Consequently, when all sub-headings in Table 1 are considered together, the analyzed prototypes exhibited a stance that supports urban integration by creating a porous envelope, in contrast to traditional commercial buildings.

4.2. Massing and Tectonic Decisions

One of the most significant elements determining a building's character within the urban environment is its massing organization and its tectonics-the way this mass is expressed through materials and details. The dense residential pattern of the Avcılar Ambarlı district and the 5-story silhouette of Fevzi Çakmak Street established a scalar reference for the designed Gastronomic Hub. In this section, the ten design prototypes were analyzed based on massing subtractions (setbacks), canopy structures as tools for climatic comfort and space definition, and the scale dialogue established with the surrounding pattern (see Table 2).

Table 2. Analysis matrix of massing and tectonic decisions (Source: Author).

Project ID / Design Parameters	**Pr 1**	**Pr 2**	**Pr 3**	**Pr 4**	**Pr 5**	**Pr 6**	**Pr 7**	**Pr 8**	**Pr 9**	**Pr 10**
Setbacks and Massing Voids	1 (L)	1 (L)	2 (M)	2 (M)	2 (M)	3 (H)	3 (H)	3 (H)	1 (L)	2 (M)
Semi-Open Space Configuration and Climatic Control	2 (M)	3 (H)	2 (M)	3 (H)	3 (H)	3 (H)	2 (M)	3 (H)	3 (H)	3 (H)
Scale Relationship with Urban Pattern and Tectonic Language	1 (L)	3 (H)	2 (M)	1 (L)	2 (M)	3 (H)	3 (H)	3 (H)	2 (M)	2 (M)
Cumulative Score	4	7	6	6	7	9	8	9	6	7
Performance Band	Low	Medium	Medium	Medium	Medium	High	High	High	Medium	Medium

The grading criteria used to evaluate the data in Table 2 define the massing character of the experimental models as follows: A 'High' rating indicates that the project utilized significant subtractions to break the massing hierarchy, that deep canopies dominate the design, and that a completely fragmented, breathable silhouette was created against the surrounding residential pattern. A 'Medium' rating indicates that setbacks and canopies are present but function as secondary elements rather than the primary character of the design, resulting in a more block-like effect despite being compatible with the surroundings. A 'Low' rating represents limited massing movements, unemphasized canopy structures, and a preference for a more introverted and closed massing language relative to the urban context.

The analysis results show that the criteria for Setbacks and Massing Subtractions were highly prioritized within specific typological variants. This demonstrates an approach that fragments the mass and creates urban voids, deliberately avoiding the closed, massive layout of the traditional mall typology. Specifically, in design prototypes Pr 6, Pr 7, and Pr 8, massing movements were used not just as an aesthetic choice but as a tool to carry the public space to upper levels through terracing.

Furthermore, regarding Semi-Open Space Configuration and Climatic Control, a considerable majority of the examples-including Pr 2, Pr 4, Pr 5, Pr 6, Pr 8, Pr 9, and Pr 10-exhibited High performance. These design prototypes utilized massing subtractions and setbacks to both ensure climatic control (natural shading) and create strong, sheltered areas defining the entrance zones. In the parameter of Scale Relationship with Surrounding Pattern and Tectonic Language, specific experimental models-most notably Pr 2, Pr 6, Pr 7, and Pr 8-achieved a high level of success. The physical reality of these massing subtractions, terraced upper floors, deep canopy structures, and vertical scale adaptations across the 10 prototypes is explicitly validated in the comparative tectonic section diagrams (Figure 3). When Table 2 is analyzed as a whole with its sub-headings, the vast majority of design prototypes successfully established a fragmented and dynamic massing dialogue that remains non-dominant, while remaining faithful to the 5-story height limitation of the surrounding residential pattern.

4.3. Flexibility and Modularity

The ten analyzed design prototypes were evaluated based on the rationality of their gridal systems, modular unit arrangements, and spatial adaptation capabilities (see Table 3). In the majority of the designs, the adoption of a rational gridal system as a primary design decision produced the spatial equivalent of an uninterrupted space configuration by providing large interior spans. The grading of the data presented in Table 3 is based on the use of the grid system as the main structural skeleton, the repetitive order of the units, and the space's ability to adapt to different scenarios (exhibitions, events, etc.).

Table 3. Analysis matrix of flexibility and modularity (Source: Author).

Project ID / Design Parameters	**Pr 1**	**Pr 2**	**Pr 3**	**Pr 4**	**Pr 5**	**Pr 6**	**Pr 7**	**Pr 8**	**Pr 9**	**Pr 10**
Rationality of the Gridal System	1 (L)	3 (H)	3 (H)	3 (H)	3 (H)	3 (H)	3 (H)	3 (H)	3 (H)	3 (H)
Modular Arrangement of Market Units	1 (L)	3 (H)	3 (H)	3 (H)	3 (H)	3 (H)	3 (H)	3 (H)	3 (H)	3 (H)
Spatial Adaptation and Flexibility	1 (L)	2 (M)	2 (M)	2 (M)	2 (M)	3 (H)	3 (H)	3 (H)	2 (M)	3 (H)
Cumulative Score	3	8	8	8	8	9	9	9	8	9
Performance Band	Low	High	High	High	High	High	High	High	High	High

The results of Table 3 indicate that, with the single exception of Pr 1, the vast majority of the design prototypes achieved gridal rationality through the systematic placement of modular units and exhibited high performance through the flexible social areas structured around these units. As an architectural outcome of the permanent shop structure strategy defined in Section 3, the modular arrangement of market units allowed for their combination to meet different commercial scales, thus grounding spatial flexibility on a rational foundation. High performance was observed at a matching rate in this regard.

This standardized structural logic is systematically demonstrated in the comparative ground floor plans (Figure 2), where rational structural grid axes and repeatable shop modules establish a clear typological baseline across the experimental cohort. Spatial adaptation and flexibility capability reached a high level across multiple variants within the cohort. It is noteworthy that despite the design originality of Pr 1, it generally exhibited the lowest performance within this specific parameter. Consequently, this modular approach has moved the experimental models beyond being static commercial centers, transforming them into flexible community platforms capable of evolving into diverse public uses.

4.4. Programmatic Hybridization and Spatial Flow

The most fundamental characteristic distinguishing the Gastronomic Hub typology from traditional commercial structures is the symbiotic relationship established between sales-oriented spaces and social or production-oriented functions. Within the scope of this study, the objective was for the marketplace to function not merely as a shopping venue but as a hybrid hub where education, production, and social interaction coexist. In this context, the ten design prototypes were analyzed based on the integration of commercial and public functions, the configuration of socially-oriented circulation, and the level of hybridization of programmatic elements across horizontal or vertical planes (see Table 4).

Table 4. Analysis matrix of programmatic hybridization and spatial flow (Source: Author).

Project ID / Design Parameters	**Pr 1**	**Pr 2**	**Pr 3**	**Pr 4**	**Pr 5**	**Pr 6**	**Pr 7**	**Pr 8**	**Pr 9**	**Pr 10**
Integration of Commercial and Public Functions	3 (H)	3 (H)	3 (H)	3 (H)	3 (H)	3 (H)	3 (H)	3 (H)	3 (H)	3 (H)
Central and Socially-Oriented Circulation Schema	3 (H)	3 (H)	3 (H)	3 (H)	3 (H)	3 (H)	3 (H)	3 (H)	3 (H)	3 (H)
Programmatic Hybridization (Horizontal/Vertical)	3 (H)	3 (H)	3 (H)	2 (M)	2 (M)	3 (H)	3 (H)	3 (H)	3 (H)	3 (H)
Cumulative Score	9	9	9	8	8	9	9	9	9	9
Performance Band	High	High	High	High	High	High	High	High	High	High

The grading of the analytical data presented in Table 4 is based on the following criteria: A 'High' rating indicates that functions are tightly articulated, with direct visual and physical links established between production (workshops) and consumption (market) areas. In experimental models at this level, the circulation scheme is shaped around a central plaza or atrium that maximizes social interaction. A 'Medium' rating indicates that hybridization is present, but functions are separated by clearer boundaries on a floor-by-floor (vertical) basis, with circulation structured in a more rational and access-oriented language. A 'Low' rating represents functions that are isolated from one another, where no spatial dialogue is established between the market area and workshops, and the circulation scheme is focused solely on technical access.

According to the analysis results, the integration of commercial and public functions, as well as the configuration of central and socially-oriented circulation, reached a High level across all experimental models. Specifically, sales units, food workshops, and tasting areas are seen to interweave within the same spatial volume. These design prototypes configure the user not merely as a consumer but as a participant witnessing the preparation and production process of food. In terms of circulation schemes, the vast majority of experimental models created a central focal point (atrium or inner courtyard) that invites the city inside, transforming circulation into a social experience.

This multi-dimensional programmatic fluidity is clearly mapped across both the horizontal plan layouts (Figure 2) and vertical spatial flow diagrams (Figure 3), illustrating how public production workshops on ground levels seamlessly interlock with upper-level social or commercial zones. In typological variants where programmatic hybridization remained at a 'Medium' level, such as Pr 4 and Pr 5, the distinction between commercial and public areas was defined by clearer physical thresholds, with hybridization structured more as a vertical relationship between floors. Consequently, the design prototypes exhibiting a high level of hybridization transformed the marketplace into a living gastronomy laboratory and a social center at the neighborhood scale, spatially supporting urban integration.

5. FINDINGS AND DISCUSSION: THE "GASTRONOMIC HUB" AS AN ARCHITECTURAL TOOL

This section synthesizes the data obtained from the typological analyses conducted in the fourth section and discusses the urban and architectural potentials of the proposed model. The integrated performance trends derived from the ten analyzed design prototypes are summarized via cumulative scores in Figure 4. The graphical data demonstrates how the scores from Tables 1–4 have shaped the primary structural and spatial backbone of the design variants.

When the graph is analyzed, it is evident that Programmatic Hybridization (4.4) and Flexibility (4.3) are the most stable and high-performing elements across the evaluated variants. Specifically, the data from Table 4 shows that the vast majority of the prototypes cluster within the "High" band (8–9 points), indicating that the food-focused program was successfully integrated with a hybrid spatial flow. In contrast, Permeability (4.1) and Mass-Tectonic (4.2) decisions emerge as the primary distinguishing factors that determine the qualitative differences between the design variants.

Indeed, design prototypes such as Pr 2 and Pr 10, which peak in the "High" performance band across all parameters on the graph, exemplify how the urban catalyst effect is maximized when urban permeability is correctly integrated with the massing language. On the other hand, the regression of examples like Pr 1 and Pr 9 into the "Low" band (3–4 points) in the Permeability (4.1) and Modularity (4.3) parameters reflects the weakness of the physical bonds these designs established with the surrounding pattern and the disruptions in their typological development.

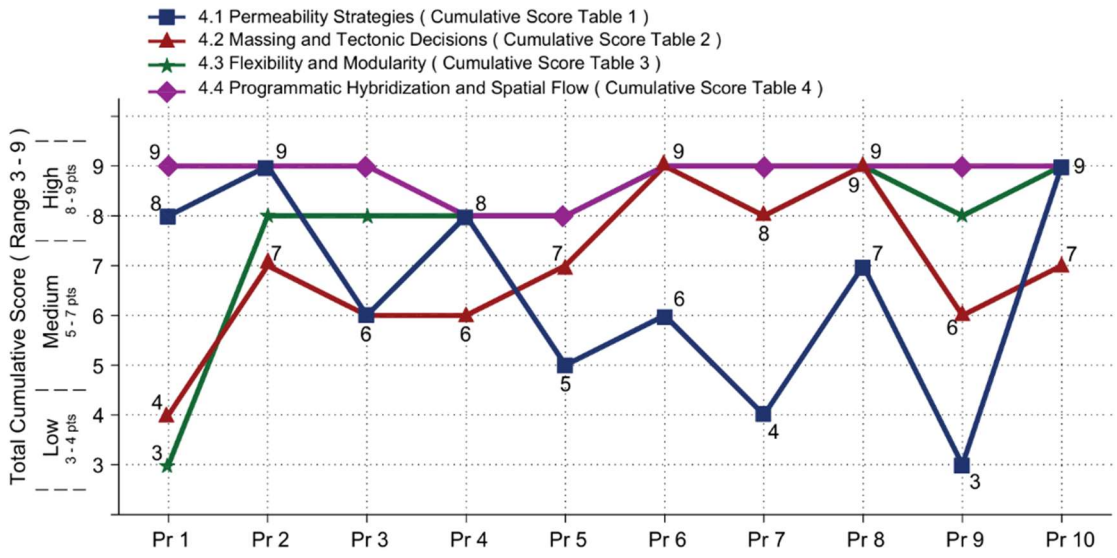


Figure 4. Comprehensive performance distribution and typological evolution of ten gastronomic prototypes across four design parameters (Source: Author).

The process of transforming these findings into a theoretical discussion is structured through a hierarchical sequence of scales, extending from urban contact to the architectural prototype (see Figure 5). The performance distribution resulting from these analyses confirms that the Gastronomic Hub model is not merely a functional solution but a typological evolution that repairs urban continuity.

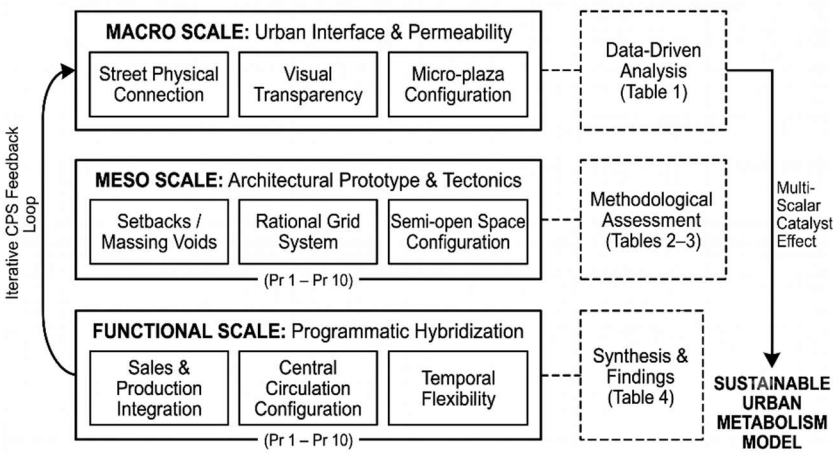


Figure 5. Conceptual flow chart of the research model; Multi-scalar transition from urban interface to architectural prototype and theoretical discussion axes (Source: Author).

- **Macro Scale: Urban Permeability and the "Open System" Configuration**

The cumulative performance scores synthesized from the typological matrices indicate that the transition from a commercial building to an urban catalyst is primarily governed by the interface established at the macro scale. The most fundamental finding of the research is that the introverted logic imposed by traditional shopping malls has been replaced by an extroverted, open system configuration across the investigated variants. As established by the Permeability Strategies data in Table 1 and physically mapped in the comparative ground floor plans (Figure 2), the physical and visual bond the design prototypes establish with the urban pattern emerges as a critical threshold determining overall performance. Specifically, the fact that experimental models Pr 2 and Pr 10 peaked with a high evaluation score in this parameter proves the decisive role of ground-level permeability in reinforcing the Fevzi Çakmak Street pedestrian spine and maintaining spatial continuity toward the historic Ambarlı Köyiçi core.

Conversely, as shown in the Figure 4 graph, the performance of specific variants such as Pr 7 and Pr 9 remained within the lower performance band, indicating that inadequacies in urban articulation and micro-plaza configuration directly diminish the project's success at the macro scale. While the public space in traditional commercial buildings is often a mere entrance foyer that ends at the threshold, in successful experimental models, the urban void (plaza/courtyard) has been transformed into a fundamental structural element that passes through the building. According to the Massing and Tectonic Decisions analysis in Table 2 and section diagrams (Figure 3), the fragmented massing language and integrated massing voids observed in these variants enabled cross-ventilation and controlled daylighting, liberating the building from mechanical system dependency. This approach transforms the commercial space from a mere consumption area into a climatic and social refuge at the neighborhood scale, supporting urban integration.

- **Meso Scale: Production Tectonics and the Representation of Local Craft**

Building upon the macro-scale integration of the open system, the research further evaluates how this permeability penetrates the architectural body through the lens of production tectonics. At this stage, the discussion focuses on how the artisan market concept-echoing traditional bazaar craftsmanship-has transformed into a production-oriented focus within the design prototypes. The findings indicate that the vast majority of the variants treated production not merely as a functional necessity but as a representational tool that defines the building's tectonic character.

When the data from Table 4 (Programmatic Hybridization) and the spatial layouts and sections in Figure 2 and Figure 3 are examined, it is observed that maker spaces and production workshops were placed at the center of circulation schemes rather than being pushed to the periphery of the

marketplace. Indeed, the fact that the evaluated models in Table 4 consistently achieved high placement in this parameter proves that production and consumption functions were successfully interwoven. Specifically, in experimental models such as Pr 2, Pr 6, and Pr 8, the integration of workshops into the market area with transparent partitions rendered the production process visible by bringing the back-of-house activities into the public view.

In contrast to the standard material usage of traditional shopping malls, the specialization of the rational gridal systems (Table 3) to accommodate production processes has transformed the building into a focal point of identity where local skills are represented. Consequently, the configuration of production as a transparent exhibition element-as indicated by the high-performance bands in the Figure 4 data-has moved the typology beyond being a mere place where food is sold, turning it into a focal point where local craft is represented within urban memory.

- **Functional Scale: Multi-Layered Program and Social Focus**

While the meso-scale focus ensures the visibility of local craft through tectonic clarity, the functional scale integrates these production zones into a multi-layered social landscape that defines the ultimate purpose of the Gastronomic Hub. The traditional understanding offered by historical market structures has evolved into a multi-layered Gastronomic Hub model within the analyzed design prototypes. An examination of the Figure 4 graph reveals that the Programmatic Hybridization (4.4) parameter is the most stable and high-performing data line across all experimental models.

The data from Table 4 proves that the design variants successfully transformed the marketplace into a hybrid community center where social interaction is organized by the architectural space. The findings confirm that the design prototypes are interwoven with social layers such as libraries, culinary schools, shared kitchens, and public terraces, clearly depicted in the vertical flow diagrams (Figure 3). The singular void configuration found in historical references has been transformed into a multi-dimensional social stage through amphitheaters and gallery voids within these typological variants. In contrast to the isolated flow of traditional markets, these structures increase the user's duration of stay, allowing different social groups to encounter one another on the same spatial plane. Specifically, the social amenities placed at the center of circulation schemes have shifted the character of commerce from a transaction-oriented area to an experience-oriented public environment. This functional depth is supported by the consistent high performance achieved in the "Integration of Commercial and Public Functions" criterion within Table 4. Consequently, the hybridization of the food-oriented program with social layers has turned the typology into active social condensers at the neighborhood scale.

- **Synthesis: Sustainable Urban Metabolism Prototype**

While the previous sections have decoded the Gastronomic Hub through its scalar layers-from urban permeability to programmatic social stages-this final synthesis demonstrates how these parameters converge to form a synchronized architectural system. The synthesis finding of this research is that macro-scale urban permeability, meso-scale production tectonics, and functional-level hybridization converge in a coordinated manner to form a holistic architectural prototype. The cumulative performance distribution in Figure 4 demonstrates how these parameters mutually reinforce one another.

Rather than being a static structure that consumes urban space, this design prototype serves as a sustainable urban metabolism element that nourishes the city and coexists with it. The gathered data validates the primary hypothesis-that commercial structures can transform into public focal points that repair urban disruptions-when the permeability providing urban continuity at the ground floor (Figure 2), the tectonics rendering production visible (Figure 3), and the hybrid program triggering social interaction are integrated. Specifically, the multi-scalar transitions schematized in Figure 5 prove that the design is not merely a building, but a system that repairs the urban pattern.

In contrast to the linear operation of traditional shopping malls that exploit the city, these gastronomic hubs represent a circular metabolism that supports local producers, prioritizes pedestrian access along

commercial corridors like Fevzi Çakmak Street, and strengthens social capital. The analysis results indicate that experimental models such as Pr 2 and Pr 10, which stabilized within the highest performance band across all parameters, are the most successful spatial counterparts of this circular system. Consequently, this integrated architectural model serves as a new typological guide for modern urban segments, prioritizing sustainability, rationality, and social benefit.

6. CONCLUSION

This research evaluated the "Food-Focused Community Center" model as an architectural alternative to conventional commercial typologies, which often persist as isolated, introverted structures within the modern urban pattern. The empirical findings validate the primary hypothesis: structuring a food-oriented hybrid program through spatial permeability, structural modularity, and programmatic hybridization effectively repairs urban continuity and provides a robust social alternative to introverted commercial environments. Rather than functioning merely as shopping venues, these architectural interventions serve as dynamic urban catalysts capable of mitigating spatial disruptions, activating public life, and fostering civic interaction at the neighborhood scale.

The results highlight the critical necessity of utilizing spatial permeability as an active structural element in urban integration. Configuring the ground floor as a direct physical and visual extension of the street through micro-plazas, continuous circulation arcades, and level-access entrances allows the building to transcend its status as a physical obstacle, becoming an urban threshold that facilitates community engagement. This physical openness, combined with the structural flexibility of rational gridal systems, establishes an adaptable architectural skeleton capable of responding to evolving functional demands over time without sacrificing spatial integrity.

Furthermore, the programmatic hybridization strategy-which co-locates public production workshops, maker spaces, and culinary areas alongside market stalls-transforms the building from a standard retail volume into a vibrant community hub where local craft and production processes are rendered visible to the public. Utilizing the Avcılar Ambarlı district as an empirical testing ground, the research demonstrates how a localized intervention along Fevzi Çakmak Street can directly support broader urban continuity, complementing the historical and spatial layers of the adjacent Ambarlı Köyiçi core. By strengthening the connection between the historic settlement fabric, commercial corridors, and the coastal promenade, the proposed model offers a scalable prototype for a "Sustainable Urban Metabolism"-one that reinforces local food cycles, supports small-scale artisans, and builds social capital. Together, these distinct architectural and urban design strategies provide a practical, tactical reference framework for climate-resilient and community-centered local governance policies.

Regarding theoretical contributions, this study offers a methodological framework for "de-malling" discussions in contemporary urban literature, presenting concrete design tools to repurpose introverted commercial voids into public generators. Methodologically, applying the "Research-Based Design" model to capstone studio environments demonstrates that experimental design outcomes can serve as reliable, evidence-based datasets for municipal planning agendas. Future research should investigate how the design parameters established in this study undergo typological transformations across diverse urban morphologies and varying residential densities. Additionally, further studies are encouraged to explore the integration of modern digital fabrication technologies with the structural tectonics of food-focused community hubs.

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INFORMATION NOTE

The research was conducted within the framework of the Architectural Design 3 Project course during the Fall 2025 semester, under the studio advisorship of the author. A curated selection of projects

developed within the studio was evaluated to highlight the most successful architectural responses to the semester's theme. These representative design prototypes are referenced throughout the article and coded from Pr 1 to Pr 10. The coding corresponds directly to the students who authored the respective projects: Önder Enes Kekeç (Pr 1), Azra Özer (Pr 2), Rayan Elsayed Imam Mohamed Ahmed (Pr 3), Dalal Saleh (Pr 4), Somia Haitham Abdulaziz Saleh Elsayes (Pr 5), Rawand Abdelmoati Awad Abdelmoat Elbaz (Pr 6), Elif Esra Pehlivan (Pr 7), Sıla Karadeniz (Pr 8), Dyala Alimawi (Pr 9), and Pelin Kılıç (Pr 10). The author gratefully acknowledges their academic contributions and the design quality of their works.

ETHICAL CONSIDERATIONS

In accordance with universal ethical standards for academic research, participation in this study was based on voluntary informed consent. All participating students were provided with a "Participant Informed Consent Form" outlining the research scope and the academic use of their design projects. In alignment with the participants' explicit preferences, student names are acknowledged herein to credit their intellectual work.

The evaluation process focused exclusively on the architectural performance of the prototypes regarding permeability, modularity, and programmatic hybridization. Individual academic grades were strictly excluded from the dataset to protect participant privacy. The selection of these ten prototypes was grounded entirely on their consistency in synthesizing complex programmatic and technical parameters within a research-based design framework, serving as exemplary case studies for the proposed model.

DECLARATION OF COMPETING 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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STATEMENT OF AI USAGE

The author used an AI tool as a technical writing assistant during the preparation of this manuscript. The tool was utilized for linguistic refinement and proofreading. However, the core theoretical framework, the data collection process, the technical audit of the architectural projects, and the final interpretation of the results were developed exclusively by the author. All AI-generated suggestions were critically reviewed and validated by the author to ensure academic accuracy and integrity.

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APPENDIX A.

	Massing Form & Urban Positioning	Tectonic Analysis (Axon.)
Pr 1		
Pr 2		
Pr 3		
Pr 4		
Pr 5		

Figure A1. Comparative visual inventory of the analyzed design prototypes (Pr 1 – Pr 5) in the context of massing form, tectonic character, and urban positioning.

	Massing Form & Urban Positioning	Tectonic Analysis (Axon.)
Pr 6		
Pr 7		
Pr 8		
Pr 9		
Pr 10		

Figure A2. Comparative visual inventory of the analyzed design prototypes (Pr 6 – Pr 10) in the context of massing form, tectonic character, and urban positioning.