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A CFAHP-BASED EVALUATION OF TENANT SELECTION CRITERIA IN MULTI-BRANCH DEPARTMENT STORES IN TAIWAN

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Abstract

This study applies the Consistent Fuzzy Analytic Hierarchy Process (CFAHP) to evaluate and prioritize key criteria in tenant selection for a multi-branch department store chain in Taiwan. Building on existing retail site-selection literature, the model integrates both quantitative and qualitative factors across three dimensions: mall location, mall image, and mall management. Expert input was collected through structured pairwise comparisons and analyzed using CFAHP to derive normalized weights for each criterion. Results indicate that customer demographic alignment, business support, and competitive intensity are among the most influential factors guiding tenant decisions, whereas operational elements such as counter management systems hold comparatively lower weight. The findings offer practical insight for retail managers seeking to align tenant mixes with strategic positioning, while also demonstrating CFAHP's value as a consistent, scalable tool for multi-criteria decision-making in complex retail environments. Implications for stakeholder alignment, model transferability, and future integration with performance gap analysis are also discussed.

Key words: CFAHP, MCDM, tenant selection, retail strategy, mall management

Introduction

The process of tenant selection influences the competitiveness and viability of modern multi-branch department stores. For retail chains, this decision-making extends beyond simple financial metrics, requiring careful consideration of a diverse set of qualitative factors that directly affect customer experience, brand perception, and long-term market positioning. While tangible aspects like rental costs and projected sales remain critical, intangible dimensions such as mall image, management quality, and location attractiveness are increasingly recognized as central components shaping consumer behaviors and preferences.

Given the multidimensional nature of these considerations, tenant selection in the department store context constitutes a complex decision-making problem requiring simultaneous evaluation of both qualitative and quantitative criteria. One avenue utilized to address this complexity by researchers and practitioners is the application of structured multi-criteria decision-making (MCDM) methods, with the Analytic Hierarchy Process (AHP) being among the most widely used. However, the classical AHP requires a large number of pairwise comparisons, which can be cognitively demanding and difficult to implement in real-world decision environments. More recently, the Consistent Fuzzy Analytic Hierarchy Process (CFAHP) has been developed as a methodological refinement of classical AHP, aiming to reduce respondent burden and improve consistency in expert judgments by incorporating fuzzy logic and transitivity-based simplifications (Chen, 2015; Hamka & Harjono, 2020).

This study applies CFAHP within a multi-branch Taiwanese department store setting, systematically evaluating key tenant selection criteria grouped into three main hierarchical dimensions: mall location, mall image, and mall management. This approach fills a notable research gap, particularly within the Taiwanese context, extending methodological rigor and practical applicability to complex, multi-dimensional retail decision-making contexts.

Literature Review

Multi-Criteria Decision-Making in Department Store Selection

Modern retail management increasingly recognizes that tenant selection decisions must incorporate multiple dimensions simultaneously. Relying exclusively on single-factor analyses (e.g., sales volume, rent revenue) risks overlooking significant intangible criteria that influence store success, including customer perceptions, strategic brand alignment, and managerial effectiveness (Safari et al., 2014; Liao & Kao, 2011). MCDM methodologies facilitate structured, systematic evaluation processes that enable integration of a range of quantitative and qualitative criteria within decision-making scenarios (Isik et al., 2013).

Applying MCDM frameworks and their structured analytical capacity is appropriate for multi-branch department

stores operating across diverse geographic and demographic contexts, where market-specific factors require context-sensitive evaluations; its utility lies in offering robust decision-making tools, which contribute to balanced evaluations that align strategically with both corporate standards and localized market realities.

Methodological Evolution from Classical AHP to CFAHP

Originally introduced by Saaty (1980), the AHP is a widely recognized MCDM approach due to its structured, hierarchical decomposition of complex decision problems and systematic pairwise comparisons. Despite these advantages, classical AHP encounters practical challenges in complex evaluations, particularly due to respondent fatigue, extensive required comparisons, and inconsistencies arising from the subjective nature of human judgment (Chen, 2015).

To address these limitations, fuzzy logic extensions of AHP have been developed to better capture subjective expert reasoning and reduce judgment inconsistencies (Isik et al., 2013; Zhang & Lu, 2004). However, traditional fuzzy AHP approaches often still require numerous pairwise comparisons, limiting practical feasibility in large-scale or multi-branch retail applications (Sakhardande & Gaonkar, 2022).

Following this, CFAHP has emerged as a robust methodological advancement explicitly designed to reduce these limitations. CFAHP minimizes the number of required comparisons by enforcing internal consistency through transitivity and logical inference, thereby alleviating respondent burden and improving judgment reliability (Chen, 2015; Hamka & Harjono, 2020; Wang & Chen, 2008). Its structured design and emphasis on consistency make it particularly suitable for complex, multi-criteria evaluations such as tenant selection in multi-site retail contexts.

For multi-branch department store operations specifically, CFAHP provides notable methodological advantages. Its reduced cognitive burden facilitates more reliable data collection across multiple locations, ensuring internal consistency and practical feasibility even in geographically dispersed retail contexts. By systematically accommodating localized market insights alongside overarching corporate strategies, CFAHP empowers decision-makers to perform nuanced tenant evaluations, balancing local market demands with strategic corporate priorities (Chen, 2015; Hamka & Harjono, 2020;).

Key Criteria in Multi-Branch Tenant Selection

Drawing from recent literature and retail industry insights, three hierarchical dimensions critically shape tenant selection processes in Taiwanese department stores: mall location, mall image, and mall management.

Mall Location

Mall location significantly affects tenant performance by shaping accessibility, customer attraction, and competitive dynamics. Central to this dimension is customer attraction ability (A1), i.e., a mall's effectiveness at drawing and maintaining consumer traffic. Factors such as tenant diversity, appealing ambiance, and integrated entertainment and dining experiences all contribute to enhancing a department store attractiveness, leading to increased dwell time and greater subsequent tenant revenues (Radha, 2019; Ng, 2016; Sozen & Devrani, 2020).

Mall location and accessibility factors such as proximity to transport networks and parking availability (A2) have a direct impact on consumer visitation and purchase behavior (Man & Qiu, 2021), and limited accessibility due to congestion or inadequate infrastructure can suppress visit frequency (Savrasovs et al., 2018). Retailers also prioritize transport-linked locations to boost foot traffic and tenant performance (Khare, 2020).

Another central criterion is competitive intensity in mall location (A3). Understanding local competitive dynamics is a significant factor in evaluating potential mall locations comprehensively. While proximity to competing retailers may initially appear disadvantageous, research demonstrates that malls strategically located near retail clusters can benefit from increased customer traffic, provided effective differentiation strategies and optimal tenant placements are implemented (Sozen & Devrani, 2020; Teller & Schnedlitz, 2012).

Mall Image

Mall image, reflecting intangible elements like perceived brand quality and ambiance, contributes to shaping customer loyalty and tenant performance through its influence on shopper satisfaction and emotional engagement (Hart & Rosenberger, 2004; Kumar, 2017). A central aspect of this dimension is the criterion of department store revenue performance (B1), as strong financial outcomes in anchor tenants directly attract high-quality lessees by signaling consistent foot traffic and spending power (Cheng et al., 2011).

Further, mall reputation (B2) impacts customer loyalty and tenant success. As is the case with individual stores and business of various kinds, positive reputations of a department store significantly enhance consumer trust and willingness to engage repeatedly, leading to repeated and prolonged visits (El-Adly & Eid, 2016; Haninda, 2020).

Another related criterion is that of customer demographic alignment (B3), i.e., the congruence between tenant offerings and the mall's targeted customer base. This factor directly shapes consumer satisfaction and retail performance. Effective alignment, based on informed consideration of local demographics (e.g., age, income, lifestyle), promotes consumer engagement, store

performance, and overall mall attractiveness (Jaafaru, 2018; Tiwari & Tripathi, 2024; Vipul, 2010).

Mall Management

Effective mall management influences tenant satisfaction, retention, and operational performance by establishing clear operational procedures and responsive systems. A critical component of this is the counter management system (C1), which governs tenant operations. When well-executed, such systems improve coordination, ensure consistent service delivery, and reduce conflict, ultimately enhancing mall-wide performance and tenant stability (Panichpathom, 2016; Tomara, 2012).

Complementing effective systems is the more intangible factor of managerial expertise (C2) of mall administrators. Managers with robust expertise in tenant relationship management, proactive communication, and operational support contribute to increased tenant satisfaction, lower turnover, and improved operational stability (Panichpathom, 2016; Savitri & Fahmi, 2017; Sujatha & Priya, 2015).

The provision of comprehensive business support (C3), including targeted marketing assistance, integrated customer relationship management (CRM) systems, and analytics-driven operational guidance, is increasingly critical for tenant success. Malls offering robust business support significantly improve tenant visibility, customer retention, and sales performance, strengthening overall competitive positioning (Anita & Premkumar, 2018; García-Nieto et al., 2025; Ng, 2016).

Each of these dimensions (see Table 1) collectively constitute an essential framework guiding tenant selection in multi-branch department store operations. Employing these criteria systematically within CFAHP facilitates balanced, strategic, and context-sensitive tenant evaluations, enhancing operational effectiveness, consumer experience, and long-term retail success.

Methodology

Research Design

This study adopted the Consistent Fuzzy Analytic Hierarchy Process (CFAHP) to develop a structured model for evaluating tenant selection criteria in a multi-branch department store context. The research objective was to derive priority weights for a range of decision factors based on expert input. CFAHP was selected due to its ability to handle multi-criteria problems with greater efficiency and consistency than classical AHP, particularly by reducing the total number of pairwise comparisons required and ensuring transitive judgment structures (Chen, 2015; Hamka & Harjono, 2020; Herrera et al., 2004).

The decision hierarchy used in this study consisted of three primary dimensions, comprising mall location, mall image, and mall management. These are further subdivided into three operational criteria each, identified through a combination of literature review and expert

consultations, ensuring relevance to both academic theory and practical decision-making in the Taiwanese department store industry. Expert judgments were collected through structured CFAHP questionnaires using a numerical 1–9 scale, which were then converted into reciprocal preference matrices for analysis.

The CFAHP procedure was carried out in five stages: (1) collecting expert pairwise comparisons, (2) transforming input into consistent fuzzy preference matrices, (3) applying transitivity-based consistency rules, (4) calculating normalized priority weights, and (5) validating the results through panel review.

Table 1: Overview of CFAHP Criteria

Dimension	Criterion	Description
Mall Location	Customer Attraction Ability	Mall's capacity to draw and retain consistent foot traffic.
	Mall Location Convenience	Ease of consumer access to mall (e.g., parking, transport).
	Competitive Intensity	Level of retail competition within the mall's vicinity.
Mall Image	Revenue Performance	Historical financial performance of the mall and tenants.
	Mall Reputation	Public perception and brand image of the mall.
	Customer Demographic Alignment	Match between tenants and mall's targeted consumer segments.
Mall Management	Counter Management System	Procedures and guidelines governing tenant operations.
	Managerial Expertise	Professional capabilities of the mall's management team.
	Business Support	Operational and marketing support provided by management.

Respondent Profiles

A panel of nine expert respondents, experienced in Taiwanese department store management and retail operations, was carefully selected. All respondents provided informed consent. The survey was conducted confidentially, maintaining the anonymity of participants. Ethical guidelines were strictly observed,

ensuring voluntary participation without conflicts of interest. Respondents' detailed backgrounds are presented in Table 2 below, including gender, age, years of professional experience, industry specialization, and managerial positions.

Table 2: Expert Respondent Profiles

Expert ID	Gender	Age	Experience (Years)	Industry	Position
1	Male	65	35	Textile	General Manager
2	Male	53	25	Food	Vice President
3	Male	63	35	Clothing	Chief Consultant
4	Female	60	37	Cosmetics	Executive Director & VP
5	Male	45	13	Fitness Equipment	Manager
6	Male	57	32	Food	Vice President
7	Female	52	23	Women's Clothing	Vice President
8	Male	67	35	Clothing	Vice President
9	Male	65	40	Clothing	Vice President

Questionnaire Design

The CFAHP questionnaire employed pairwise comparisons using Saaty's (1980) fundamental nine-point scale, which is designed to capture the relative preference of one criterion over another. A value of 1 denotes that the two criteria are equally important. Higher odd-numbered values—3, 5, 7, and 9—represent increasing levels of preference for one criterion over the other, corresponding to moderate, strong, very strong, and extreme preference, respectively. Even numbers (2, 4, 6, and 8)

serve as intermediate values to reflect judgments that fall between the main levels of importance. Respondents compared each pair of criteria to express relative importance.

Calculation Steps

The CFAHP methodology was executed through a structured series of computational steps adapted from Hsu & Kuo (2025), Herrera et al. (2004) and Chen & Lee (2015). Pairwise comparisons were collected from respondents using structured CFAHP questionnaires. Each pairwise comparison was recorded and structured into an initial preference matrix. Responses from experts were transformed into a reciprocal fuzzy preference relation matrix $P = (p_{ij})$, where each element p_{ij} indicates the preference of criterion a_i over criterion a_j:

$$p_{ij} = g(a_{ij}) = \frac{1}{2}(1 + log_9 a_{ij}), \quad p_{ij} + p_{ji} = 1$$

Here, $p_{ij} = 0.5$ indicates equal preference, $p_{ij} > 0.5$ indicates preference towards a_i, and $p_{ij} < 0.5$ indicates preference towards a_j.

To ensure consistency, the fuzzy preference relation matrix must satisfy the additive transitivity property:

$$p_{ij} + p_{jk} + p_{ki} = \frac{3}{2}, \quad for\ every\ i, j, k$$

When inconsistency appeared, minor adjustments were applied using the consistency-preserving transformation function:

$$f(x) = \frac{x + m}{1 + 2m}, \quad x \in [-m, 1 + m],\ m > 0$$

After ensuring consistency, fuzzy values were transformed into final weights. If matrix entries were within [0,1], weights were calculated directly via:

$$a_{ij} = 9^{2p_{ij}-1}, \quad r_i = \sum_{j=1}^{n} a_{ij}, \quad W_i = \frac{r_i}{\sum_{i=1}^{n} r_i}$$

Where W_i represents the normalized weight for each criterion. All CFAHP computations were performed using Excel-based analysis to facilitate ease of use and transparency in the analytical process.

The CFAHP model was validated through an expert panel review, involving respondents who assessed the clarity, relevance, and applicability of criteria definitions and model outcomes. Feedback was incorporated to refine the model, ensuring practical validity.

Results

The CFAHP analysis provided clear empirical evidence regarding the relative importance of key tenant-selection criteria within the multi-branch department store context. Table 3 summarizes the dimension-level and sub-criterion weights, derived from expert pairwise comparisons. Table 4 ranks the nine sub-criteria in descending order of

Table 3: CFAHP Dimension and Criterion Weights

Dimension	Dimension Weight	Criterion	Local Weight	Global Weight
Mall Location (A)	0.3128	Customer Attraction Ability (A1)	0.372	0.1164
		Mall Location Convenience (A2)	0.2388	0.0747
		Competitive Intensity (A3)	0.3892	0.1217
Mall Image (B)	0.3883	Revenue Performance (B1)	0.2305	0.0895
		Mall Reputation (B2)	0.2212	0.0859
		Customer Demographic Alignment (B3)	0.5483	0.2129
Mall Management (C)	0.2990	Counter Management System (C1)	0.1189	0.0355
		Managerial Expertise (C2)	0.2483	0.0742
		Business Support (C3)	0.6328	0.1892

Table 4: CFAHP Criteria Ranked by Global Weight

Rank	Dimension	Criterion	Global Weight
1	Mall Image	Customer Demographic Alignment	0.2129
2	Mall Management	Business Support	0.1892
3	Mall Location	Competitive Intensity	0.1217
4	Mall Location	Customer Attraction Ability	0.1164
5	Mall Image	Revenue Performance	0.0895
6	Mall Image	Mall Reputation	0.0859
7	Mall Location	Mall Location Convenience	0.0747
8	Mall Management	Managerial Expertise	0.0742
9	Mall Management	Counter Management System	0.0355

their global weights, offering a clearer picture of their relative priority in expert evaluation. The analysis demonstrates that among the three primary dimensions, Mall Image emerged as the most critical (weight = 0.3883). Within this dimension, the criterion Customer Demographic Alignment (B3) was particularly dominant (global weight = 0.2129), underscoring the necessity of matching tenant offerings closely to the mall's primary consumer segments. Meanwhile, both Revenue Performance (B1) and Mall Reputation (B2) received moderate yet meaningful emphasis, indicating that while financial stability and reputation play supportive roles, strategic alignment with consumer demographics remains paramount.

Mall Location was identified as the second-most important dimension (weight = 0.3128). Within this category, Competitive Intensity (A3) emerged as the leading criterion (global weight = 0.1217), reflecting awareness among experts of the strategic centrality of careful competitive positioning. Customer Attraction Ability (A1) followed closely (global weight = 0.1164), highlighting the importance of malls' inherent drawing power and experiential appeal. By contrast, Mall Location Convenience (A2) was rated somewhat lower (global weight = 0.0747), suggesting that convenience, while beneficial, may have become a baseline expectation rather than a differentiating factor.

Finally, the dimension of Mall Management was ranked third overall (weight = 0.2990), though its leading criterion, Business Support (C3), held substantial importance (global weight = 0.1892). This emphasizes the growing role of strategic and operational assistance provided by mall management to tenant success. Conversely, Managerial Expertise (C2) and the effectiveness of Counter Management Systems (C1) received lower global weights (0.0742 and 0.0355, respectively), indicating their supportive but less critical roles in initial tenant selection decisions.

Considered collectively, these results indicate a clear prioritization by industry experts toward criteria that directly influence consumer experiences and competitive positioning, providing an empirically grounded foundation to guide strategic tenant-selection decisions in a multi-branch department store context.

Discussion

Key Takeaways

The analysis provided clear, prioritized insights into strategic tenant-selection criteria for the department store chain. The highest-ranked criterion, alignment with target customer demographics, highlights the critical importance of ensuring tenants resonate directly with the primary consumer segments. This confirms existing research emphasizing that demographic alignment significantly drives consumer loyalty and enhances retail performance (Jaafaru, 2018; Vipul, 2010). Furthermore, the prominent weight assigned to business support reinforces earlier stud-

ies that identified mall-level strategic collaboration as essential to sustaining long-term tenant success and overall mall competitiveness (García-Nieto et al., 2025; Ng, 2016).

Results indicate that competitive intensity within the mall's local environment was assigned a high relative weight, suggesting that experts regard it as a significant consideration in location decisions. Existing literature notes that the effects of heightened competition are multifaceted, requiring careful differentiation strategies to maintain a competitive edge (Teller & Schnedlitz, 2012), warranting thorough evaluation when planning tenant mixes. By contrast, operational criteria such as managerial expertise and counter management systems were deemed less influential in the initial selection phase, though they remain central to ongoing tenant success.

Managerial Implications

This study provides a variety of empirically grounded strategic recommendations directly informed by the CFAHP results. The foremost criterion by global weight, customer demographic alignment, suggests mall managers should explicitly select tenants based on clear alignment with the mall's primary consumer profiles. Managers would benefit from implementing demographic analyses during tenant evaluation, systematically ensuring tenant offerings resonate effectively with target segments, thereby enhancing consumer attraction and long-term loyalty.

The substantial importance attributed to business support indicates a need for institutionalizing collaborative managerial practices. This implies that mall management should actively develop structured support initiatives such as integrated CRM systems, joint promotional campaigns, and data-driven analytics support. Such measures would not only boost tenant performance but also reinforce a differentiated competitive position for the mall overall.

Relatedly, the high centrality attributed to competitive intensity highlights the necessity of carefully considering market competition when selecting tenant mixes. Managers are advised to regularly conduct local competitive analyses and strategically position tenant categories to balance differentiation and complementary clustering.

Closely linked to competitive intensity is the criterion of customer attraction ability which scored nearly equal in importance. This highlights the need for managers to assess not only market positioning against competitors but also inherent drawing power. Tenant mixes should be designed to reinforce the mall's capacity to attract and retain consistent foot traffic through features such as experiential retail, entertainment offerings, or complementary service bundles, contributing to amplifying the impact of location-based advantages.

Finally, given the lower relative importance of operational criteria such as managerial expertise and counter management systems, mall managers

might benefit from deemphasizing operational technicalities during initial tenant selection. Instead, the strategic alignment and support structures identified as high-priority criteria should drive the primary focus of tenant decision-making processes. Adopting CFAHP or similar structured methods as standard practice, supported by targeted training for management, could significantly enhance consistency, transparency, and accountability in tenant selection, aligning practical decisions clearly with strategic organizational objectives.

Limitations

This study was conducted using internal experts from a single multi-branch department store chain in Taiwan. As such, results may reflect organization-specific biases or preferences. Future research could validate the CFAHP model using external experts or across multiple retail chains to enhance generalizability. Furthermore, the criteria set employed, while comprehensive, might need adjustments if applied to significantly different industries or cultural contexts outside Taiwan or across different retail formats (e.g., specialty malls or lifestyle centers).

Conclusion

The main objective of this study was to systematically evaluate and rank tenant selection criteria for multi-branch department stores using the CFAHP method. The results demonstrate that customer demographic alignment is the most critical factor, followed closely by business support from mall management, competitive intensity in the surrounding environment, and customer attraction ability. These top-ranked criteria reflect a clear strategic shift in retail tenant selection from traditional financial metrics toward consumer-focused alignment, strategic collaboration, and market positioning.

The CFAHP methodology proved valuable in producing consistent, expert-driven prioritizations that support more structured and transparent decision-making. Future research could enhance this model by integrating complementary tools such as Importance–Performance Gap Analysis (IPGA), which would allow managers to identify critical areas of underperformance relative to strategic importance. Beyond tenant selection, CFAHP can be adapted to a wide range of strategic decisions in retail management, including site expansion, promotional planning, and customer experience optimization.

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