

ISTANBUL TECHNICAL UNIVERSITY★ GRADUATE SCHOOL

**KEY PERFORMANCE FACTORS IDENTIFICATION MODEL
FOR
SHOPPING MALL INVESTMENTS IN TURKIYE**



Ph.D. THESIS

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Department of Architecture

Project and Construction Management Programme

FEBRUARY 2026

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İSTANBUL TEKNİK ÜNİVERSİTESİ ★ LİSANSÜSTÜ EĞİTİM ENSTİTÜSÜ

**ALİŞVERİŞ MERKEZİ YATIRIMLARINDA
TEMEL PERFORMANS FAKTÖRLERİNİN BELİRLENMESİ MODELİ
TÜRKİYE ÖRNEĞİ**

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To my precious daughter Deniz...



FOREWORD

It has been a long journey, a very long indeed, where I felt very-well accompanied...

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February 2026

Zeynep YILMAZ
Architect, M.Sc.



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ABBREVIATIONS

AMOS	: Analysis of Moment Structures
ANN	: Artificial Neural Network
AVM	: Alisveris Merkezi
BDP	: Building Design Performance
BSP	: Building Services Performance
CFI	: Comparative Fit Index
COVID	: Corona Virus Disease
DF	: Degrees of Freedom
H	: Hypothesis
HEPA	: High-Efficiency Particulate Air
HVAC	: Heating, Ventilation, Air Conditioning
ITU	: Istanbul technical University
N	: Neuron (in the ANN modeling)
PCMIN	: Parsimony-Adjusted Minimum Discrepancy
PCMIN/DF	: Parsimony-Adjusted Fit Index
RDP	: Retail Store Design Performance
ReLU	: Rectified Linear Unit
RMSEA	: Root Mean Square Error of Approximation
SEM	: Structural Equation Modelling



SYMBOLS

α	: Cronbach Alpha internal consistency
β	: Standardized regression coefficient
φ	: Correlation among variables
λ	: Factor loading
ε	: Measurement error





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KEY PERFORMANCE FACTORS IDENTIFICATION MODEL FOR SHOPPING MALL INVESTMENTS IN TURKIYE

SUMMARY

Key performance factors in commercial project investments in Türkiye are identified by the model conceived in this thesis. This model reflects the most significant performance factors impacting the retail store sales performance and thus contributing to the efficiency of shopping mall investments. It is noteworthy that the success of shopping malls is primarily contingent on the retail stores' sales performance. To achieve this goal, this study has conducted a thorough literature review, where performance factors are demonstrated in previous researches. Following the thorough literature review, the identified factors were classified into three dependent variables such as the retail store design performance, the building design performance and the building services performance variables. Since the existing researches did not focus on the ranking of the performance factors, this study aimed to evaluate the ranking of the performance factors impacting the retail store sales performance to create a guiding model for commercial project investors and shopping mall designers. As a result, this new model is expected to significantly influence the design processes of retail project groups and investors. It aimed to identify the significance of the factors that impact the sales performance of retail stores. By achieving this, the study intends to provide a scientific perspective and a robust foundation for shopping mall investments, enabling the creation of well-designed and effective commercial investments.

Following the classification of the factors, a questionnaire was developed for expert judgement. This step aimed at discussing and consolidating the identified performance factors. To assess the content validity of the identified measurement factors, the study conducted interviews with seven experts in the retail industry and three customers using the expert judgement method. The experts consisted of a group of professionals with more than 15 years of experience in the retail sector. The interviewed experts were asked to evaluate the measurement factors for content validity with the Five-Point Likert scale (5-strongly agree, 1-strongly disagree). Irrespective of the category of dependent variables, the expert judgement results demonstrated the most significant performance factors impacting the retail store sales performance as *the presence of carpark* and *the brand variety* with the same highest scores. *The retail store visibility* and *the retail store interior design* factors followed them in the second rank. Some additional performance factors were also suggested by the experts such as *marketing billboards in the mall*, *social responsibility projects*, *social activities*, *direct relationship of the mall with the public spaces*, *flexible architectural design according to weather conditions* and *abundant use of landscape in the shopping mall*. Furthermore, the following four retail store design performance factors, which were not significant with the lowest scores, were eliminated: *the proximity of the retail store to the customer wet cores*, *the proximity of the retail store to the foodcourt*, *the proximity of the retail store to the delivery yard* and *the proximity of the retail store to the event area*. These updated factors were added to or eliminated from the questionnaire to obtain a revised list for the pilot study.

Successively, after forming the final questionnaire, the pilot study was conducted with 16 retail store managers with over 15 years of experience. They evaluated each factor

via a questionnaire survey. Respondents in the pilot study ranked the most crucial factors as *brand variety, presence of carpark, heating/ventilation/air conditioning (HVAC) comfort, shopping mall lighting design*. The findings of the pilot study were then tested for model accuracy using diverse modelling systems such as the structural equation modelling (SEM) and the artificial neural network (ANN). AMOS (Analysis of Moment Structures), one of the most preferred software for Structural Equation Modelling (SEM) is used during this study. The R software environment was used for artificial neural network analysis.

After the consolidation of the performance factors via the expert judgement and the pilot study, a last check has been made by the İTÜ Ethical Committee and the main research has been initiated by sending the final questionnaire to 314 retail store managers in 6 shopping malls in 5 different cities of Türkiye: İskenderun, Antakya, Gaziantep, Sivas and İstanbul. The main study evaluated the performance factors in the pre-pandemic period and the pandemic period. After several calls, reminders, site visits and face-to-face meetings, the respondents' number reached 204, which is above the targeted minimum number of respondents. For the pre-pandemic period, respondents ranked the most crucial factors as *the brand variety, the presence of carpark, the efficiency of cleaning services, the lighting design concept of the shopping mall, and the HVAC comfort in the shopping mall*. The top five factors did not alter in the pandemic period but *the efficiency of cleaning services* and *the HVAC comfort* were ranked as the highest two factors successively. Contrary to the expectations from the existing researches published in the literature, the average score of the building service performance factors is the highest among the average score of the three dependent variables (building design performance, retail store design performance and building service performance). *The brand variety* factor outperformed all other performance factors such building design factors or retail store design factors. The study further revealed that the retail store design performance variable achieved a substantially lower score in total, positioning it behind the two other variables (the building design performance variable and the building services performance variable). This thesis finally suggests that when a shopping mall is designed in accordance with the most significant factors (*the brand variety, the presence of carpark, the efficiency of cleaning services, the HVAC comfort, the shopping mall lighting design*), the retail stores located in the shopping mall are likely to experience enhanced performance. This improvement, in turn, translates into a tangible return on investment for the shopping mall development, a noteworthy recommendation for shopping mall investors and designers.

ALISVERIS MERKEZI YATIRIMLARINDA TEMEL PERFORMANS FAKTÖRLERİNİN BELİRLENMESİ MODELİ TÜRKİYE ÖRNEĞİ

ÖZET

Bu çalışma, Türkiye’deki ticari proje yatırımlarında önemli performans faktörlerini belirlemeye yönelik bir tanımlama modeli oluşturmayı amaçlamaktadır. Model, alışveriş merkezi yatırımlarının verimliliğine katkıda bulunan ve mağaza satış performansını etkileyen en önemli performans faktörlerini yansıtmaktadır. Alışveriş merkezlerinin başarısının büyük ölçüde perakende mağazaların satış performansına bağlı olduğu dikkate değerdir. Perakende sektörü; e-ticaretin yükselişi, alışveriş merkezlerinin çoğalması, azalan satın alma gücü ve COVID-19 pandemisinin devam eden etkileri nedeniyle artan bir rekabetle karşı karşıyadır. Bu durum, alışveriş merkezleri içerisindeki perakende mağazalarının satış performansını her zamankinden daha önemli hâle getirmiştir. Alışveriş merkezlerinde perakende mağazalarının satış performansını etkileyen faktörlerin belirlenmesi ve değerlendirilmesi, alışveriş merkezi yatırımlarının optimize edilmesine yönelik yeni bir modelin geliştirilmesine katkı sağlayacaktır. Böylece, yüksek performanslı olmanın yanı sıra daha verimli, finansal açıdan uygulanabilir ve sürdürülebilir yeni sistemlerin ve analizlerin oluşturulmasına imkân tanınacaktır. Bu çalışmanın önemi, bahsedilen nedenlerden ötürü dikkate değerdir ve perakende sektörü yatırımcıları ve tasarımcıları için katma değer sağlayacağı düşünülmektedir.

Bu amaç doğrultusunda, performans faktörlerinin önceki araştırmalarda belirlendiği kapsamlı bir literatür taraması yapılmıştır. Literatür taraması sonrasında performans faktörleri; mağaza tasarım performansı, bina tasarım performansı ve bina hizmetleri performansı olmak üzere üç gizil değişken altında sınıflandırılmıştır. Mevcut araştırmaların çoğunluğu performans faktörlerinin önem düzeyi ve sıralamasına odaklanmadığından, bu çalışma mağaza satış performansını etkileyen faktörlerin sıralamasını değerlendirerek ve hangi performans faktörlerinin satış performansını daha çok etkilediğini saptayarak, ticari proje yatırımcıları ve alışveriş merkezi tasarımcıları için yol gösterici bir model oluşturmayı hedeflemiştir. Bu yeni modelin, proje tasarım gruplarının ve yatırımcıların tasarım süreçlerini önemli ölçüde etkilemesi beklenmektedir. Çalışma, mağazaların satış performansını etkileyen faktörlerin önemini belirlemeyi hedeflemektedir. Bu hedef doğrultusunda, alışveriş merkezi yatırımlarına bilimsel bir bakış açısı ve sağlam bir temel sunmak, iyi tasarlanmış ve verimli ticari yatırımların oluşturulmasına olanak sağlama amacı güdülmüştür.

Performans faktörlerinin sınıflandırılmasının ardından, bu faktörlerden türetilen bir anket, performans faktörlerinin tartışılması ve konsolidasyonu için gerekli olan uzman görüşüne sunulmak amacıyla hazırlanmıştır. Belirlenen ölçüm faktörlerinin kapsam geçerliliğini değerlendirmek için, uzman görüşü yöntemi kullanılarak perakende sektöründe 15 yıldan fazla deneyime sahip yedi uzman ve üç müşteri ile görüşmeler yapılmıştır. Uzmanlar farklı meslek gruplarından ve farklı profesyonel sınıflardan seçilmiş ve böylece oldukça kapsamlı bir temsil sağlanmıştır. Görüşülen uzmanlardan, ölçüm faktörlerini beşli Likert ölçeği (5-tamamen katılıyorum, 1-hiç katılmıyorum) ile değerlendirmeleri istenmiştir. Gizil değişken kategorilerini dikkate almaksızın, uzman görüşü sonuçlarına göre mağaza satış performansını en çok etkileyen faktörler; *alışveriş merkezinde otopark bulunması* ve *marka çeşitliliği*’dir. Bunları ikinci sırada *mağaza görünürlüğü* ve *mağaza iç tasarımı* izlemiştir. Uzmanlar ayrıca *alışveriş*

merkezinde pazarlama panoları, sosyal sorumluluk projeleri, sosyal etkinlikler, alışveriş merkezinin kamusal alanlarla doğrudan ilişkisi, hava koşullarına göre esnek mimari tasarım ve peyzajın yoğun kullanımı gibi ek performans faktörleri önermiştir. Öte yandan, en düşük puan almış ve anlamlı bulunmayan dört mağaza tasarım performans faktörü (*mağazanın ıslak hacimlere, yemek alanına, teslimat alanına ve etkinlik alanına yakınlığı*) elenmiştir. Bir sonraki aşama olan pilot çalışma aşaması için güncellenmiş performans faktörleri listesini elde edebilmek amacıyla bu önerilen faktörler eklenmiş ya da önemsiz bulunanlar çıkarılmıştır.

Uzman görüşlerinin ardından, revize anket oluşturulduktan sonra, 15 yıldan fazla deneyime sahip 16 mağaza yöneticisi ile pilot çalışma gerçekleştirilmiştir. Pilot çalışmaya katılım sağlayanlar, Gaziantep ilinde bulunan bir alışveriş merkezinde görev yapan mağaza müdürleridir. Katılımcılar her faktörü anket yoluyla değerlendirmiştir. Pilot çalışmada en kritik faktörler *marka çeşitliliği, AVM’de otoparkin bulunması, ısıtma/havalandırma/iklimlendirme konforu ve alışveriş merkezi aydınlatma tasarımı* olarak sıralanmıştır. Pilot çalışmanın bulguları, yapısal eşitlik modellemesi (SEM) ve yapay sinir ağı (ANN) gibi çeşitli modelleme sistemleri kullanılarak model doğruluğu açısından test edilmiştir. Çalışmada yapısal eşitlik modellemesi için en çok tercih edilen yazılımlardan biri olan AMOS (Analysis of Moment Structures) kullanılmış, yapay sinir ağı analizi için ise “R” yazılımı tercih edilmiştir.

Uzman görüşü ve pilot çalışma ile performans faktörlerinin konsolidasyonunun ardından, İTÜ Etik Kurulu’ndan yorumlar alınmış ve ana araştırma, nihai anketin Türkiye’nin beş farklı şehrindeki (İskenderun, Antakya, Gaziantep, Sivas ve İstanbul) altı alışveriş merkezinde 314 perakende mağaza yöneticisine gönderilmesiyle başlatılmıştır. Ana çalışma, 14 perakende mağaza tasarım performans faktörünü, 20 bina tasarım performans faktörünü ve 14 bina hizmetleri faktörünü ölçmüştür. Alan araştırmasında, katılımcıların, faktörleri pandemi öncesi ve pandemi dönemi olmak üzere iki ayrı fazda değerlendirmesi istenmiştir. Birçok arama, hatırlatma, saha ziyareti ve yüz yüze görüşmelerin ardından yanıt sayısı hedeflenen minimum sayıyı yakalamış ve 204’e ulaşmıştır. Veri toplama aşaması Kasım 2021–Nisan 2022 dönemi boyunca yaklaşık 6 ay sürmüştür. Veriler modele yüklenmiş ve modelin güvenilirliği test edilmiştir. Bu çalışma, ANN yaklaşımını SEM ile birleştirerek modelin güvenilirliğini ve öngörü gücünü artırmıştır. Üç gizil değişkenden tüm performans faktörlerine ait faktör yükleri 0.50’nin üzerinde ölçülmüş olup, bu durum söz konusu performans faktörlerinin ilgili gizil değişkenlerin güçlü yordayıcıları olduğunu göstermektedir. Ayrıca faktör yüklerinin büyük çoğunluğunun 0.70 ve 0.80’in üzerinde olması, modelin ölçüm kalitesinin oldukça yüksek olduğunu ortaya koymaktadır. Tüm maddelerin ait oldukları faktörler üzerine yüksek düzeyde yüklenmesi, yakınsak geçerliliği desteklemekte; bu da modeldeki gizil değişkenlerin, ilgili faktörler tarafından iyi tanımlandığı anlamına gelmektedir. Ayrıca üç gizil değişken arasında güçlü karşılıklı ilişkiler sergilemektedir. Bu sonuç, kapsamlı bir literatür taramasının entegrasyonu, uzman panellerinin güçlü deneyimi ve araştırmacının perakende sektörü kapsamındaki önemli mesleki birikimi sayesinde elde edilmiştir.

Pandemi öncesi dönem için katılımcılar en kritik faktörleri *marka çeşitliliği, AVM’de otopark bulunması, etkin temizlik hizmetleri, alışveriş merkezi aydınlatma tasarımı ve AVM’deki iklimlendirme konforu* olarak sıralamıştır. Özellikle *marka çeşitliliği* faktörü, katılımcıların konsolide görüşleriyle en önemli faktör olarak değerlendirilmiştir. En önemli ilk beş performans faktörü sıralamasındaki faktörler, bina hizmetleri performansı ve bina tasarım performansı faktörleridir. Mağaza tasarım

performansı faktörleri bu sıralamada yer bulamamıştır. Pandemi öncesi dönem için sadece mağaza tasarım performansı faktörlerine bakıldığında ise en önemli ve satış performansı üzerinde en çok etkisi olan performans faktörlerinin *mağazanın AVM içindeki yeri, mağazanın aydınlatma tasarımı ve mağazanın AVM'deki görünürlüğü* olduğu ortaya çıkmıştır.

Pandemi dönemi değerlendirmesinde ise performans faktörleri değişmemiş, ancak sıralama farklı sonuçlanmıştır. Bu dönemde katılımcıların en yüksek puanla değerlendirdiği performans faktörleri şu şekilde sıralanmaktadır: *Etkin temizlik hizmetleri, AVM'deki iklimlendirme konforu, AVM'de otopark bulunması, marka çeşitliliği ve AVM aydınlatma tasarımı*. Literatürdeki mevcut araştırmalardan beklenenin aksine, bina hizmetleri performansı faktörlerinin ortalama puanı, üç gizil değişkenin (bina tasarım performansı, mağaza tasarım performansı ve bina hizmetleri performansı) ortalama puanları arasında en yüksek olmuştur. *Marka çeşitliliği* faktörü, bina tasarım veya mağaza tasarım faktörleri gibi diğer tüm performans faktörlerini geride bırakmıştır. Çalışma ayrıca, perakende mağaza tasarım performansı değişkeninin toplamda diğerlerine göre oldukça düşük bir puan elde ettiğini ve diğer iki değişkenin (bina tasarım performansı ve bina hizmetleri performansı) gerisinde kaldığını ortaya koymuştur.

Bu çalışmada, uzman görüşleri paneli, pilot çalışma ve ana çalışmada toplanan tüm veriler kendi aralarında karşılaştırılmış ve tartışılmıştır. Elde edilen sonuçlar, mevcut literatür çalışmalarıyla desteklenmiş ve/veya mevcut literatür ile bu çalışmanın verileri arasındaki farklar ortaya konulmuştur. Bu tez, alışveriş merkezinin en önemli faktörlere (*marka çeşitliliği, AVM'de otopark bulunması, etkin temizlik hizmetleri, AVM'deki iklimlendirme konforu ve alışveriş merkezi aydınlatma tasarımı*) uygun şekilde tasarlanması durumunda, AVM'de bulunan mağazaların satış performansının artacağını önermektedir. Modelin güvenilirliği yüksek olduğundan, perakende sektöründeki tasarımcılar ve yatırımcılar, girdilerde yer alan performans faktörlerini değiştirerek çeşitli senaryoları simüle edebilirler. Bu çalışma, alışveriş merkezi yatırımına somut bir performans modeli sunarak yatırımcılar ve tasarımcılar için dikkate değer bir öneri sunmaktadır.



1. INTRODUCTION

This study identifies key performance factors for shopping mall investments in Türkiye and proposes a model for their evaluation. This model captures the most impactful performance factors influencing retail store sales performance, thereby enhancing the overall efficiency of shopping mall investments. It is important to emphasize that the success of shopping malls largely depends on the sales performance of their retail stores. This thesis aims to identify the most significant performance factors via an efficient model that would serve shopping mall investors and designers for more effective shopping mall design. The retail industry is facing increased competition due to the rise of e-commerce, the proliferation of shopping malls, reduced purchasing power, and the ongoing effects of the COVID-19 pandemic. As a result, the sales performance of retail stores within shopping malls has gained increasing importance. Identifying and evaluating the factors within shopping malls that influence retail store sales performance will aid in developing a new model for optimizing shopping mall investments, leading to the creation of new systems and analyses that are not only high-performing but also more productive, financially viable, and sustainable.

Retail developments constitute a major portion of the economy because they are considered one of the most secure investment models as they promise a long-term and consistent revenue for the investment (Ying & Alias, 2022). Furthermore, the retail sector holds a prominent position in the economy due to its wide-ranging scope, encompassing various sub-sectors like ready-to-wear textiles, food and beverages, services, electronics. Consequently, the imperative of ensuring the effectiveness and long-term viability of the retail sector becomes readily apparent, as its faltering or recessionary trends could significantly curtail the prosperity of numerous affiliated sub-sectors. Shopping mall investments majorly govern the retail industry. Effective and sustainable investments in the retail sector play a pivotal role in bolstering the retail industry and its various subdivisions. Therefore, the shopping mall investments' performance holds immense significance in the realm of economic development.

The retail industry in Türkiye is experiencing heightened competition, characterized by the rapid growth of e-commerce, the oversupply of retail centers, and reduced consumer spending capacity due to economic pressures. These dynamics present emerging challenges for shopping mall investments. Given these challenges, shopping mall investments must evolve and implement new models to achieve heightened efficiency, productivity, feasibility, and sustainability. The success of shopping malls hinges on a multifaceted set of factors, including their location, accessibility, architectural design, tenant mix, size, the conceptual approach of the shopping mall, and most notably, the performance of the individual retail establishments, as underscored by Bakhshizadeh et al. (2017). High-performing retail stores not only remain within the shopping mall but also serve as magnets for visitors, thus making substantial contributions to the overall performance of the shopping mall.

On the other hand, retail stores which do not have sufficient sales performance are subject to close or to be removed from the shopping mall. Consequently, the sales performance of the retail stores is crucial for the sustainability of the shopping mall.

The primary focus of this thesis centers on the sales performance of retail stores situated inside a shopping mall and it discusses in detail the factors that impact on the sales performance of retail stores. At the initial stage, the study created a clear frame and scope of work, where it examines the criteria for evaluating the retail stores' sales performance, which may differ for diverse retail stores. This study omits the predetermined criteria for evaluating the sales performance of retail stores, which are established during the investment feasibility phase. These criteria include factors like location, shopping mall dimensions, and shopping mall category. These factors are fixed design inputs and remain unchanged following the establishment of the shopping mall investment. Nonetheless, sales performance factors for retail stores, such as retail store dimensions, retail store design, lighting design, and vertical circulation, are significant factors that can differ between one retail store and another. This study seeks to determine the variables that influence the retail stores' sales performance and to assess the significance of these measurement factors.

As discussed more in detail in the Methodology section, the study determined the performance factors of retail stores after an intensive review of literature. Following the literature review, the scope of work realized an expert judgement and a pilot study

about the evaluation of each performance factor. Consequently, the findings of both studies are discussed in detail, and they are compared to each other.

After the consolidation of the retail store performance factors by the expert judgement and the pilot study, the research stepped in a further and wider study where it questioned a group of 204 retail store managers about the retail store performance factors from six different shopping malls in six cities in Türkiye. The findings of this main study revealed the most significant sales performance factors for retail stores located in a shopping mall such as *brand variety, presence of carpark, efficiency of cleaning services, lighting design concept of the shopping mall, and HVAC comfort in the shopping mall*. Furthermore, the study was expanded to evaluate the same performance factors for the COVID-19 pandemic period. These findings allowed the research to evaluate and to discuss in detail the performance factors and to create a design model for successful retail project investments. The expansion of the evaluation through the pandemic period allowed interesting results for comparison between pre-pandemic and pandemic periods. The created model has very good reliability and reflects high predictive performance.

1.1 Purpose of Thesis

Retail project investments such as shopping malls or commercial centers constitute a group of commercial investments where the main purpose lies in the effectiveness of the project. These commercial investments, such as shopping malls, house a large number of retail stores under one physical roof or under the same cluster if this is the subject of an open-air retail project. The success of a retail investment is measured by the success of the retail stores located in this specific retail investment project. Furthermore, the success of the retail stores relies on their sales performance. If the sales performance factors which affect the effectiveness of the retail store are revealed and measured, then the success of the retail investments will be predicted and foreseen.

Building on this viewpoint, the present thesis seeks to propose a performance factor identification model that elucidates the influence of essential performance factors on the sales performance of retail stores within shopping malls in Türkiye. According to the literature review, the major performance factors are grouped in the spatial/architectural design factors. Therefore, the main purpose of this thesis lies in the willingness to capture the relationship between the spatial/architectural design and

the sales performance of the retail stores located in a shopping mall. Understanding the impact of retail store design or shopping mall building design on the sales performance of the retail stores will allow designers and investors to create more successful shopping malls.

1.2 Importance of Thesis

As discussed in the previous chapter, the main purpose of this thesis is to create a design model which will allow retail investments to be more effective and more successful. By revealing the diverse sales performance factors and then by evaluating them, researchers found out the most important and the least important sales performance factors that affect the sales of a retail store in a shopping mall. Moreover, researchers categorized these performance factors into 3 groups such as building performance factors, retail store performance factors and building services factors. The importance rank of each performance factor was discussed, thus sorting out the factors that would need more attention in the design process. Knowing these performance factors in advance, will allow designers and investors to design more effective retail investment projects. In a milieu where the competition becomes more challenging and retail investments struggle some major difficulties enhanced by e-commerce and increase in supply, only the most effective shopping malls will survive these difficulties and will create satisfying commercial assets. The thesis' importance lies in the fact that the performance-based identification model will allow to create more effective shopping malls.

The retail sector constitutes a cornerstone of the contemporary economy, distinguished by its extensive and multifaceted structure that encompasses a wide array of sub-sectors, including ready-to-wear apparel, food and beverages, services, and electronics. This structural diversity underscores the sector's systemic importance, as fluctuations within retail activity can generate significant ripple effects across interrelated industries. Consequently, safeguarding the operational efficiency and long-term sustainability of the retail sector emerges as a strategic imperative for ensuring broader economic resilience.

Within this framework, investments in shopping malls represent a critical lever for the development and consolidation of the retail ecosystem. These investments serve as catalysts for economic dynamism across associated sectors. Therefore, the

performance and sustainability of shopping mall investments hold considerable significance in shaping macroeconomic trajectories and fostering inclusive economic growth. These statements clearly show the importance of the subject chosen for this thesis. In light of the preceding analysis, it becomes evident that this research holds substantial practical significance. By addressing the critical role of the retail sector and the strategic importance of shopping mall investments, this thesis contributes to a deeper understanding of the mechanisms underpinning economic development.

Previous research has examined the performance factors of retail sales performance by investigating various typological frameworks, including those based on building design as well as economic and sociological perspectives. Furthermore, a comprehensive review of the existing literature reveals a notable gap: no prior research has proposed a design model from project management typology framework gathering performance factors from several categories. This absence underscores the originality and relevance of the present study. By systematically evaluating the factors influencing sales performance and engaging in in-depth discussions with experts from the retail sector, this research aims to generate valuable insights. These contributions are expected to benefit not only practitioners, particularly designers and investors involved in shopping mall development, but also the academic community by offering a novel framework to inform strategic decision-making and enhance project outcomes. The insights derived from this study are thus poised to inform both scholarly discourse and policymaking, reinforcing the relevance and timeliness of the research.



2. LITERATURE REVIEW

This thesis conducts a thorough literature review of Turkish and international scientific papers to reach the goal of creating a key performance identification model for retail investments in Türkiye. This literature review aimed to reveal the sales performance of the retail stores situated in a shopping mall. The performance criteria revealed from the literature review were subject to be revised, questioned and consolidated by the expert judgement group.

The second aim of the literature review was to find out whether the previous studies had already created similar performance-based models for retail stores in a shopping mall project. This second target was an important one due the fact that the thesis subject should be an authentic and original one. After thorough literature review, the findings indicated that a similar performance-based model was not created by earlier studies. The review indicates that although numerous studies examine individual performance factors, no earlier study offers a holistic, categorized performance-based design model focusing on retail store sales performance. This gap establishes the methodological and conceptual foundation of the present research as well as consolidating the originality of the thesis subject.

2.1 Literature Background

A review of Turkish and international literature identified 37 scientific papers that guide the shopping mall design management criteria. These 37 scientific papers study different subjects and issues of shopping mall design management such as presence of carpark, daylight perception in the shopping mall, building materials used in the shopping mall or proximity of the retail store to main cores, etc.

Kusumovidagdo et al. (2012) focus on the shopping mall visitors' perception of the interior atmosphere of the mall and how this perception affects their shopping habits. From this paper, 12 retail store performance criteria have been derived such as: retail store design, proximity to shopping mall main cores (food court, customer wet cores, mall entrance and delivery yard), number floor levels, building materials used, floor

height, HVAC comfort, general lighting concept, proximity to vertical circulation equipment, carpark concept (position and payment), interior signage, brand mix, marketing activities. As a extension study, Minerva and Kusumovidagdo (2024) emphasizes on the retail store design performance factors and their impact on shopping mall success.

Another leading study was Webber et al. (2018)'s research about the remodeling of the retail store for better performances. The study discusses the multiple criteria that affect the retail store performance and offers some modification strategies for better retail store performance. Retail store performance criteria derived from this study are retail store design, position of the retail store in the shopping mall, architectural design of the shopping mall, floor cladding material of common areas, HVAC comfort in shopping mall, general lighting concept of shopping mall, noise level and interior signage.

The study conducted by Köksal and Tıǧlı (2018) is a descriptive content analysis which analyzes 20 master's theses, 13 doctoral dissertations and 20 papers about the consumers' behaviors in shopping malls in Türkiye. Proximity to main cores (foodcourt, playground, supermarket, event area, customer wet cores, mall entrances), HVAC comfort, noise level, physical comfort of resting area, accessibility in shopping mall, proximity to vertical circulation equipment, proximity to the carpark, service variety offered in shopping mall, efficient cleaning services, brand mix, presence of an entertainment center, safety and security, presence of a cultural event center in shopping mall are major retail store performance criteria observed in this study.

The research article by Nebati and Ekmekçi (2018) represent a model of performance evaluation for shopping malls. The performance criteria driven from this study are retail store design, position of the retail store in shopping mall, smart building technologies, efficient use of water and energy, architectural design of shopping mall, floor cladding material in common areas, HVAC comfort, daylight in shopping mall, brand mix and presence of an entertainment center in the shopping mall.

Çakmak and Yılmaz (2018) discuss the impact of architectural design of shopping malls on consumer behaviors upon a case study in Konya, Turkey. Major retail store performance criteria derived from this study are retail store design (including store lighting design and retail store front design), the architectural concept of shopping mall, efficient energy use, daylight in shopping mall and marketing activities of

shopping mall. In parallel to this research, the study conducted by Riaz et al. (2024) examines how spatial efficiency, layout planning, and sustainability considerations influence retail store sales performance.

The studies by Burnaz and Topçu (2011) and by Ventakesh (2025) emphasize on the importance of planning appropriate tenant mix and placement of the retail stores to maximize their performance. Brand mix in shopping mall is the major criteria studied in this article. The factors related to planning retail tenant mix are categorized into 4 groups such as target market related, financial, retailer related, shopping mall related factors. This categorization informed the structure of the present study into the categorization of the retail store performance factors.

Jalil Abdullah and Jian (2019) propose a model for shopping complex design based on universal design concept using structural equation modeling. Universal design is a concept that allows the accessibility of the building for all users equally. According to universal design concept, proximity to customer wet cores and to mall entrances, the architectural design of shopping mall, the width of the mall corridors, the floor cladding material in the common areas, HVAC comfort in the shopping mall, physical comfort in resting areas, interior accessibility, proximity to vertical circulation equipment, signage elements, service variety in shopping mall, safety and security are important retail store performance criteria. This study tests its model using structural equation modeling; therefore, it has been a major guide for understanding the structural equation modeling.

The research made by Bakhshizadeh et al. (2017) discusses the shopping mall's success in an increasingly highly competitive environment in Tehran, Iran. They propose a qualitative model, and they test it by structural equation modeling (SEM). 4 retail store performance criteria are derived from this research such as architectural design of shopping mall, marketing activities in shopping mall, service variety and effectiveness in shopping mall and brand mix.

Chotipanich and Issarasak (2016) focus on facility management operation strategy for better performance in shopping malls. Performance criteria derived from this research constitute a complimentary part of my study as they investigate the issue from an operational point of view. Effectiveness of fire escape scenario, carpark concept in shopping mall (position, payment concept), effectiveness of cleaning services, safety

and security (presence of x-ray equipment and a security guard at the entrances) are main performance factors discussed in this study.

The study conducted by John et al. (2016) evaluates the performance of a popular shopping mall in Brazil focusing on its location, use, aesthetics and security. The study revealed several retail store performance factors such as proximity to food court, number of retail floor levels, architectural design of shopping mall.

Another important factor for retail store and shopping mall performance is the daylight presence in the building according to the study made by Solovyev (2018). Spaces flooded by daylight bring more comfort and confidence to the building users according to this study. Therefore, daylight in the shopping mall has been added to the performance factors list.

Wessam et al. (2018) also focuses on daylighting performance in shopping malls. According to this study, the fact that the shopping mall customers feel the daylight in the shopping mall increases the relationship with the outside and makes people stay longer time in malls.

Lee (2010) studies the education, cultural and event areas in new generation shopping malls on the case of Ibn Battuta Mall, Dubai. These education and cultural areas merge with entertainment areas in new generation malls. Thus, a new concept “edutainment” is created. According to this study, proximity of a retail store to the edutainment and event areas is a major factor for retail store performance. Dey et al. (2019) also underscores the importance of entertainment facilities among the performance factors of shopping malls.

The master thesis of Kısı (2015) studies in detail the occupancy safety in shopping mall architectural design. From this study, 4 important performance factors have been derived: effectiveness of fire escape scenario, proximity to fire escape corridors, presence of carpark in shopping mall and presence of x-ray equipment and a security guard at the entrance of the shopping mall.

By means of extensive literature research, researchers have identified the specific criteria for retail store sales performance which will allow the assessment of factors influencing sales performance. The research background is delimited by keywords, including shopping mall design, retail store performance, and the overall efficiency of

shopping mall design. Researchers analyzed in detail twenty-two major scientific papers about the topic and created a list of performance factors through these papers.

Retail store performance factors such as retail store interior design, shopwindow design, retail store lighting design, retail store dimensions and floor height appear in studies by Minerva and Kusumowidagdo (2024), Yılmaz Çakmak and Yılmaz (2018), Kusumowidagdo et al. (2011), Nebati and Ekmekçi (2019), Webber et al. (2018). The last 2 authors focused also on the performance factors related to the placement of the retail store inside the shopping mall. Webber et al. (2018) conducted a study on the remodeling of retail stores to enhance their performance. This study delves into the numerous criteria that impact the performance of retail stores and presents strategies for modifying them to enhance retail store performance. The study has identified several criteria for evaluating retail store performance. These criteria include retail store design, location of the retail store within the shopping mall, the shopping mall's architectural design, the choice of floor covering materials in public premises, heating/ventilation/air conditioning comfort inside shopping mall, the overall lighting concept, noise levels, indoor signs.

Another notable research realized by Köksal and Tıǧlı in 2018 involved a descriptive content analysis. This analysis examined a total of twenty master's theses, thirteen PhD dissertations, and twenty research studies focused on consumer behavior within shopping malls in Turkey. The study identified several major retail store performance criteria, including closeness to key areas such as the food hall, kids' playground, supermarket, event area, customer service centers, and center entrances. Additionally, factors such as indoor climate control systems' comfort, noise levels, resting areas' physical comfort, shopping mall accessibility, closeness to the car park, the range of services provided within the shopping mall, effective sanitation services, brand diversity, the presence of a leisure center, security measures, availability of a cultural performance hall within the shopping mall were observed as significant criteria in the study. Retail store performance factors related to the placement of the retail store in the shopping mall appear in the study by Köksal and Tıǧlı (2018) as well as by Lee (2010), which studies the relationship between the cultural and event areas of the shopping mall and the retail stores' performance.

Building design performance factors such as intelligent building technologies, effective utilization of energy and water, the shopping mall's design, the flooring

material used in public spaces, daylight in shopping mall appear in the studies by Nebati and Ekmekçi (2019), Jalil Abdullah and Jian (2019), Bakhshizadeh et al. (2017) and John et al. (2016). In overall, these studies examine the impact of these building design performance factors on the retail store performance.

The research carried out by Chotipanich and Issarasak in 2017 primarily focuses on key performance factors that include the efficiency of fire exit scenarios, the carpark scenario within the shopping mall, the security measures and the effectiveness of sanitation services. This study explores facility management operation strategies aimed at improving performance within shopping malls.

Researchers extracted four significant building performance factors from Kısa's master's thesis (2017). These factors include the efficiency of fire escape scenarios, the closeness to fire exit passageways, the presence of a car park within the shopping mall complex, and the presence of security personnel and x-ray equipment in the facility.

Another important factor for retail store performance and shopping mall performance is the daylight presence in the building according to the study made by Solovyev (2018). The study argues that spaces flooded by daylight bring more comfort and confidence to the building users. Daylight perception factor appears also in studies by Yılmaz Çakmak and Yılmaz (2018) and Nebati and Ekmekçi (2019). Mayhoub and Rabboh (2022) claim that daylight perception has a major impact on the customers' satisfaction. El-Abd et al. (2018) also focus on daylighting performance in shopping malls. Another study about daylight in retail buildings emphasizes the impact of daylight on energy consumption and thermal performance of shopping malls (Prakash et al., 2021).

Building services performance factors such as brand mix, management service variety, branch mix, service effectiveness, marketing activities appear in the studies by Ahmad (2012), Ahmadi et al. (2020), Bakhshizadeh et al. (2017), Ventakesh (2025), Burnaz and Topçu (2011), Köksal and Tıǧlı (2018), Paul (2017) and Xu et al. (2022).

As explained in previous paragraphs, studies examined during the literature review do not classify the performance factors according to their variable groups, as shown in Table 2.1. Therefore, they do not compare the variable groups as a whole. In contrast to the studies covered among literature review, this research endeavors in assessing

factors shaping the performance conditions under which retail store sales performance emerges, through the examination of three distinct groups of dependent variables: building design performance, retail store design performance, and building services performance. Researchers seek to discuss the interrelationships among the performance factors within these three dependent variables and to compare the rankings of the dependent variables. Therefore, this study targets to cover a missing analysis point in the previous studies.

Table 2.1: Performance factors categorized via literature review.

Performance Factors	References
Retail store interior design; Shopwindow design	Faria et al. (2022), Nebati and Ekmekçi (2019), Khan et al. (2022), Çakmak and Yilmaz (2018), Kusumovidagdo et al. (2012), Weber et al. (2018), Ahmadi et al. (2020), Minerva and Kusumowidagdo (2024)
Lighting design of retail store	Ahmadi et al. (2020), Nebati and Ekmekçi (2019), Çakmak and Yilmaz (2018), Kusumovidagdo et al. (2012), Khan et al. (2022), Minerva and Kusumowidagdo (2024)
Retail store dimensions; Retail store floor height	Büyüksahin (2023), Faria et al. (2022), Kusumovidagdo et al. (2012), Khan et al. (2022)
Location of the retail store in shopping mall	Nebati and Ekmekçi (2019), Weber et al. (2018)
Visibility of retail store	Weber et al. (2018), Riaz et al. (2024)
Proximity of retail store to main cores of the shopping mall, to event area	Köksal and Tıǧlı (2018), Lee (2010)
Proximity of retail store to supermarket, to kids playground, to event area	Köksal and Tıǧlı (2018)
Proximity of retail store to foodcourt	Riaz et al. (2024) John et al. (2016), Köksal and Tıǧlı (2018), Kusumovidagdo et al. (2012)
Proximity of retail store to delivery yard	Kusumovidagdo et al. (2012)
Proximity of retail store to customer wet cores	Abdullah and Jian (2019), Köksal and Tıǧlı (2018), Kusumovidagdo et al. (2012)
Proximity of retail store to main entrances	Abdullah and Jian (2019), Köksal and Tıǧlı (2018), Kusumovidagdo et al. (2012)
Smart building technologies used in shopping mall; Efficient use of water and energy; Open-air vs enclosed mall concept; Floor level of retail store	Ferreira et al. (2023), Nebati and Ekmekçi (2019)
Architectural design of the shopping mall	Büyüksahin (2023), Abdullah and Jian (2019), Yuan et al. (2021), Nebati and Ekmekçi (2019), Weber et al. (2018), Bakhshizadeh et al. (2017), Ahmadi et al. (2020)
Number of floor levels of the shopping mall	Ying and Alias (2022), John et al. (2016), Kusumovidagdo et al. (2012), Yuan et al. (2021)
Shopping mall corridor width	Büyüksahin (2023), Abdullah and Jian (2019), Riaz et al. (2024)
Shopping mall common area floor cladding material	Abdullah and Jian (2019), Nebati and Ekmekçi (2019), Kusumovidagdo et al. (2012), Weber et al. (2018)

Table 2.1 (continued): Performance factors categorized via literature review.

Building materials used in the shopping mall; Shopping mall floor height	Yuan et al. (2021), Kusumovidagdo et al. (2012)
Physical comfort in the shopping mall; HVAC comfort in the shopping mall	Ferreira et al. (2023), Abdullah and Jian (2019), Nebati and Ekmekçi (2019), Köksal and Tıǧlı (2018), Kusumovidagdo et al. (2012), Ahmadi et al. (2020), Prakash et al. (2021)
Lighting design concept of the shopping mall	Kusumovidagdo et al. (2012), Weber et al. (2018)
Noise level in the shopping mall	Köksal and Tıǧlı (2018), Weber et al. (2018)
Accessibility of the shopping mall by handicapped people; Physical comfort of resting areas	Abdullah and Jian (2019), Köksal and Tıǧlı (2018)
Proximity of the retail store to the vertical circulation	Abdullah and Jian (2019), Köksal and Tıǧlı (2018), Kusumovidagdo et al. (2012)
Efficiency of the fire escape scenario	Kısa (2015), Chotipanich and Issarasak (2017)
Proximity of the retail store to the fire escape corridors	Kısa (2015)
Presence of carpark	Ying and Alias (2022), Kısa (2015), Köksal and Tıǧlı (2018), Kusumovidagdo et al. (2012), Chotipanich and Issarasak (2017), Riaz et al. (2024)
Proximity of the retail store to the carpark	Köksal and Tıǧlı (2018), Kusumovidagdo et al. (2012), Chotipanich and Issarasak (2017)
Whether the carpark is free of charge or not	Kusumovidagdo et al. (2012), Chotipanich and Issarasak (2017)
Daylight perception in the shopping mall	Mayhoub and Rabboh (2022), Solovyev (2018), Çakmak and Yılmaz (2018), Nebati and Ekmekçi (2019), Wessau et al. (2018)
Efficiency of the guidance signboards	Abdullah and Jian (2019), Kusumovidagdo et al. (2012), Weber et al. (2018)
Variety of management services	Faria et al. (2022), Nebati and Ekmekçi (2019), Köksal and Tıǧlı (2018)
Presence of ATM machines	Abdullah and Jian (2019)
Presence of info desk	Abdullah and Jian (2019), Köksal and Tıǧlı (2018)
Efficiency of cleaning services	Faria et al. (2022), Köksal and Tıǧlı (2018), Chotipanich and Issarasak (2017)
Brand variety	Xu et al. (2022), Nebati and Ekmekçi (2019), Köksal and Tıǧlı (2018), Kusumovidagdo et al. (2012), Burnaz and Topçu (2011), Ahmadi et al. (2020), Ying and Alias (2022), Venkatesh (2025)
Branch mix in the shopping mall; Presence of kiosques	Xu et al. (2022), Kusumovidagdo et al. (2012), Ahmadi et al. (2020), Venkatesh (2025)
Presence of an entertainment center; Proximity of the retail store to the entertainment center	Nebati and Ekmekçi (2019), Köksal and Tıǧlı (2018)
Presence of x-ray machines and security guards	Kısa (2015), Köksal and Tıǧlı (2018), Abdullah and Jian (2019), Chotipanich and Issarasak (2017)
Presence of a cultural center; Proximity of the retail store to the cultural center	Köksal and Tıǧlı (2018)
Marketing activities	Kusumovidagdo et al. (2012), Bakhshizadeh et al. (2017)
Landscape design in the shopping mall	Aslantamer and Ilgın (2024)

2.2 Research Criteria According to the Literature Review

The performance criteria list created according to the above-mentioned scientific studies in the literature are categorized under 3 main groups:

- Retail store performance criteria; spatial or physical criteria which are unique to a specific retail store
- Building performance criteria; physical criteria which derive from the architectural, structural, mechanical and electrical design of the shopping mall
- Building services performance criteria; criteria which derive from the shopping mall management services

The performance criteria set derived from the literature review were grouped into 3 latent variables according to their focus subject. Table 2.2 exhibits the retail store performance criteria which measure the retail store design characteristics or the spatial values of the retail store. These specifications are unique for each retail store.

Table 2.2: Retail store design performance factors derived from literature.

Retail Store Design Performance Factors		
Factor no	Factor type	Factor Definition
1	RDP	Retail store design
1a	RDP	Shopwindow design
1b	RDP	Retail store lighting design
1c	RDP	Retail store size
1d	RDP	Retail store height
2	RDP	Location of the retail store in the shopping mall
2a	RDP	Visibility of retail store
2b	RDP	Floor level of retail store
3	RDP	Proximity of the retail store to main cores in the shopping mall
3a	RDP	Proximity to the kids playground
3b	RDP	Proximity to the supermarket
3c	RDP	Proximity to the event area (edutainment concept)
3d	RDP	Proximity to the foodcourt
3e	RDP	Proximity to the delivery yard
3f	RDP	Proximity to customer wet cores (babycare room, family wc, prayer room, etc)
3g	RDP	Proximity to main entrances
3h	RDP	Proximity to vertical circulation (elevators, escalators, travelators)
3i	RDP	Proximity to fire escape corridors
3j	RDP	Proximity to carpark
3k	RDP	Proximity to entertainment center
3l	RDP	Proximity to cultural center

Similarly, the building design performance criteria group is shown on Table 2.3. These criteria point out the specifications of the shopping mall design and the technical specifications it covers. Finally, the third criteria group derived from the literature

review is exhibited by Table 2.4, with building services performance criteria which cover the mall management services offered by the mall management to the retail stores. These services remain identical for each retail store.

Table 2.3: Building design performance factors derived from literature.

Building Design Performance Factors		
Factor no	Factor type	Factor Definition
6	BDP	Smart building technologies
6a	BDP	Efficient use of energy and water
7	BDP	Architectural design of shopping mall
7a	BDP	Number of floors in shopping mall
7b	BDP	Open-air vs. enclosed box concept
7c	BDP	Common area customer corridor width
7d	BDP	Floor cladding material on common area
7e	BDP	Building materials used in shopping mall
7f	BDP	Floor height of shopping mall
8	BDP	Physical comfort in shopping mall
8a	BDP	HVAC comfort in shopping mall
8b	BDP	Lighting concept in shopping mall
8c	BDP	Noise level in shopping mall
8d	BDP	Comfort in resting areas
9	BDP	Accessibility of shopping mall by handicapped people
10	BDP	Efficiency of fire escape scenario
11	BDP	Presence of carpark
12	BDP	Daylight perception in shopping mall
13	BDP	Signage boards in shopping mall

Table 2.4: Building services performance factors derived from literature.

Building Services Performance Factors		
Factor no	Factor type	Factor Definition
14	BSP	Variety of management services in shopping mall
14a	BSP	Presence of ATM machines
14b	BSP	Presence of infodesk
14c	BSP	Efficiency of cleaning services
15	BSP	Brand variety in shopping mall
15a	BSP	Branch mix in shopping mall
15b	BSP	Presence of kiosques
16	BSP	Presence of an entertainment center
16a	BSP	Whether the carpark is free of charge or not
17	BSP	Presence of x-ray machines and security guards at the entrances
18	BSP	Presence of a cultural center
19	BSP	Marketing activities in shopping mall

3. METHODOLOGY

Based on the findings of the literature review, key performance measurement factors were identified and grouped into three main latent variable categories: retail store design performance, building design performance, and building services performance. These variables constitute the conceptual foundation of the research model.

The first variable group, which is the "retail store design" latent variable, is associated with both retail store interior design and its positioning inside the shopping mall. Factors like "retail store's lighting design", "retail store window design," and "closeness to mall entrances" fall within this variable category. The second latent variable "building design" is contingent upon architectural, structural, electrical, mechanical design aspects of shopping mall, established upon the mall's design stage and applicable to all retail stores within. Aspects like "shopping mall floor height," "heating/ventilation/air conditioning (HVAC) comfort" and "number of entrances" exemplify building design factors. The final latent variable encompasses criteria for "building services," that pertain to services supplied by shopping mall management. Elements like "security services" and "sanitation services" fall under this domain and are consistent across all retail stores in the shopping mall.

The study constructed a model showing the relationships and the impact of the 3 latent variables between each other as discussed in this chapter. The methodology of the study follows a multi-stage approach comprising expert judgement, a pilot study, and a large-scale main study to validate, refine, and test the proposed model.

3.1 Model Formulation

The structural equation modelling (SEM) approach was primarily considered to construct the model for this thesis because SEM is the ideal approach for grouping items into latent variables and testing causal paths between them. Initially, the research aimed to identify the performance factors impacting the retail store sales performance. This target, supported by the literature review, resulted in the model below represented

in Figure 3.1. This model aimed to reveal the impact of the retail store design performance, the building design performance and the building services performance on the retail store sales performance by the following hypotheses:

- *H1*: The retail store design performance impacts the retail store sales performance
- *H2*: The building design performance impacts the retail store sales performance
- *H3*: The building services performance impacts the retail store sales performance

The mathematical formulation of the structural model was formulated as:

$$RTP = \text{const} + H1 \cdot RDP + H2 \cdot BSP + H3 \cdot BDP + \varepsilon$$

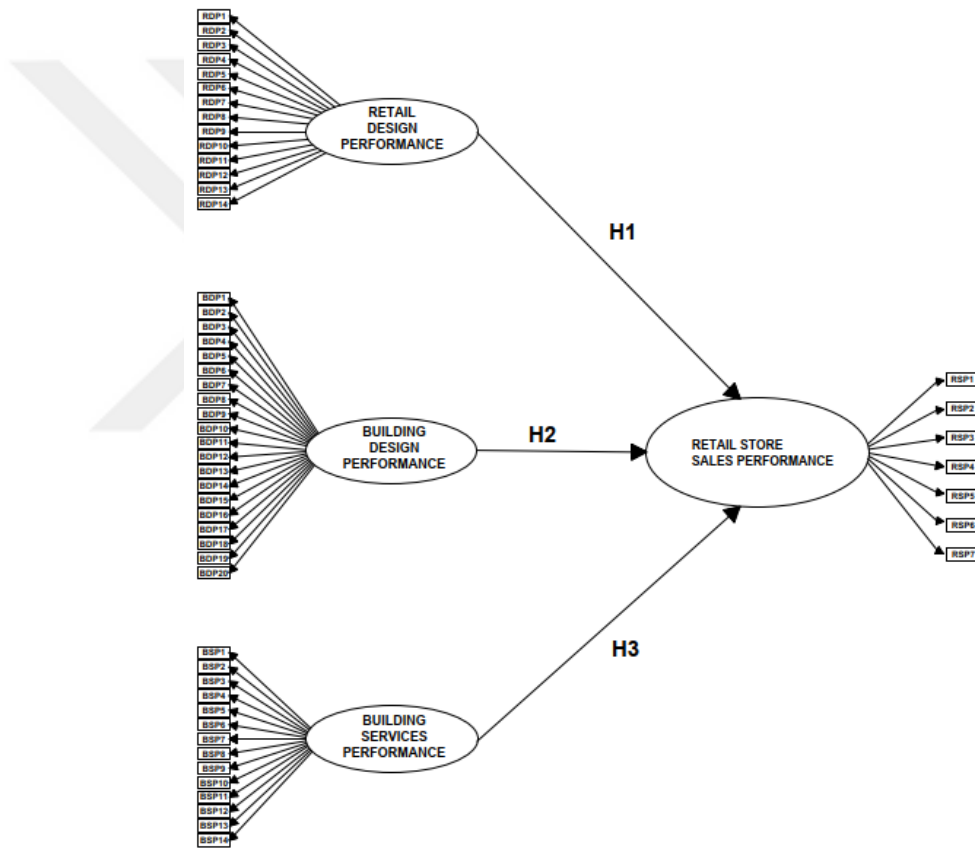


Figure 3.1: Predictive Model.

Although retail store sales performance was initially conceptualized as the primary outcome variable of the proposed model, empirical findings from the pilot and main studies revealed that this construct could not be reliably operationalized as a single latent variable. The very low internal consistency value (Cronbach's $\alpha = 0.185$) indicates that the indicators associated with sales performance do not represent a unidimensional construct.

From a theoretical perspective, retail store sales performance is widely acknowledged as a multifaceted and context-dependent outcome, influenced not only by spatial, architectural, and service-related factors, but also by external variables such as brand strength, pricing strategies, promotional campaigns, macroeconomic conditions, seasonal demand fluctuations, and firm-specific managerial decisions. These influences introduce substantial heterogeneity that limits the feasibility of modelling sales performance as a reflective latent construct within a structural equation modelling framework.

Consistent with methodological literature on SEM, constructs exhibiting low internal coherence and strong susceptibility to exogenous influences are more appropriately treated as outcome references rather than as latent variables within the structural model. Consequently, retail store sales performance was excluded from the structural model and the research focus was redirected toward examining the interrelationships among performance-enabling dimensions (retail store design performance, building design performance, and building services performance) which collectively shape the conditions under which sales performance emerges.

This approach aligns with prior studies that conceptualize sales performance as an emergent outcome of interrelated environmental and managerial factors rather than a directly measurable latent construct. The study provides a theoretically robust and methodologically reliable framework for understanding the mechanisms that indirectly influence retail store sales performance by modelling the mutual interactions among these enabling performance dimensions.

Therefore, the retail store sales performance variable was omitted, and a new structural model was formed with the 3 remaining variables as shown in Figure 3.2. This revised model was fitted and supported by SEM approach in AMOS (Analysis of Moment Structures). The research took this model as basis and continued the study accordingly. In the revised model, the three latent variables, retail store design performance (RDP), building design performance (BDP) and building services performance (BSP), interact and impact each other with double-path arrows. The internal consistency of the variables was suitable such as Cronbach's α RDP= 0.919, Cronbach's α BSP= 0.945 and Cronbach's α BDP= 0.961. The revised model demonstrates the following hypotheses:

- *H1*: The retail store design performance and the building services performance impact each other.
- *H2*: The retail store design performance and the building design performance impact each other.
- *H3*: The building services performance and the building design performance impact each other.

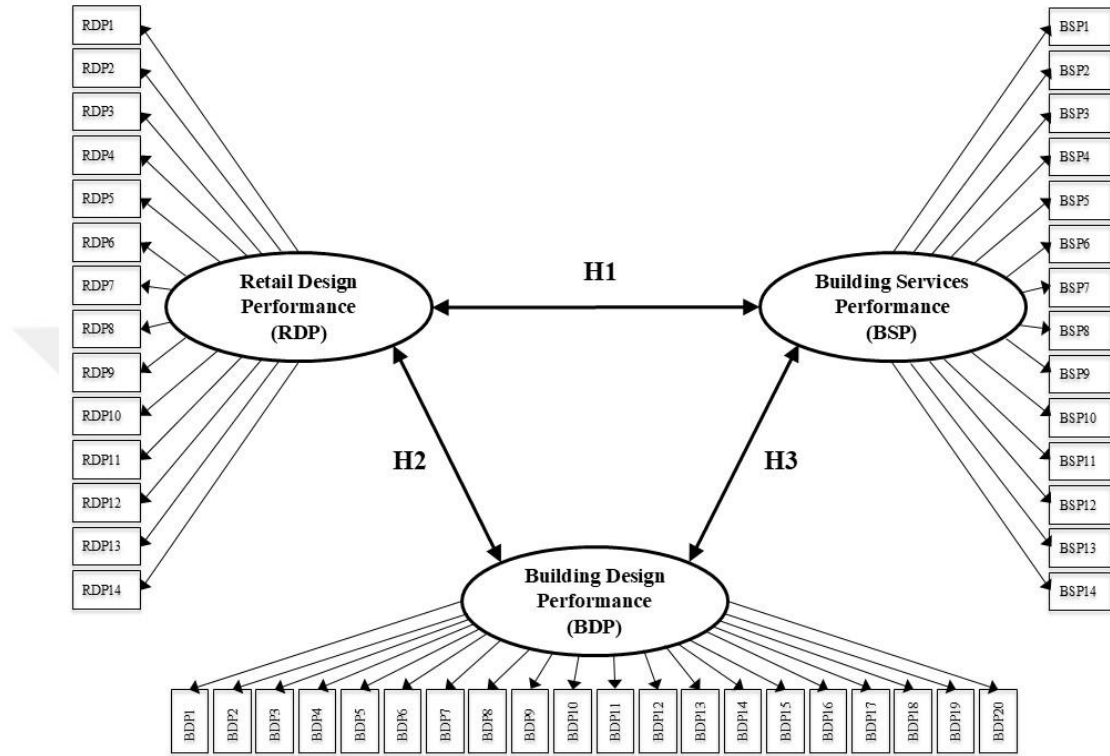


Figure 3.2: Revised Structural Model.

Artificial Neural Networks (ANN) were also incorporated into the study due to their ability to model complex, non-linear relationships among variables, which traditional SEM approaches often assume to be linear. ANN provides superior predictive capability and effectively handles multicollinearity. Combining ANN with SEM offers a complementary approach: SEM validates the theoretical structure and causal relationships among latent constructs, while ANN enhances predictive accuracy and captures intricate patterns in the data, thereby strengthening both the explanatory and predictive power of the research model. Thus, ANN added more depth and strength into the analysis of the research.

3.2 Methodology of the Expert Judgement Study

The research verified the content validity of 'retail store sales performance' by using the expert-judgement method and conducting interviews with a panel of experts. This expert group comprised professionals with more than 15 years of experience in different facets of the retail industry. The expert group initially involved seven professionals such as one distinguished architect, one shopping mall manager, one shopping mall operations director, one deputy general manager serving as leasing director and three retail store managers. More details about the experts' professional background and their expertise area are given in Table 3.1. In addition to the professionals, three shopping mall customers also took part in this expert group to provide insights from a customer perspective. Following the literature review, 21 retail store design performance factors, 19 building design performance factors and 12 building services performance factors constituted the expert judgement questionnaire. The participants assessed these performance factors by utilizing a Five-Point Likert scale, where 5 represented "strongly agree," and 1 represented "strongly disagree." The responses to each factor were assigned to a factor loading, indicating the influence degree for every factor. In this expert judgement, the retail store design performance latent variable is assessed using twenty-one factors; the building design performance latent variable measured by using nineteen factors; finally, the building services performance latent variable measured by using twelve factors. Towards the conclusion of the questionnaire, researchers also included four open-ended questions, allowing respondents to offer new performance measurement factors based on their valuable insights and experiences.

Table 3.1: Background of the participants in the expert judgement.

Participant	Role/Position	Years of Experience	Education Level	Area of Expertise
Expert A	Co-founder / Partner	27	Master in Architecture	Architectural design
Expert B	Deputy General Manager	17	Bachelor in Architecture	Feasibility / leasing in retail industry projects
Expert C	Operations Director	22	BSc in Civil Engineering	Construction / operations of shopping malls
Expert D	Shopping Mall Manager	25	BSc in Mechanical Engineering	Operations in shopping malls
Expert E	Retail Store Manager	20	BA in Business Administration	Sales in electronics retail industry

Table 3.1 (continued): Background of the participants in the expert judgement.

Expert F	Retail Store Manager	18	BA in Business Administration	Sales in clothing retail industry
Expert G	Retail Store Manager	15	BA in Labor Economics	Sales in supermarket retail industry

3.3 Methodology of the Pilot Study

Following the expert judgement, researchers computed the importance rankings for each latent variable and each factor through the calculation of the arithmetic mean. Subsequently, they assessed the new performance measurement factors proposed by the participants through the open-ended questions and incorporated them into the existing list. Meanwhile they eliminated less important factors. As a result, a refined and comprehensive list of instruments for measuring retail store sales performance was established, demonstrating content validity.

For instrument refinement and reliability, researchers regenerated a pilot study. After the content validation of retail store sales performance factors via expert group judgement method and the evaluation of the expert group judgement, the studies for the pilot study initiated in August 2020. The pilot study aimed to test and consolidate the results of the expert judgement and to enhance the list of factors influencing the retail store's sales performance. The pilot study group consisted of sixteen retail store managers from the shopping mall in Gaziantep, Türkiye. The sixteen retail stores belong to diverse retail branch mix such as textile, prêt-à-porter, cosmetics, food & beverage, personal care, electronics. This diversity of retail branch mix enriches the evaluation of the answers and the findings of the pilot study.

Following the expert judgement results, researchers made some adjustments in the performance factors' list for the pilot study questionnaire. In the retail store design performance latent variable group, they subtracted the lowest ranked four factors, which are found as:

- proximity of the retail store to the customer wet cores
- proximity of the retail store to the foodcourt
- proximity of the retail store to the delivery yard
- proximity of the retail store to the event area

Contrarily to the retail store design performance factors, in the building services performance variable two more factors were suggested by the expert judgement committee and added to the revised questionnaire: *the marketing billboards in the*

shopping mall and the social responsibility projects, social activities. For building design performance latent variable, the expert group suggested three more factors such as *direct relationship of the mall with the public spaces, flexible architectural design according to weather conditions and abundant use of landscape in the shopping mall.* The study added these three factors into the updated latent variable groups for the pilot study. Finally, the questionnaire comprised of seventeen retail store design performance factors, fourteen building services performance factors and twenty-two building design performance factors.

Subsequently, the study updated the questionnaire where it revised and improved the statements consolidated by the expert judgement and measuring the rank of significance of the factors influencing the three dependent variables: retail store design performance, building services performance, building design performance. Following these three sections, they created a new section for measuring the retail store sales performance factors because the expert group emphasized the necessity of a separate section consisting of retail store sales performance factors. Consequently, researchers sorted out from the literature the key performance indicators for retail stores, and they inserted them into the questionnaire in the section of the retail store sales performance. Additionally, an expert panel of five experts (with +15 years' experience) evaluated the list of performance factors and the whole questionnaire, and they suggested some new questions to further develop the questionnaire. The intervention of the expert panel can be followed on Fig.3.1. The new questions comprised of four following topics:

- The effect of the sociological background to the retail store performance,
- Online sales versus traditional sales,
- The customer habits which have been altered after the Covid-19 pandemic,
- The retail sector/shopping mall trends which attract customers most.

After the addition of these four questions, the final questionnaire of the pilot study consisted of seventy-three statements/questions. Seventeen statement/questions belong to retail store design performance factors, fourteen to building services performance factors, twenty-two to building design performance factors, eighteen to retail store sales performance factors. Finally, the last two questions are general open-ended questions which are not categorized under a specific latent variable group. The whole final questionnaire is presented via a questionnaire link. Every factor received

a loading score, indicating influence extent, by utilizing the Five-Point Likert scale (with 5 representing "strongly agree" and 1 representing "strongly disagree"). The final questionnaire was sent to sixteen retail store managers with over 15 years of experience in the shopping mall in Gaziantep City. All the sequences of the methodology are revealed in the methodology flow chart below (Fig.3.3).

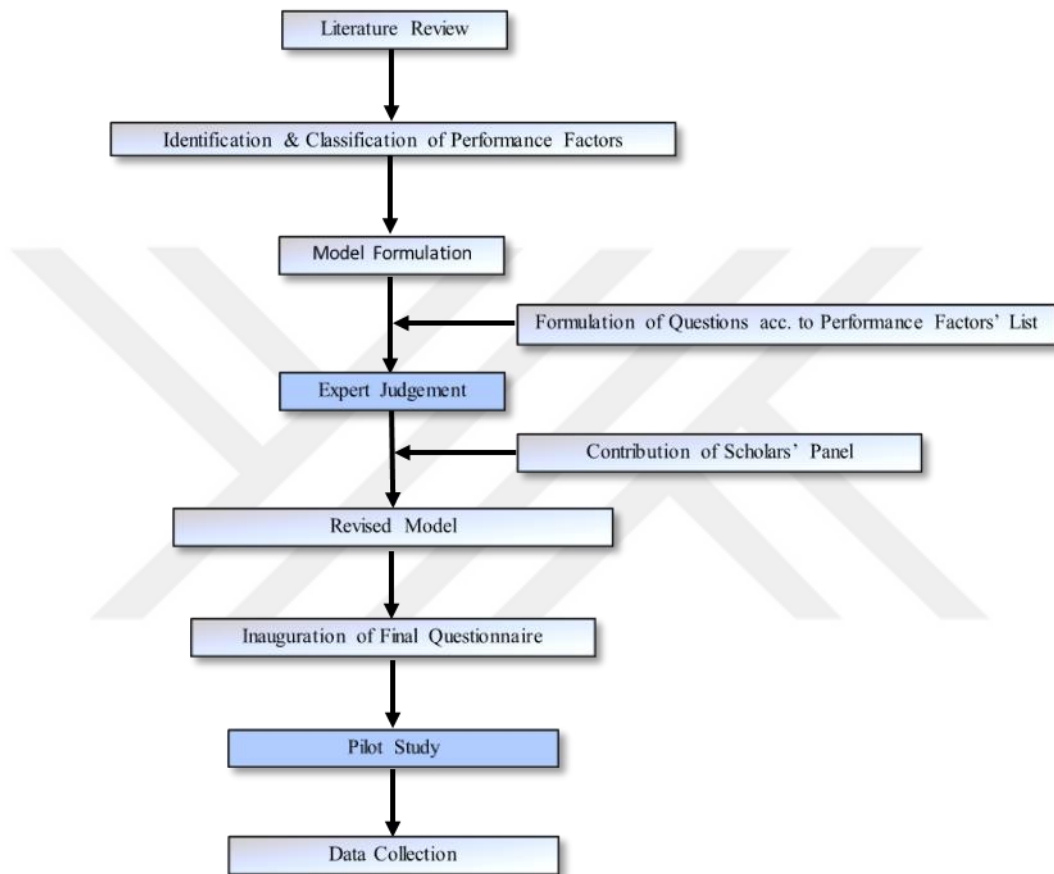


Figure 3.3: Methodology Flow Chart until the End of Pilot Study.

3.4 Methodology of the Main Study

Completion of the pilot study enabled the research to advance to its final stage—the main study. Following the test of the pilot study’s answers for model accuracy, there were not observed any major problems on the model working. As a consequence, the main study was initiated.

The research incorporated the İTÜ Ethical Committee’s feedback, finalized the questionnaire, and distributed it to 314 retail store managers in six shopping malls across İskenderun, Antakya, Gaziantep, Sivas, and İstanbul.

- 1 shopping mall in Gaziantep: 102 active stores
- 1 shopping mall in İskenderun: 94 active stores
- 1 shopping mall in Antakya: 63 active stores
- 1 shopping mall in Sivas: 55 active stores
- 2 shopping malls in İstanbul: 44 active stores

The final questionnaire was sent to 314 participants in November 2021. As a common view, it was very hard to collect data from the participants in the questionnaire. After several calls and reminders, 162 responses were collected in January 2022 for pre-pandemic and pandemic conditions separately, out of 314 participants to whom the final questionnaire was sent. Due to initially low response rates, additional data collection strategies, including on-site interviews, were employed to achieve the required sample size -minimum 200 responses- for robust model testing. In the shopping mall visits, the questionnaire was done directly as one-to-one interviews with retail store managers. This way, the number of respondents increased to 204. This amount was sufficient for the data targeted and the data collection via the questionnaire concluded at the end of April 2022. The sequences and levels of the methodology of the whole study are shown in the methodology chart below as Fig.3.4.

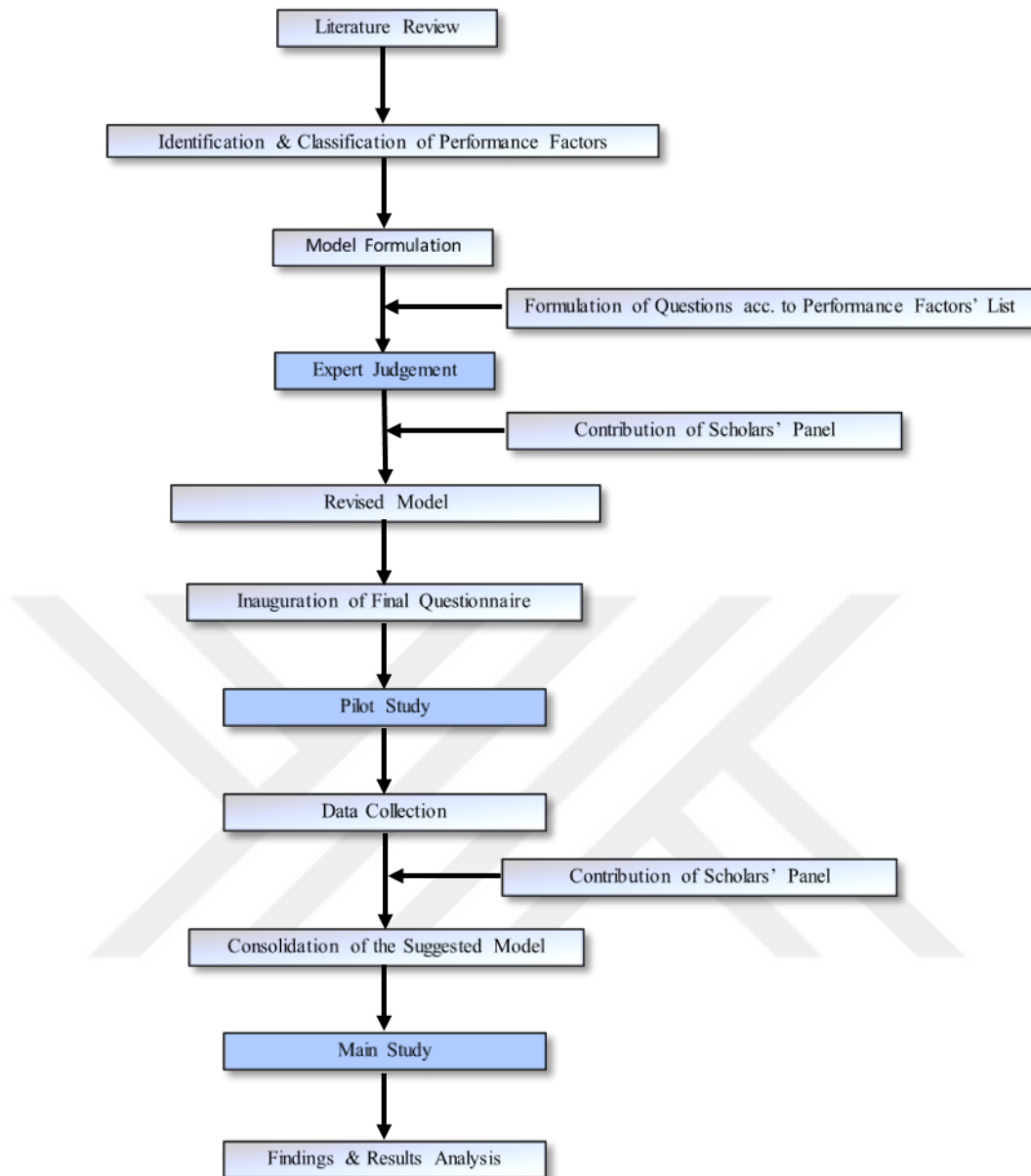


Figure 3.4: Methodology Flow Chart of the Whole Research.

4. FINDINGS AND DISCUSSION

4.1 Findings

As discussed in the methodology section, the research conducted in the scope of this thesis is divided into three groups, depending on the evaluation of the performance factors. Therefore, the present study preferred to categorize the findings of the research into three main groups such as findings of the expert judgement study, findings of the pilot study and findings of the main study.

4.1.1 Findings of the expert judgement study

The expert judgement measured the retail store design performance latent variable by 21 factors, the building design performance latent variable by 19 factors, and building services performance latent variable by 12 factors. The findings of the study will be presented according to these three latent variables. First, the ranking of factors will be evaluated within their own categories, then they will be compared in the overall factors' list.

In the retail store design performance latent variable, the expert committee identified *the retail store visibility* and *the retail store interior design* as two most crucial factors influencing retail store sales performance dependent variable. This finding aligns with the research published by Faria et al. (2022) and by Minerva and Kusumowidagdo (2024), which study the role of retail store design between customer satisfaction and commitment. Within the framework of retail store design performance as the latent variable, the expert committee evaluation revealed that *visibility of the retail store* and its *interior design* were ranked as the two most influential factors on retail store sales performance in Turkish shopping malls. Regarding the standard deviation values, respondents are mostly consolidated around these two factors' importance rank. Following prior perception-based studies, a standard deviation threshold of approximately 1 was adopted as an indicative boundary for respondent consensus.

Among the 5 statistically significant factors, respondents ranked the *floor height of the retail store* at the bottom line.

Survey respondents pinpointed *the presence of a carpark* as the most critical factor influencing retail store sales performance within the realm of building design performance latent variable. Respondents' views are totally consolidated around this factor. This finding aligns perfectly with the previous studies from Köksal and Tıǧlı (2018) and from Chotipanich and Issarasak (2017). On the other hand, 7 out of 19 building design performance factors are not statistically significant as their standard deviation values are greater than 1. Among the statistically significant factors, *the floor height of shopping mall* and *the construction materials used* received the lowest score.

Regarding the building services performance dimension, the expert group exhibited perfect consensus ($\sigma = 0$) in ranking *the brand variety* as the most critical factor impacting the sales performance of retail stores in Turkish shopping malls. This finding aligns with the studies published by Teller and Reutterer (2008) and Wakefield and Baker (1998), which reflects that the tenant mix and variety constitute high impact on shopping mall performance. The study by Kisa (2015) similarly underlines the importance of carpark; however, contrary to this study, Kisa published that the proximity of the retail unit to the carpark is also an important performance factor (2015). 5 performance factors amidst the 12 factors assessing the building services performance latent variable (*brand mix, existence of ATM machines, existence of cultural center and entertainment center and existence of kiosques*) present standard deviation values showing that the respondents' views are diversified. '*The presence of security guards and x-ray machines*' got the lowest importance rank unlike the study by Jalil Abdullah and Jian (2019).

Irrespective of the category of latent variables, the expert group consistently identified the pinnacle as follows: *presence of carpark* and *brand variety* (both with mean scores: 5.00). Additionally, they considered *the retail store visibility* (mean score: 4.90), *the retail store interior design* (mean score: 4.90), *the marketing activities conducted in the shopping mall* (mean score: 4.80), *the retail store lighting design* (mean score: 4.80), and *the effectiveness of sanitation services* (mean score: 4.80) as the most significant contributors to the retail store sales performance. The ranking of all the performance factors (categorized under 3 latent variables: retail store design performance, building design performance, building services performance) in the

expert judgement are listed in Table 4.1. The research did not take into consideration the factors with standard deviation values greater than 1 (marked as bold), as respondents have diversified views about these factors.

Table 4.1: Expert judgement results of latent variables.

Retail Store Design Performance			Building Design Performance			Building Services Performance		
Factors	Mean	St Dev	Factors	Mean	St Dev	Factors	Mean	St Dev
visibility of the retail store	4,90	0,32	presence of carpark	5,00	0,00	brand variety	5,00	0,00
retail store interior design	4,90	0,32	HVAC comfort in the shopping mall	4,60	0,70	efficiency of cleaning services	4,80	0,42
lighting design of the retail store	4,80	0,63	architectural design of the shopping mall	4,60	0,52	marketing activities	4,80	0,42
shop window design of the retail store	4,70	0,95	shopping mall corridor width	4,40	0,70	whether the carpark is free of charge or not	4,60	0,52
location of the retail store in the shopping mall	4,40	1,26	physical comfort in the shopping mall	4,40	0,70	branch mix in the shopping mall	4,40	1,07
proximity of the retail store to the vertical circulation	4,30	1,06	noise level in the shopping mall	4,40	0,70	presence of ATM machines	4,40	1,26
retail store dimensions	4,20	1,03	physical comfort of resting areas	4,30	0,82	presence of info desk	4,30	0,67
floor level of the retail store	4,10	1,45	lighting design concept of the shopping mall	4,20	0,92	variety of management services	4,20	0,92
proximity of the retail store to the entrances	4,00	1,05	efficiency of the guidance signboards	4,10	0,99	presence of x-ray machines and security guards	4,10	0,99
proximity of the retail store to the main cores	3,90	1,20	open-air vs enclosed mall concept	4,00	0,94	presence of a cultural center	4,00	1,25
proximity of the retail store to the carpark	3,80	1,14	shopping mall floor height	3,90	0,99	presence of an entertainment center	3,90	1,29
floor height of the retail store	3,60	0,70	number of floor levels of the shopping mall	3,90	1,37	presence of kiosques	3,80	1,14
proximity of the retail store to the entertainment center	3,30	1,64	building materials used in the shopping mall	3,90	0,88	-----	-----	-----
proximity of the retail store to the supermarket	3,10	1,52	accessibility of the shopping mall by handicapped people	3,90	1,29	-----	-----	-----
proximity of the retail store to the cultural center	3,10	1,45	smart building technologies used in the shopping mall	3,70	1,34	-----	-----	-----

Table 4.1 (continued): Expert judgement results of latent variables.

proximity of the retail store to the kids playground	3,00	1,25	shopping mall common area floor cladding material	3,60	1,17	-----	-----	-----
proximity of the retail store to the fire escape corridors	3,00	1,63	efficient use of water and energy	3,10	1,20	-----	-----	-----
proximity of the retail store to the event area	2,70	1,16	daylight perception in the shopping mall	3,10	1,20	-----	-----	-----
proximity of the retail store to the delivery yard	2,70	1,25	efficiency of the fire escape scenario	3,00	1,63	-----	-----	-----
proximity of the retail store to the foodcourt	2,50	1,43				-----	-----	-----
proximity of the retail store to the customer wet cores	2,50	1,35				-----	-----	-----

4.1.2 Findings of the pilot study

Based on the expert judgement results, the researchers revised the list of performance factors (as detailed in the methodology section) for use in the pilot study questionnaire. According to the revision made after the expert judgement method, 17 factors measure the retail store design performance latent variable, 14 factors measure the building services performance latent variable, and 22 factors measure the building design performance latent variable.

The pilot study results rank the following factors as the most important ones among the retail store design performance latent variable group, with mean scores of 4.80 each: *the retail store's lighting design*, *the retail store window design* and *the location of the retail store in the shopping mall*. Respondents have mostly consolidated views on these factors. However, respondents have diversified views on 7 factors (out of 17) with standard deviation values greater than 1.

The pilot study reveals the most significant factors' ranking of the building design performance latent variable as following: *the presence of carpark*, *the HVAC comfort* and *the shopping mall's lighting design concept* with 4.90 mean score each.

Respondents consolidated their views around these factors with standard deviations $\sigma=0,34$ and $0,25$ successively. The utmost importance of *carpark presence* is similarly underscored by the research published by Wong and Nair (2018).

The respondents in the pilot study regard *the brand range in the shopping mall* as the most critical factor among the building services performance latent variable's factors, assigning it a mean score of 5.00. Also, this factor reflects a total consolidation of respondents' views ($\sigma=0$). *The effectiveness of sanitation services* (mean score: 4.80) and *the branch mix in the shopping mall* (mean score: 4.70) come as the second and the third most important factors, similarly underlined by Köksal and Tıǧlı (2018). None of the building services performance factors reflect diversified views, all these factors have standard deviation values below 1 ($\sigma < 1$).

As per the pilot study, the rankings of factors across all three performance latent variables (retail store design performance, building design performance, and building services performance) can be found in Table 4.2. The factors marked as bold reflect the factors where respondents have diversified views with ($\sigma > 1$).

Table 4.2: Pilot study results of latent variables.

Retail Store Design Performance			Building Design Performance			Building Services Performance		
Factors	Mean	St Dev	Factors	Mean	St Dev	Factors	Mean	St Dev
shop window design of the retail store	4.75	0.58	HVAC comfort in the shopping mall	4.94	0.25	brand variety	5.00	0.00
lighting design of the retail store	4.75	0.45	lighting design concept of the shopping mall	4.94	0.25	efficiency of cleaning services	4.75	0.58
location of the retail store in the shopping mall	4.75	0.58	presence of carpark	4.88	0.34	branch mix in the shopping mall	4.69	0.48
floor level of the retail store	4.69	0.48	accessibility of the shopping mall by handicapped people	4.81	0.40	presence of an entertainment center	4.63	0.50
visibility of the retail store	4.63	0.62	physical comfort of resting areas	4.63	0.50	variety of management services	4.56	0.63
proximity of the retail store to the main cores	4.63	0.50	physical comfort in the shopping mall	4.56	0.63	whether the carpark is free of charge or not	4.56	0.81
retail store interior design	4.44	0.51	shopping mall corridor width	4.50	0.63	presence of info desk	4.44	0.63
floor height of the retail store	4.00	0.73	shopping mall floor height	4.50	0.63	presence of a cultural center	4.44	0.89

Table 4.2 (continued): Pilot study results of latent variables.

proximity of the retail store to the vertical circulation	4.00	0.97	noise level in the shopping mall	4.50	0.89	presence of ATM machines	4.38	0.62
proximity of the retail store to the entrances	3.81	1.05	efficiency of the guidance signboards	4.44	0.63	presence of x-ray machines and security guards	4.38	0.89
retail store dimensions	3.69	1.20	efficiency of the fire escape scenario	4.44	0.73	marketing activities	4.31	0.60
proximity of the retail store to the entertainment center	3.63	1.02	direct relationship of the mall with the public spaces	4.44	0.73	marketing billboards in the mall	4.25	0.93
proximity of the retail store to the carpark	3.38	1.45	flexible architectural design acc.to weather conditions	4.38	0.62	presence of kiosques	4.00	0.97
proximity of the retail store to the kids playground	3.25	1.18	smart building technologies used in the shopping mall	4.38	0.81	social responsibility projects, social activities	3.88	0.72
proximity of the retail store to the cultural center	2.94	1.12	shopping mall common area floor cladding material	4.38	0.72	-----	-----	-----
proximity of the retail store to the supermarket	2.69	0.87	building materials used in the shopping mall	4.38	0.81	-----	-----	-----
proximity of the retail store to the fire escape corridors	2.69	1.01	architectural design of the shopping mall	4.25	0.77	-----	-----	-----
-----	-----	-----	abundant use of landscape in the shopping mall	4.25	0.86	-----	-----	-----
-----	-----	-----	open-air vs enclosed mall concept	4.13	1.09	-----	-----	-----
-----	-----	-----	daylight perception in the shopping mall	4.13	1.36	-----	-----	-----
-----	-----	-----	efficient use of water and energy	4.00	0.82	-----	-----	-----
-----	-----	-----	number of floor levels of the shopping mall	3.94	1.18	-----	-----	-----

4.1.3 Findings of the main study

The main study data collection initiated directly after the evaluation of pilot study's data and consolidation of the performance factors throughout this latest step. Before the inauguration of the main study, the questionnaire was revised according to the results of the pilot study. The performance factors which have received very low-ranking points, have not been consolidated and have been eliminated from the performance factors' list. From the retail design performance latent variable, 3 factors were discarded:

- proximity of the retail store to the fire escape corridors (mean score: 2.7)
- proximity of the retail store to the cultural center (mean score: 2.9)
- proximity of the retail store to the entertainment center (mean score: 3.6)

The reasons why these retail design performance factors are omitted lie firstly in the low ranking they received and secondly in the similarity with the other performance factors in the latent variable group. *The proximity of the retail store to the fire escape corridors* and *the proximity of the retail store to the cultural center* factors were eliminated because of the lowest ranking, whereas *the proximity of the retail store to the entertainment center* was omitted because it was similar to *the proximity of the retail store to the kids playground* factor. As a result, 14 retail design performance factors remained to be measured in the main study.

The building design performance latent variable was measured by 22 building design performance factors in the pilot study. However, 2 among these measured performance factors were not able to be consolidated and they were discarded due to the fact that their extent of coverage has doubled some of the performance factors already listed among the building design performance latent variable's factors, although their ranking were quite acceptable. The 2 omitted building design factors are the following:

- architectural design of the shopping mall (mean score: 4.3)
- shopping mall common area floor cladding material (mean score: 4.4 points)

The architectural design of the shopping mall factor was discarded because the other building performance factors exist already in the scope of architectural design of the shopping mall. Results of the pilot study showed that measuring this factor in a separate question, as a separate factor created some confusion and had a doubling impact. The second omitted building design performance factor was *the shopping mall*

common area floor cladding material. This performance factor needed to be eliminated because another building performance factor, which is *the building materials used in the shopping mall*, covered a larger scope in the building materials so *the floor cladding material* was already contained by this larger-scope performance factor. Table 4.3 shows clearly the evolution of the performance factors quantities throughout the different study phases of this thesis.

Table 4.3: Evolution of performance factors' quantities.

Performance Factors' Quantity According to Latent Variables				
	Retail Design Performance (RDP)	Building Design Performance (BDP)	Building Services Performance (BSP)	Total
Expert Judgement	21	19	12	52
Pilot Study	17	22	14	53
Main Study	14	20	14	48

The period between November 2021 and April 2022, where the main study data was collected, was the period where all the sectors in the economy were impacted severely by the pandemic COVID-19. As that was the first time for centuries that the world was effected by a global pandemic, academicians and researchers aimed to gather as much information as possible about the impact of the pandemic. As a consequence, researchers in this study decided to create two separate sections for each question of the final questionnaire. Therefore, unlike the pilot study and the expert judgement, each question in the main study's questionnaire measured the performance factors for two different periods; 1. Evaluation for the pre-pandemic period, 2. Evaluation for the pandemic period. Thus, the researcher targeted to reveal the differences or the changes in the measurement of the importance of performance factors between the pre-pandemic period and the pandemic period.

4.1.3.1 Findings of the main study for pre-pandemic period

This section presents the key findings from the main study pertaining to the pre-pandemic period. As explained in the previous section, researchers completed the necessary revisions in the questionnaire after the pilot study and thus the main study targeted to measure 14 performance factors in the retail store design performance latent variable, 20 in the building design performance latent variable and 14 in the building services performance latent variable.

The location of the retail store in the shopping mall factor received the highest ranking (mean score 4.38) among the retail store design performance factors. The standard deviation of this factor was $\sigma = 1.03$ which can be considered as borderline for consolidation of the respondents' views. *The lighting design of the retail store* factor is the second highest rank in the retail store design performance latent variable, with the same standard deviation as $\sigma = 1.03$. Following these ranks comes *the visibility of the retail store* as the third most important performance factor for the retail store design performance latent variable as observed in Table 4.4. This factor shows respondents consensus ($\sigma < 1$). An important and interesting finding in the main study is that the performance factors in the retail store design performance variable have all standard deviations higher than 1, except the third-ranked factor (*the visibility of the retail store*). This finding shows that respondents have more or less diversified views on these retail store design performance factors. When the lowest ranks of this variable are considered, *the proximity of the retail store to the carpark*, *the proximity of the retail store to the supermarket* and *the proximity of the retail store to the kids playground* are measured with mean scores 3.12, 3.26 and 3.38 successively. This finding contradicts with the study published by Köksal and Tıǧlı (2018) indicating them as significant performance factors. Table 4.4 shows that their standard deviations are higher than 1 ($\sigma > 1$), revealing the fact that the respondents have diversified views on these 3 retail store design performance factors.

The first 2 ranks in the building design performance latent variable factors are shared by 2 performance factors and are found as *the presence of carpark* and *the lighting design concept of the shopping mall*, with mean scores such as 4.50 and 4.47 and with standard deviations $\sigma = 0.93$ and $\sigma = 0.88$ successively. This shows that participants of the main study have consolidated views on these factors. Table 4.4 shows that the third rank is covered by *the HVAC comfort in the shopping mall* with 4.4 mean score. It is considered that the respondents have consolidated views also on this factor as its standard deviation is calculated as $\sigma = 0.99$. The least important building design performance factors are measured as *the number of floor levels of the shopping mall* (mean score: 3.73), *the efficiency of the fire escape scenario* (mean score: 3.85), *the efficient use of water and energy* (mean score: 3.89). These low-scored factors have their standard deviations higher than 1 ($\sigma > 1$), meaning that the respondents have diversified views on these factors.

The brand variety is measured as the most important performance factor among the building services performance latent variable, according to the participants of the main study with a mean score 4.59 and standard deviation $\sigma = 0.97$. The study by Ventakesh (2025) underlines similarly the importance of tenant mix as a crucial performance factor. *The efficiency of cleaning services* factor is measured as the second highest rank with mean score 4.49 and standard deviation $\sigma = 0.96$. The third highest rank is covered by *the presence of a cultural center* factor where the mean score is found as 4.40 and the standard deviation calculated as 1.06. The respondents have consolidated views on the 2 first-ranked performance factors, whereas the views on the third most important factor are more diversified. When the 3 lowest ranks are considered as in Table 4.4, it is found that the performance factors as *the presence of kiosques, the social responsibility projects, social activities organized in the shopping mall* and *the presence of info desk* are measured with mean scores 3.75, 3.93 and 3.97 respectively. Their standard deviation vary between $\sigma = 1.12$ and $\sigma = 1.17$, which shows that respondents have diversified views on these performance factors.

Table 4.4: Main study results of latent variables for pre-pandemic period.

Retail Store Design Performance			Building Design Performance			Building Services Performance		
Factors	Mean	St Dev	Factors	Mean	St Dev	Factors	Mean	St Dev
location of the retail store in the shopping mall	4.38	1.03	presence of carpark	4.50	0.93	brand variety	4.59	0.97
lighting design of the retail store	4.34	1.03	lighting design concept of the shopping mall	4.47	0.88	efficiency of cleaning services	4.49	0.96
visibility of the retail store	4.33	1.00	HVAC comfort in the shopping mall	4.44	0.99	presence of a cultural center	4.40	1.06
retail store window design of the retail store	4.21	1.21	accessibility of the shopping mall by handicapped people	4.40	0.95	variety of management services	4.37	0.98
floor level of the retail store	4.19	1.17	flexible architectural design acc.to weather conditions	4.28	1.00	presence of an entertainment center	4.34	1.00
proximity of the retail store to the main cores	4.10	1.15	physical comfort of resting areas	4.25	1.01	branch mix in the shopping mall	4.30	1.05

Table 4.4 (continued): Main study results of latent variables for pre-pandemic period.

retail store interior design	4.07	1.31	noise level in the shopping mall	4.23	1.02	whether the carpark is free of charge or not	4.25	1.19
retail store dimensions	3.96	1.17	shopping mall corridor width	4.22	1.01	presence of ATM machines	4.23	1.14
proximity of the retail store to the vertical circulation	3.85	1.21	direct relationship of the mall with the public spaces	4.20	1.11	marketing activities	4.22	1.10
floor height of the retail store	3.78	1.21	smart building technologies used in the shopping mall	4.18	1.02	marketing billboards in the mall	4.09	1.08
proximity of the retail store to the entrances	3.73	1.26	physical comfort in the shopping mall	4.15	1.03	presence of x-ray machines and security guards	4.04	1.18
proximity of the retail store to the kids playground	3.38	1.24	efficiency of the guidance signboards	4.07	1.05	presence of info desk	3.97	1.12
proximity of the retail store to the supermarket	3.26	1.28	open-air vs enclosed mall concept	4.05	1.06	social responsibility projects, social activities	3.93	1.16
proximity of the retail store to the carpark	3.12	1.21	daylight perception in the shopping mall	4.00	1.16	presence of kiosques	3.75	1.17
-----	-----	-----	shopping mall floor height	3.99	1.05	-----	-----	-----
-----	-----	-----	building materials used in the shopping mall	3.94	1.09	-----	-----	-----
-----	-----	-----	abundant use of landscape in the shopping mall	3.94	1.14	-----	-----	-----
-----	-----	-----	efficient use of water and energy	3.89	1.14	-----	-----	-----
-----	-----	-----	efficiency of the fire escape scenario	3.85	1.18	-----	-----	-----
-----	-----	-----	number of floor levels of the shopping mall	3.73	1.17	-----	-----	-----

4.1.3.2 Findings of the main study for pandemic period

The main study also covered the data collection for the latent variables of retail store design performance, building design performance and building services performance during the pandemic period. The participants have been asked secondly to evaluate the

design performance factors for the pandemic period. Thus, each performance factor has been evaluated by the respondents both for the pre-pandemic and the pandemic periods. In this section, findings of the main study for the pandemic period will be explained according to each latent variable.

According to the data presented in Table 4.5, the following performance factors from the retail store design performance latent variable constitute the highest 3 ranks of importance: *the location of the retail store in the shopping mall*, *the visibility of the retail store* and *the lighting design of the retail store*, with mean scores 4.28, 4.20 and 4.13 successively. The standard deviation for the *location of the retail store in the shopping mall* and *the visibility of the retail store* factors are calculated as $\sigma = 1.12$, whereas the factor *lighting design of the retail store* shows a standard deviation of $\sigma = 1.19$. The respondents' view on these factors are not considered as consolidated. The lowest ranks in the retail store design performance latent variable are evaluated as *proximity of the retail store to the carpark* (mean score: 3.17; $\sigma = 1.23$), *proximity of the retail store to the kids playground* (mean score: 3.26; $\sigma = 1.25$) and *proximity of the retail store to the supermarket* (mean score: 3.29; $\sigma = 1.30$). Regarding the standard deviations, one can clearly state that the participants' views on these factors are diversified ($\sigma > 1$).

The building design performance latent variable during the pandemic period demonstrates the highest ranked performance factor as the HVAC comfort in the shopping mall with 4.52 mean score and $\sigma = 0.95$ standard deviation. The participants have consolidated views on this factor ($\sigma < 1$). On the second and third highest ranks are placed the *presence of carpark* and *the lighting design concept of the shopping mall* factors with mean scores 4.48 and 4.41 consecutively. As both of them have standard deviation levels lower than 1 ($\sigma < 1$), it is considered that the participants of the main study have consolidated views on these performance factors. The least important building design performance factor for the pandemic period is found as *the number of floor levels of the shopping mall* (mean score: 3.68; $\sigma = 1.18$). This least important performance factor is followed by the factors of *efficiency of the fire escape scenario* (mean score: 3.86; $\sigma = 1.16$) and *the building materials used in the shopping mall* (mean score: 3.90; $\sigma = 1.11$) as second and third least important performance factors. The participants' views on these 3 lowest ranked performance factors are found as diversified as their standard deviation value is calculated higher than 1 ($\sigma > 1$).

Contrary to this study findings, Chotipanich and Issarasak (2017) underline the importance of the efficiency of fire escape scenario.

Table 4.5 reveals that, among the building services performance factors, *the efficiency of cleaning services* was rated as the most critical, achieving the highest mean score of 4.54 ($\sigma = 0.96$), indicating strong agreement among respondents regarding its influence on retail store sales performance in Turkish shopping malls. Furthermore, this performance factor is the sole factor within the building services performance latent variable on which participants exhibit a consensus, as the standard deviation is calculated as lower than 1 ($\sigma < 1$). The *brand variety* factor is ranked as the second most important performance factor within this variable with a mean score 4.47. This performance factor is followed by *the variety of management services* with a mean score 4.31. The standard deviations for both factors exceed 1, indicating substantial variability in respondents' perspectives on these factors. Respondents considered *the presence of kiosques* as the least important performance factor in this variable (mean score: 3.68; $\sigma = 1.18$). The following building services performance factors are ranked as the second and third lowest for the pandemic period: *the social responsibility projects*, *social activities* and *the presence of info desk* with mean scores 3.87 and 3.90 respectively. Their standard deviations exceed 1 ($\sigma > 1$), reflecting that the participants do not have a consensus on these factors' evaluation. The presence of a cultural center or an entertainment center does not emerge as one of the key performance factors, which stands in contrast to the findings reported by Dey et al. (2019).

Table 4.5: Main study results of latent variables for pandemic period.

Retail Store Design Performance			Building Design Performance			Building Services Performance		
Factors	Mean	St Dev	Factors	Mean	St Dev	Factors	Mean	St Dev
location of the retail store in the shopping mall	4.28	1.12	HVAC comfort in the shopping mall	4.52	0.95	efficiency of cleaning services	4.54	0.96
visibility of the retail store	4.20	1.12	presence of carpark	4.48	0.97	brand variety	4.47	1.07
lighting design of the retail store	4.13	1.19	lighting design concept of the shopping mall	4.41	0.95	variety of management services	4.31	1.04
floor level of the retail store	4.08	1.23	accessibility of shopping mall by handicapped people	4.37	0.99	whether the carpark is free of charge or not	4.22	1.19

Table 4.5 (continued): Main study results of latent variables for pandemic period.

proximity of the retail store to the main cores	4.01	1.20	flexible architectural design acc.to weather conditions	4.34	1.02	presence of ATM machines	4.22	1.15
retail store window design of the retail store	4.00	1.32	shopping mall corridor width	4.28	0.99	branch mix in the shopping mall	4.21	1.13
retail store interior design	3.91	1.37	physical comfort of resting areas	4.20	1.07	presence of a cultural center	4.21	1.19
retail store dimensions	3.81	1.26	smart building technologies used in the shopping mall	4.19	1.02	presence of an entertainment center	4.15	1.15
proximity of the retail store to the vertical circulation	3.77	1.28	noise level in the shopping mall	4.19	1.08	marketing activities	4.12	1.15
floor height of the retail store	3.73	1.24	direct relationship of the mall with the public spaces	4.19	1.13	presence of x-ray machines and security guards	4.04	1.19
proximity of the retail store to the entrances	3.72	1.29	physical comfort in the shopping mall	4.16	1.05	marketing billboards in the mall	4.01	1.13
proximity of the retail store to the supermarket	3.29	1.30	open-air vs enclosed mall concept	4.15	1.10	presence of info desk	3.9	1.20
proximity of the retail store to the kids playground	3.26	1.25	efficiency of the guidance signboards	4.07	1.04	social responsibility projects, social activities	3.87	1.18
proximity of the retail store to the carpark	3.17	1.23	daylight perception in the shopping mall	4.04	1.17	presence of kiosques	3.68	1.18
-----	-----	-----	shopping mall floor height	4.03	1.08	-----	-----	-----
-----	-----	-----	abundant use of landscape in the shopping mall	3.93	1.17	-----	-----	-----
-----	-----	-----	efficient use of water and energy	3.91	1.18	-----	-----	-----
-----	-----	-----	building materials used in the shopping mall	3.90	1.11	-----	-----	-----
-----	-----	-----	efficiency of the fire escape scenario	3.86	1.16	-----	-----	-----
-----	-----	-----	number of floor levels of the shopping mall	3.67	1.18	-----	-----	-----

4.1.3.3 Validation and reliability of the model trained with main study findings

This study models the interrelationships among sales-enabling performance dimensions that collectively shape the commercial success potential of shopping mall retail environments, rather than directly predicting sales performance. The model of the study was trained with the dataset of the main study (for pre-pandemic period) findings using SEM and ANN approaches consecutively. The pandemic period findings were not used for model training because this period is considered as a special period where the shopping malls faced closures and retail sector behaviors were not natural. SEM validated the theoretical framework and examined causal relationships among latent variables. SEM provided also interpretability and hypothesis testing, ensuring the conceptual soundness of the model. Furthermore, ANN was applied for the same dataset to enhance predictive accuracy. This sequential approach leveraged the strengths of both methods: SEM for theory confirmation and ANN for robust prediction.

The SEM model is reflected in Figure 4.1 and the fit indices of the model measured in AMOS are represented as below. Although the CFI value is slightly below the conventional 0.90 threshold, it remains acceptable given the model complexity and sample size, as supported by the satisfactory RMSEA, SRMR, and PCMIN/DF values.

- CFI: ≈ 0.872 (acceptable threshold as explained above)
- SRMR: ≈ 0.064 (acceptable)
- RMSEA: 0.069 (acceptable)
- PCMIN/DF: 1.927 (good parsimony-adjusted fit)

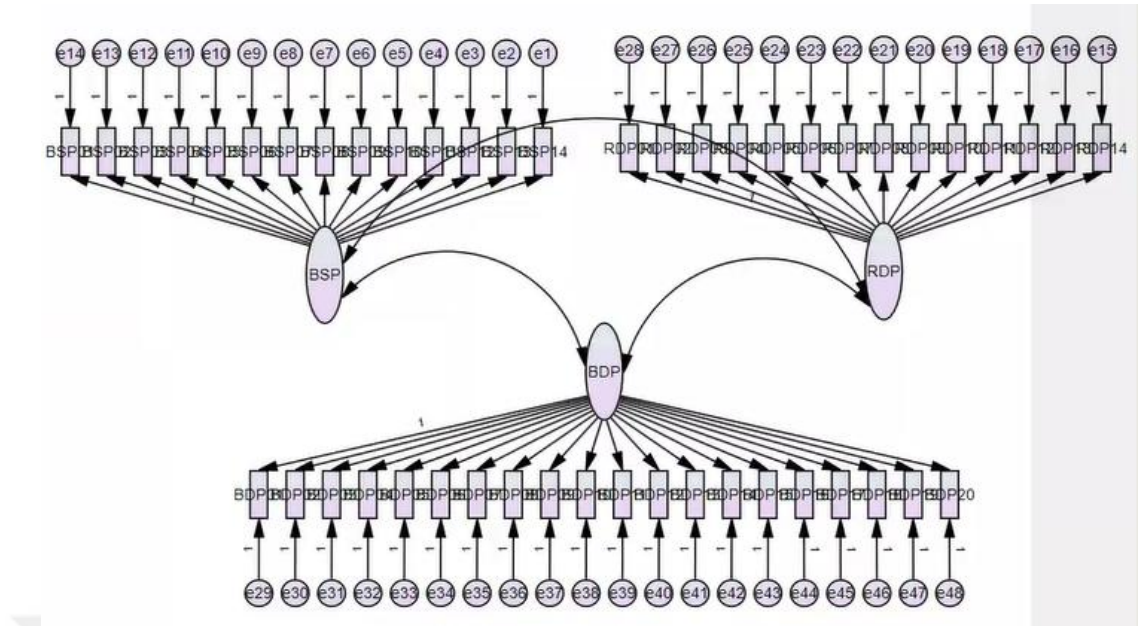


Figure 4.1: SEM Model for Main Study Dataset.

The estimated path coefficients of the model are measured and reflected in Figure 4.2 such as: $RDP \rightarrow BSP$: 0.781 ($p < .001$); $RDP \rightarrow BDP$: 0.295 ($p < .001$); $BSP \rightarrow BDP$: 0.705 ($p < .001$). Regarding these path coefficients, the model reflects that the retail store design performance latent variable strongly predicts the building services performance latent variable (H1: $\beta=0.781$). Similarly, the building services performance latent variable strongly predicts the building design performance latent variable (H3: $\beta=0.705$). However, the retail store design performance latent variable has a moderate direct effect on the building design performance latent variable (H2: $\beta=0.295$). The squared multiple correlation (R^2) for BDP is 0.776, indicating that the structural model accounts for approximately 77.6% of the variance in BDP. This reflects a substantial explanatory power of the predictors, suggesting that the specified relationships capture the underlying dynamics of BDP effectively. This result confirms that the theoretical structure of the model is well supported.

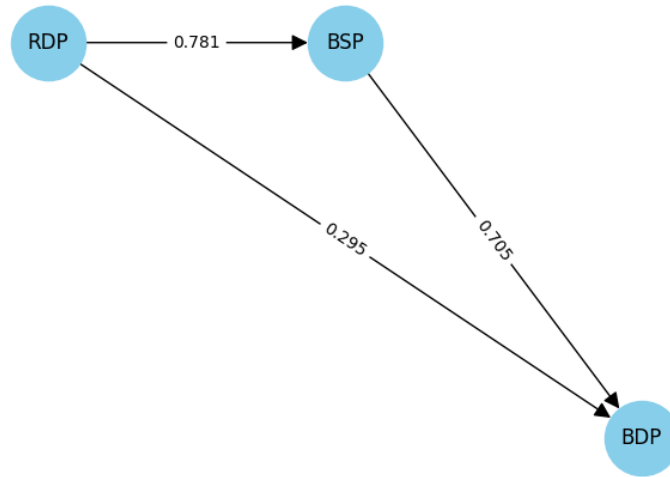


Figure 4.2: Model Path Diagram for Main Study Dataset.

The factor loadings of all performance factors in 3 latent variables are measured as greater than 0.50 meaning that these performance factors are strong indicators of their latent variables. Moreover, most of the factor loadings are measured above 0.70 and 0.80 which reflects excellent measurement quality for the model. All items load strongly on their intended factors, supporting convergent validity, meaning that the latent variables are well-defined by their factors in the model. This outcome reflects the integration of a thorough literature review, the strong experience of expert panels, and the researcher's substantial professional experience within the retail sector.

The model shows strong interrelationships among the three latent variables as demonstrated in Table 4.6. The high correlation between the retail store design performance variable, the building design performance variable and the building services performance variable may be explained by the common conceptual base and theoretical domains of the latent variables.

Table 4.6 : Latent variables correlation matrix.

Latent Variables Correlation Matrix in the Model			
	RDP	BSP	BDP
RDP	1.000	0.776	0.777
BSP	0.776	1.000	0.866
BDP	0.777	0.866	1.000

The study estimated the model also from Artificial Neural Network (ANN) approach for its predictive power and stronger interrelationships interpretation. In ANN setup, inputs are considered as retail store design performance variable (RDP) and building services design performance variable (BSP). The target consists of building design performance variable (BDP). ANN architecture is constructed with 2 hidden layers (10 and 5 neurons) and Rectified Linear Unit (ReLU) activation. The performance indices of the model are measured as below:

- RMSE (Train): 0.376
- RMSE (Test): 0.405
- R^2 (Train): 0.730
- R^2 (Test): 0.833

The ANN explains ~83% of variance in BDP on the data set, which reflects a very strong predictive performance for BDP. The R^2 (coefficient of determination) metric, $R^2 = 0.833$ means that the model's predictions account for 83.3% of the variability in the actual BDP values in the test data. In other words, if the different scores across retail units in BDP are considered, the ANN can predict 83% of those differences accurately based on RDP and BSP. The ANN architectural diagram is demonstrated in Figure 4.3.

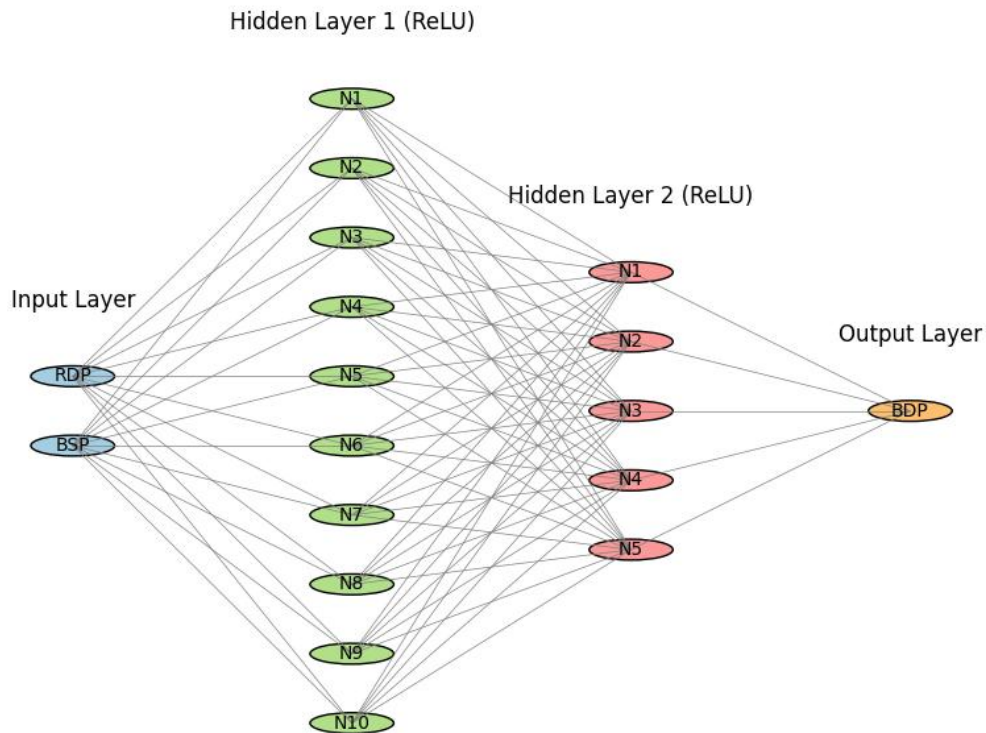


Figure 4.3: ANN Architecture of the Model- 2 Inputs / 10 & 5 Hidden / 1 Output.

All layers are fully connected, meaning every neuron in one layer connects to every neuron in the next layer. The network learned weights on these connections to achieve $R^2 \approx 0.83$ on the dataset. Predictions are very close to actual values. (RMSE ≈ 0.40 on a 1–5 scale). The close alignment between training and test RMSE values indicates that the ANN model generalizes well and does not suffer from overfitting. The training curve showed smooth convergence (no overfitting) as reflected in Figure 4.4.

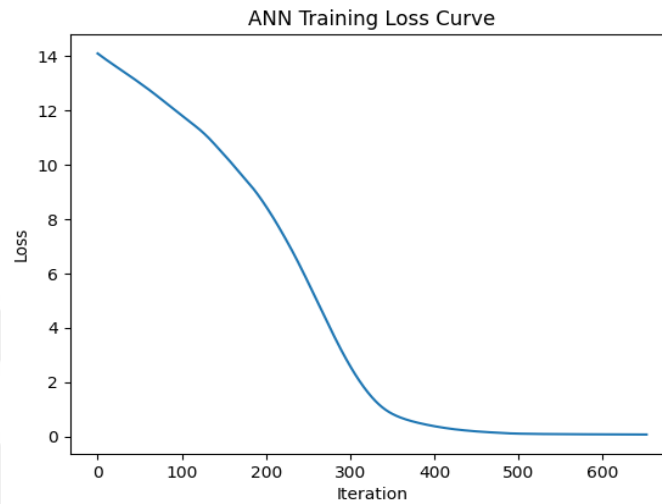


Figure 4.4: ANN Training Loss Curve.

4.2 Discussion

This chapter discusses mainly the findings of the expert judgement, of the pilot study and of the main study. The discussion will be elaborated mainly by comparison of the findings of the expert judgement study, pilot study and the main study successively. The structural model is interpreted with the actual findings by showing the model evaluation results via SEM and ANN. The discussion is primarily developed through a comparative analysis of the following categories:

- Comparison of findings between the expert judgement and the pilot study
- Comparison of findings between the expert judgement and the main study
- Comparison of findings between the pilot study and the main study
- Comparison of findings between the pre-pandemic period and the pandemic period in the main study

4.2.1 Comparison of findings between the expert judgement study and the pilot study

The expert judgement measured *the retail store design performance* latent variable by 21 factors. However, the results showed that four factors received scores under 3.00. Therefore, researchers subtracted these four factors from the list, leaving 17 factors for retail store design performance for the main study questionnaire. The experts eliminated the factors below:

- *retail store's closeness to the event area*
- *retail store's closeness to the delivery yard*
- *retail store's closeness to the food court*
- *retail store's closeness to customer restrooms*

Findings indicate that eliminated factors are related to the placement of the retail store in the shopping mall. This implies that the customer circulation through event space, delivery yard, food hall and customer restrooms do not have an important effect on the sales performance of the retail store.

The expert judgement measured *the building design performance* latent variable by 19 factors. However, the expert group added 3 more factors according to their experience in the retail sector. These factors are listed below as:

- *flexible architectural design according to weather conditions*
- *direct relationship of the mall with the public spaces*
- *extensive utilization of landscaping within the shopping mall*

Similarly, the initial expert judgement measured *the building services performance* latent variable factors by 12 factors. Moreover, the expert group suggested the following factors to the questionnaire, summing up to 14 factors:

- *marketing billboards in the mall*
- *social responsibility projects and social activities*

Regarding the deep experience and knowledge of the expert group in the diverse sections of the retail sector, researchers took these additional factors into consideration, and they added them into the final questionnaire of the main study.

This research initially examines shifts in the ranking positions of key performance factors as assessed in the expert judgement versus the main study results, ahead of a detailed analysis of individual factor rankings across latent variables. Therefore, the present study analyzes the mean score of each latent variable both in the expert judgement and in the main study. It should be noted that some factors have been added or subtracted after the expert judgement to be able to create a more accurate list of factors as explained in previous paragraphs.

According to the expert judgement results, the mean score, averaged across 12 factors of the building services latent variable is 4.36, which is the highest average among the 3 latent variable groups (*building service performance variable, building design performance variable and retail store design performance variable*). As shown in Table 4.6, the 2nd highest score belongs to the average of 19 factors of the building design latent variable with 4.01 mean score. The retail store design latent variable's 17 factors received the lowest average mean score as 3.95. For an adequate comparison of the average mean scores between the expert judgement and the pilot study these four factors are left aside as explained above.

Table 4.7: Comparison of results for latent variables.

Latent Variables	Expert Judgement Mean Score	Pilot Study Mean Score
Retail store design performance	3,95	3,93
Building design performance	4,01	4,45
Building services performance	4,36	4,52

The pilot study measured the *building services performance* latent variable by 14 factors listed in Table 4.2. The *building services performance* latent variable received the highest average mean score among the 3 latent variables in the main study as 4,52 (whereas 4,36 in the expert judgement). Similarly, the second highest score belongs to the *building design performance* factors with an average score of 4.01 in the expert judgement and 4,45 in the main study. The third importance rank shows the *retail store design performance* latent variable's 17 factors with average score 3,95 in the expert judgement and 3,93 in the main study. Table 4.7 shows these results clearly. The present study made the independent samples t-test on mean scores for the results in

Table 4 and got p-value $\alpha = 0,44$, which means that the results are not statistically significant ($\alpha < 0,05$: statistically significant). Therefore, there is no significant difference between the latent variables results' mean scores in expert judgement versus the main study.

Findings from the pilot study clearly point out that the building services and the building design latent variables' performance factors, which are factors belonging to the shopping mall itself and which are stable for all the retail stores, are more important than the retail store design performance factors for the sales performance of the retail stores in the shopping mall. This fact implies that customers care more about the shopping mall building itself and the shopping mall services they encounter in this building and this behavior impacts on the retail store sales performance directly. The retail store design performance factors which are variable on each retail store have less impact on the sales performance of the retail store.

According to the expert judgement results, the highest-ranking factors are *carpark presence* and *brand variety*, both of which received a full score of 5.00. Also, respondents are consolidated on the importance of these factors ($\sigma = 0$). Both factors influencing the sales performance of a retail store are not directly related to the retail store; instead, they seem contingent on latent variables of building services and building design. The most significant influences on retail store sales performance are rooted in the shopping mall's environment and the retail store's location within the mall. Furthermore, the *presence of a carpark* factor underscores that easy car accessibility serves as a significant incentive for customers to visit the shopping mall, aligning with findings in the research by İpekçi (2014) and Kusumowidagdo et al. (2011). In the pilot study results, *the presence of carpark* factor has received 4.90 mean score, and the standard deviation is $\sigma = 0.34$, which shows that respondents have consolidated views on this major factor.

A factor in 'the building services' latent variable, top-ranked both in the expert judgement and in the pilot study, *the brand variety in the shopping mall* generates a combined effect and draws people through the shopping mall, thereby significantly impacting the sales performance of retail stores. The results of this research, in line with the research conducted by Ventakesh (2025) and Burnaz and Topçu (2011), demonstrate that the concept of offering a diverse range of products in one location has a strong appeal to customers.

The expert judgement results demonstrate that the second-highest ranking by two retail store design-related factors, namely *the retail store interior design* and *the retail store visibility* both achieve a mean score of 4.90. The retail store interior design plays a dual role: it serves to draw in customers to the retail store and encourages them to spend additional time there. Both aspects have a direct impact on the sales performance of the retail store, which aligns with the findings mentioned in the studies by Webber et al. (2018) and by Minerva and Kusumowidagdo (2024). Considering the principle that individuals are guided by their visual perception, the factor of *retail store visibility* is deemed one of the most significant factors influencing a store's sales performance, aligning with findings from a study carried out by Webber et al. (2018). Nevertheless, the results indicate that *the retail store window design* is a relatively less important factor, with a mean score of 4.70, ranking it 4th in importance.

Unlike the expert judgement, in the pilot study the top second rank consists of three factors with 4.90 mean score each, which are *the presence of carpark*, *the shopping mall's heating/ventilation/air conditioning (HVAC) comfort* and *the shopping mall's lighting design concept*. These factors all belong to the building design latent variable group. The top two rankings are quite different in the expert judgement and in the pilot study. Although in the expert judgement, the first two top ranks are evenly distributed between three latent variable groups, in the main study 'the building services' latent variable and 'the building design' latent variable fully cover these ranks and leave the retail store design latent variable to the 3rd rank. This implies that respondents of the main study considered 'the retail design performance' latent variable as less important and this finding is parallel to the mean score finding, which states the retail store design performance latent variable as the least important among all the latent variables, as explained in the previous paragraphs.

The top third rank score is 4.80 in the expert judgement, and it is shared by three performance factors such as *marketing activities*, *effectiveness of sanitation services* and *retail store's lighting design*. The first two factors belong to the building services latent variable and the last one belongs to 'the retail store design' latent variable. At this degree of ranking, "building services" factors outrank the "retail store design" factors. The shopping mall's management, through its periodic marketing activities and the effectiveness of its sanitation services, draws customers and thereby positively impacts the sales performance of retail stores. Additionally, the retail store lighting

design, including factors like efficacy, light intensity, and light color, significantly influences shoppers' behavior, as aligned with the study by Nebati and Ekmekçi (2019). Likewise, the participants in the main study ranked *the retail store lighting design* as third most significant factor influencing the retail store's sales performance. Also, within pilot study, the *lighting design concept of the shopping mall* score has 4.90 score (second top rank). Correspondingly, Chebat et al. (2014) and Prakash et al. (2021) emphasize the importance of the lighting design concept of the shopping mall factor. Following the results of this study and the literature, one must state clearly that a well-designed shopping mall lighting concept with divers lighting fixtures in specific areas (see Figure 4.1), will contribute very positively to the sales performance of retail stores.

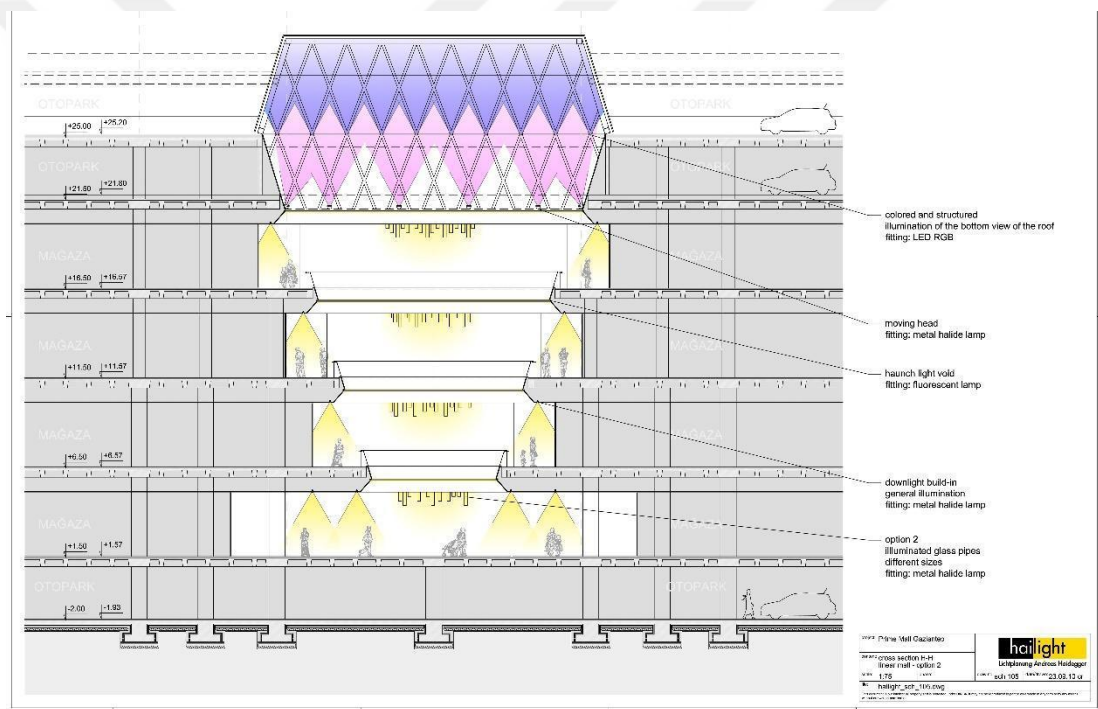


Figure 4.5: Effective Shopping Mall Lighting Design in Primemall Gaziantep.

The pilot study ranks the third position by 4 factors: *retail store lighting design*, *retail store front design*, *location of retail store within shopping mall* and *the effectiveness of sanitation services*. It is clearly observed that the top third rank mostly consists of ‘the retail store design performance’ factors.

The factor about the carpark payment system (free vs. payable) within the building service performance variable obtained a mean score of 4.60 in both the expert judgement and the pilot study. Thus, respondents, mostly consolidated with $\sigma=0.52$,

consider this factor as a more significant one. This factor clearly shows that free carpark service affects positively the shopping behaviors of customers.

The expert judgement results place *the shopping mall architecture* and *the HVAC comfort in the shopping mall* as the fifth most significant factors influencing sales performance of retail stores. Customers are inclined to retail stores and linger in environments that are both well-designed and well-climatized, a finding that aligns with the study conducted by Costa Webber et al. (2018). Moreover, this outcome reinforces the notion that shopping mall design should encompass a well-integrated approach that combines architectural design efficiency and electromechanical systems as a whole. The study by Ferreira et al. (2023) consolidates this finding. However, in the pilot study, *the shopping mall's architectural design* factor's score decreased to 4.30, although *the HVAC comfort in the shopping mall* factor gained points to 4.90 score. This implies that the significance of the building design is still consistent in the pilot study, but the respondents gave more importance to the detailed scopes rather than the general idea of design.

Expert panel evaluations ranked three distinct factors jointly at sixth position with a mean score of 4.40: *physical comfort of the shopping mall*, *sound intensity inside the shopping mall* and *the shopping mall corridor width*. Notably, the first two factors have been identified as significant for the prosperity of a shopping mall in numerous previous research, such as those by Bakhshizadeh et al. (2017), Yılmaz Çakmak and Yılmaz (2018), Yuan et al. (2021) and Köksal and Tıgılı (2018). However, the third factor, *the shopping mall corridor width*, offers unique insights into the significance hierarchy of factors influencing the sales performance of retail stores. The expert judgement and the main study find out that the proper mall corridor width plays a significant role for 'the building design performance' variable. The effective mall corridor width for good customer circulation is shown in Figure 5 below. The effective mall corridor width is driven from the idea that the corridor should be wide enough to let customers circulate easily but narrow enough to enable customers to see the shopwindows closely enough (Figure 4.2). The study by Büyükşahin, S. (2023) consolidates this result. Another point sorted out from the pilot study results compared to the expert judgement results is that *the physical comfort of the mall* gained more importance and was ranked in fifth line with 4.60 score. This result aligns with the

study of Kusumowidagdo et al. (2011). Therefore, these results are consolidated by both studies.



Figure 4.6: Effective Mall Corridor Width.

Participants in the main study placed *the presence of cultural performance hall* as seventh factor influencing sales performance of retail stores among the building services variable, in a manner consistent with the conclusions drawn from the expert judgement. It received a mean score of 4.40. This ranking level comprises of three other factors of building services latent variable such as *presence of info desk, ATM machines, x-ray machines and security personnel*.

The pilot study garnered the factor related to the mall's accessibility for individuals with disabilities, a mean score of 4.80 and secured the fifth position among factors of all the latent variables. This clearly states that this factor affects the retail store sales performance as much as *the retail store's lighting design, the shopwindow design or the sanitation services' efficiency*. This shows that the consciousness of universal design and the spatial justice for all customers are upraising concepts as similarly indicated in the study by Can and Kılıç Delice (2018).

The following factors among the building design performance factors, received the same 4.40 mean score in the pilot study, and they got the 22nd rank out of 53 factors: *the efficiency of the guidance signboards, the building materials used, the smart building technologies used, the common area floor cladding material, the fire escape scenario effectiveness, flexible architectural design and direct relationship of the mall with public spaces*. These building design-related factors, which are uniform across all retail stores, have a moderate impact on the sales performance of the retail store. In the expert judgement these factors received less points and their scores were not identical.

The common area floor cladding material factor had only 3.60 mean score, while *the smart building technologies used* received 3.70 mean score. *The effectiveness of the guidance signboards* and *the building materials used* factors slightly ranked higher with 4.10 and 3.90 mean scores consecutively.

Numerous research (Nebati & Ekmekçi, 2019; Yılmaz Çakmak & Yılmaz, 2018) have highlighted the positive influence of daylight on customer shopping behaviors. Nevertheless, the factor concerning *daylight perception in the shopping mall* obtained the 17th position out of 19 ranks in both the expert judgement study and the main study. Moreover, the respondents have diversified views on this issue ($\sigma=1.20$ in expert judgement, $\sigma=1.36$ in pilot study).

The fire escape regulation stands out as one of the most crucial regulations that shopping mall designs must adhere to. Consequently, shopping mall building designs consistently adhere to fire escape regulations to obtain the necessary building permits. That being stated, in the pilot study, the factor relating to the *closeness of the retail store to the fire exit passageways* remains at the lowest rank, with a mean score of 2.70. However, *the effectiveness of the fire escape scenario* attains a higher level of importance in the pilot study, with a mean score of 4.40.

Although *the location of the retail store* factor stands at the first level among the retail store design latent variable's factors in the pilot study, respondents do not attribute importance to *the closeness of the retail store to the major interest areas* factor when it comes to its impact on retail store sales performance. Factors like *proximity to supermarket, service yard, playground, leisure event mall, food hall, and customer restrooms* are rated between sixteenth and nineteenth positions out of 19. These are regarded as per the least influential factors influencing retail store's sales performance. Thus, researchers considered leaving these factors out of the questionnaire in the pilot study.

4.2.2 Comparison of findings between the expert judgement study and the main study

Consistent with the methodology detailed in preceding chapters, the expert judgement process engaged seven highly qualified professionals, each with more than a decade of hands-on experience in Türkiye's retail industry. Furthermore, 3 participants from

the customer-side have been involved in the expert judgement to bring in the customer point of view and to consolidate the results. On the other hand, as the research evolved throughout the main study, the final main study collected data from 204 respondents. This being stated, the comparison of findings that will be emancipated in this section, bring together two studies from different scales and expertise levels. The expert judgement has a small-scale participant group who involves very experimented collaborators, whereas the main study gathers a large-scale group with less academic expertise but more practical expertise in the retail sector. The comparison of findings between the expert judgement and the main study is interesting and important in the sense that the first one is the initiating point of this research whereas the other one is the final enhanced step of the research.

As the main study is divided into 2 sections for data collection for the pre-pandemic period and for the pandemic period, the comparison between the expert judgement and the main study will be discussed in 2 following sections.

4.2.2.1 Comparison of findings between the expert judgement study and the main study for the pre-pandemic period

The findings of the retail store design performance variable show that the experts who participated in the expert judgement ranked *the visibility of the retail store* factor as the most important design performance factor with 4.90 mean score. Conversely, the participants of the main study found that the most important design performance factor relies on *the location of the retail store in the shopping mall* with 4.38 mean score. The second highest-ranked retail store design performance factor by the expert group is *the retail store interior design*, whereas the main study's participants did not even rank this performance factor among the top five factors, contradicting with the study by Minerva and Kusumowidagdo (2024) which underlines the crucial impact of retail store design on sales performance.

The similarities between the main study for pre-pandemic period and the expert judgement are found among the following performance factors: *visibility of the retail store*, *lighting design of the retail store*, *shop window design of the retail store*. These three performance factors appear in the top 5 factors both in the expert judgement and the main study for pre-pandemic period (Table 4.8). Especially, the *shop window design of the retail store* is placed in the forth highest rank both in the expert judgement

and the main study, similarly stated as an important performance factor in the research by Nebati and Ekmekçi (2019) and Khan et al. (2022). These 3 performance factors are found to be indispensable for the retail store design performance and consequently for the retail store sales performance.

A comparative analysis of the retail store design performance factors in the expert judgement and main study datasets highlights a noteworthy observation: experts possessing academic qualifications and/or substantial professional experience in the retail sector consistently ranked design-related factors more highly. In contrast, in the main study, the participants' group, all retail store managers, who have clearly a more commercial experience in the retail sector, ranked the factors which are less directly related to the design in higher ranks, such as *the location of the retail store in the shopping mall, the floor level of the retail store, the proximity of the retail store to the main cores, to the vertical circulation and to the entrances*. Due to this observation, one can deduce that retail store design performance is dependent not only on the direct design factors but also on the spatial factors related to the shopping mall where it is located. As the retail store managers, who participated in the main study, have responded to the questionnaire from a more commercial point of view, the findings of the main study reveal that these spatial factors have an important impact on the sales performance of the retail stores in a shopping mall.

Table 4.8: Comparison of retail store design performance findings between the expert judgement and the main study for pre-pandemic period.

Retail Store Design Performance Latent Variable's Top Five Ranking Factors					
1. Expert Judgement			2. Main Study for Pre-pandemic Period		
Factors	Mean	St Dev	Factors	Mean	St Dev
visibility of the retail store	4.90	0.32	location of the retail store in the shopping mall	4.38	1.03
retail store interior design	4.90	0.32	lighting design of the retail store	4.34	1.03
lighting design of the retail store	4.80	0.63	visibility of the retail store	4.33	1.00
shop window design of the retail store	4.70	0.95	shop window design of the retail store	4.21	1.21
location of the retail store in the shopping mall	4.40	1.26	floor level of the retail store	4.19	1.17

Analysis of the second latent variable—building design performance—reveals both similarities and differences between the expert judgement and the main study results. The first and the most important similarity is that in both studies, *the presence of carpark* factor is ranked at the highest level with standard deviations lower than 1, meaning that the respondents of both expert judgement and the main study had consensus on the importance of this performance factor. *The HVAC comfort in the shopping mall* is revealed as an important performance factor which has an impact on the retail store sales performance both in the expert judgement and the main study for pre-pandemic period. This finding aligns perfectly with the study published by Kusumowidagdo et al. (2011).

Despite these similarities, the expert judgement and the main study demonstrate also some major differences. Unlike the expert judgement, the main study exhibits *the lighting design concept in the shopping mall* as a very important performance factor, ranking it on the second level among the building design performance factors and matching with the findings by Weber et al. (2018). Another factor which has low ranking in the expert judgement, *the accessibility of shopping mall by handicapped people*, is placed at the fourth rank as one of the important building design performance indicators. On the other hand, as shown in Table 4.9, *the shopping mall corridor width*, ranked the fourth most important building design performance factor, is not considered as an impactful factor for building design performance variable in the main study for the pre-pandemic period. Another surprising difference is reflected in the fact that the lowest rank is accorded to the factor number of floor levels of the shopping mall in the main study. Contrary to this finding, the expert group has evaluated this factor with a higher scoring, which is in parallel with the common design practice of shopping malls. Experts in the retail sector analyze deeply and calculate the feasibility of the number of floors to be constructed for better building design performance, whereas in the main study the factor has been measured with the lowest scoring.

Table 4.9: Comparison of building design performance findings between the expert judgement and the main study for pre-pandemic period.

Building Design Performance Latent Variable's Top Five Ranking Factors					
1. Expert Judgement			2. Main Study for Pre-pandemic Period		
Factors	Mean	St Dev	Factors	Mean	St Dev
presence of carpark	5.00	0.00	presence of carpark	4.50	0.93
HVAC comfort in the shopping mall	4.60	0.70	lighting design concept of the shopping mall	4.47	0.88
architectural design of the shopping mall	4.60	0.52	HVAC comfort in the shopping mall	4.44	0.99
shopping mall corridor width	4.40	0.70	accessibility of the shopping mall by handicapped people	4.40	0.95
physical comfort in the shopping mall	4.40	0.70	flexible architectural design acc.to weather conditions	4.28	1.00

The analysis of the building services performance latent variable demonstrates that both in the expert judgement and the main study, the following factors are ranked at the highest level respectively: *the brand variety* and *the efficiency of cleaning services*. The consensus of the participants of the expert judgement and of the main study reinforces the ranking of these factors and reflects their deep impact in the building services performance variable. This studies by Köksal and Tıǧlı (2018) and Chotipanich and Issarasak (2017) strengthen this finding on the ranking of these performance factors. The similarity of the findings of the expert judgement and the main study continues by *the branch mix in shopping mall* factor. Respondents in both studies evaluated this factor as the fifth and sixth highest scoring. The building services performance variable is observed as the only variable where respondents of both studies have measured the performance factors in a similar way. This comparison may reveal that experts in the retail sector and retail store managers who participated in the main study have a common understanding for the building services performance variable, whereas they have more diversified views when it comes to the building design performance or the retail store design performance variables.

However, some differences in the findings are also demonstrated in the measurement of the ranking of the performance factors (Table 4.10). *The presence of cultural center* and *the presence of entertainment center* factors received the lowest scoring in the expert judgement, whereas they are ranked as the third and fifth highest level in the main study for the pre-pandemic period.

Table 4.10: Comparison of building services performance findings between the expert judgement and the main study for pre-pandemic period.

Building Services Performance Latent Variable's Top Five Ranking Factors					
1. Expert Judgement			2. Main Study for Pre-pandemic Period		
Factors	Mean	St Dev	Factors	Mean	St Dev
brand variety	5.00	0.00	brand variety	4.59	0.97
efficiency of cleaning services	4.80	0.42	efficiency of cleaning services	4.49	0.96
marketing activities	4.80	0.42	presence of a cultural center	4.4	1.06
whether the carpark is free of charge or not	4.60	0.52	variety of management services	4.37	0.98
branch mix in the shopping mall	4.40	1.07	presence of an entertainment center	4.34	1.00

4.2.2.2 Comparison of findings between the expert judgement study and the main study for the pandemic period

The second phase of the main study is dedicated to the pandemic period, where the participants were asked to respond to the same questionnaire from the point of view considering the pandemic period. This second phase of questionnaire aimed to collect data from the pandemic period to observe the changes that the pandemic has brought to retail sector.

The expert group ranked *the visibility of the retail store* with the highest scoring among the retail store design performance latent variable, whereas respondents in the main study for the pandemic period have measured this factor as the second most important rank and found *the location of the retail store in the shopping mall* as the most impactful performance factor. *The lighting design of the retail store* is considered as one of the most impactful performance factors both in the expert judgement and in the main study for pandemic period, also supported by Nebati and Ekmekçi (2019) and Yılmaz Çakmak and Yılmaz (2018). As demonstrated in Table 4.11, an interesting point of comparison is that *the floor level of retail store* and *the proximity to the main cores* are two factors which have gained a higher importance in the pandemic period. This finding is understandable in the sense that people wanted to complete their shopping experience with minimum interaction and minimum time spent in the shopping mall. Another noteworthy finding is that *the shopwindow design* factor—

previously ranked among the top five performance factors in the expert judgement—lost its significance in the main study for the pandemic period. As shopping time became limited and consumers focused on essential purchases rather than leisure, the influence of the shopwindow design factor on retail store design performance diminished.

Table 4.11: Comparison of retail store design performance findings between the expert judgement and the main study for pandemic period.

Retail Store Design Performance Latent Variable's Top Five Ranking Factors					
1. Expert Judgement			2. Main Study for Pandemic Period		
Factors	Mean	St Dev	Factors	Mean	St Dev
visibility of the retail store	4.90	0.32	location of the retail store in the shopping mall	4.28	1.12
retail store interior design	4.90	0.32	visibility of the retail store	4.20	1.12
lighting design of the retail store	4.80	0.63	lighting design of the retail store	4.13	1.19
shop window design of the retail store	4.70	0.95	floor level of the retail store	4.08	1.23
location of the retail store in the shopping mall	4.40	1.26	proximity of the retail store to the main cores	4.01	1.20

The comparison in the second latent variable, which is the building design performance variable, indicates significant differences between the results of the expert judgement and the results of the main study for the pandemic period. *The presence of carpark* is measured with the highest scoring in the expert judgement whereas the highest rank is dedicated to *the HVAC comfort in the shopping mall* factor in the main study for the pandemic period (Table 4.12). This finding is quite important in the sense that shopping mall users or retail store managers have realized the importance of technical infrastructure such as the HVAC systems during the pandemic period. *The lighting design in the shopping mall* and *the accessibility of the shopping mall by handicapped people* are found as two factors considered among the top 5 impactful performance factors in the main study. According to the participants of the expert judgement, these 2 factors were not measured among the highest ranked performance factors. The flexible architectural design according to weather conditions factor is ranked as one of the top 5 significant performance factors; this finding aligns with the study by Aslantamer and Ilgin (2024), where outdoor and semi-outdoor

architectural design factors are considered as highly important during the pandemic period.

Table 4.12: Comparison of building design performance findings between the expert judgement and the main study for pandemic period.

Building Design Performance Latent Variable's Top Five Ranking Factors					
1. Expert Judgement			2. Main Study for Pandemic Period		
Factors	Mean	St Dev	Factors	Mean	St Dev
presence of carpark	5.00	0.00	HVAC comfort in the shopping mall	4.52	0.95
HVAC comfort in the shopping mall	4.60	0.70	presence of carpark	4.48	0.97
architectural design of the shopping mall	4.60	0.52	lighting design concept of the shopping mall	4.41	0.95
shopping mall corridor width	4.40	0.70	accessibility of the shopping mall by handicapped people	4.37	0.99
physical comfort in the shopping mall	4.40	0.70	flexible architectural design acc.to weather conditions	4.34	1.02

The brand variety was considered as the most impactful performance factor among the building services performance latent variable, with full scoring (mean score: 5.00) and full consensus of participants (standard deviation: $\sigma=0$) in the expert judgement. That was the only performance factor with such a strong rank of importance (Table 4.13). This finding is furtherly supported by the studies by Ventakesh (2025), Burnaz and Topçu (2011) and Köksal and Tıǧlı (2018). However, when the findings of the main study for the pandemic period are considered, it is observed that the highest rank among the building services performance factors is dedicated to *the efficiency of the cleaning services*. This result can be logically explained by the fact that during the pandemic, the most important issue was the healthy environment and the security of being able to shop in a clean and non-infected atmosphere. This survival sense or perception overcame all other important factors from the former periods. Moreover, *the marketing activities* and *the branch mix in the shopping mall* factors which were measured as in the top 5 most impactful performance factors in the expert judgement, lost their high ranking in the main study for the pandemic period. This outcome is consistent with expectations because during the pandemic period all marketing activities were cancelled, and people came to the shopping malls only for functional shopping and not for leisure.

Table 4.13: Comparison of building services performance findings between the expert judgement and the main study for pandemic period.

Building Services Performance Latent Variable's Top Five Ranking Factors					
1. Expert Judgement			2. Main Study for Pandemic Period		
Factors	Mean	St Dev	Factors	Mean	St Dev
brand variety	5.00	0.00	efficiency of cleaning services	4.54	0.96
efficiency of cleaning services	4.80	0.42	brand variety	4.47	1.07
marketing activities	4.80	0.42	variety of management services	4.31	1.04
whether the carpark is free of charge or not	4.60	0.52	whether the carpark is free of charge or not	4.22	1.19
branch mix in the shopping mall	4.40	1.07	presence of ATM machines	4.22	1.15

4.2.3 Comparison of findings between the pilot study and the main study

Both the pilot study and the main study employed an identical data collection methodology. The questionnaires exhibit only minor variations, as the model had been previously checked and the factors consolidated prior to the pilot study. Only some factors and questions were left aside because they received very low scores as explained in the previous sections. Among the retail store design performance variable, 3 factors were eliminated after the pilot study and 14 performance factors remained for the main study. For the building design performance latent variable, the pilot study revealed that 2 performance factors were negligible, thus 20 building design performance factors were consolidated for the main study. The building services performance latent variable did not encounter any change in the performance factors after the pilot study. Therefore, the questionnaire remained identical for building services latent variable in the pilot study and the main study, with 14 performance factors to be measured. The main difference between the pilot study and the main study lays in the scale of the participants: the pilot study is realized with 16 participants whereas the main study's respondents reached 204. In both studies, retail store managers participated in the questionnaire and thus contributed to the research.

As in the case of comparison between the expert judgement and the main study, the comparison of findings between the pilot study and the main study will be discussed in two separate sections such as the comparison between the pilot study and the main

study for the pre-pandemic period and the comparison between the pilot study and the main study for the pandemic period.

4.2.3.1 Comparison of findings between the pilot study and the main study for the pre-pandemic period

The lighting design of the retail store, the shopwindow design of the retail store and the location of the retail store in the shopping mall received the highest scoring among the retail store performance factors in the pilot study with the same mean score 4.75. However, in the main study for pre-pandemic period, respondents ranked at the highest level *the location of the retail store in the shopping mall* factor with 4.38 mean score. The study by Weber et al. (2018) similarly ranked *the location of the retail store in the shopping mall* among the most significant performance factors. This performance factor is followed by the *lighting design of the retail store* and *the visibility of the retail store* factors. As demonstrated in Table 4.2 and in Table 4.4, the top 5 highest-ranked are identical in the pilot study and in the main study for pre-pandemic period. The only variation lies in the relative ordering within this top five group. This similarity consolidates the findings of the research for the retail store design performance latent variable. On the other hand, three factors (*the location of the retail store in the shopping mall, the floor level of the retail store, the visibility of the retail store*) among the top ranked performance factors are directly related to the fact that the retail store is located in a shopping mall (Table 4.14). This finding indicates that the retail store design performance is impacted by spatial inputs of the shopping mall.

Table 4.14: Comparison of retail store design performance findings between the pilot study and the main study for pre-pandemic period.

Retail Store Design Performance Latent Variable's Top Five Ranking Factors					
1. Pilot Study			2. Main Study for Pre-pandemic Period		
Factors	Mean	St Dev	Factors	Mean	St Dev
shop window design of the retail store	4.75	0.58	location of the retail store in the shopping mall	4.38	1.03
lighting design of the retail store	4.75	0.45	lighting design of the retail store	4.34	1.03
location of the retail store in the shopping mall	4.75	0.58	visibility of the retail store	4.33	1.00
floor level of the retail store	4.69	0.48	shop window design of the retail store	4.21	1.21
visibility of the retail store	4.63	0.62	floor level of the retail store	4.19	1.17

When the building design latent variable is analyzed through the comparison of findings of the pilot study and the main study for the pre-pandemic period, it is observed that *the presence of carpark* factor attained the highest mean score in both studies. The second, third and forth levels of scoring are attributed to the following performance factors as a common finding in both studies: *the HVAC comfort in the shopping mall, the lighting design concept of the shopping mall, the accessibility of the shopping mall by handicapped people* (Table 4.15). As for the retail store design performance latent variable, these similarities reinforce the findings of the research. An interesting finding, lacking in the current literature review, lays in the fact that in the main study the factor of *flexible architectural design according to weather conditions* was found to be the fifth most impactful performance factor. Apparently, the participants' evaluation reflects that this factor has an important impact on the building design performance.

Table 4.15: Comparison of building design performance findings between the pilot study and the main study for pre-pandemic period.

Building Design Performance Latent Variable's Top Five Ranking Factors					
1. Pilot Study			2. Main Study for Pre-pandemic Period		
Factors	Mean	St Dev	Factors	Mean	St Dev
HVAC comfort in the shopping mall	4.94	0.25	presence of carpark	4.50	0.93
lighting design concept of the shopping mall	4.94	0.25	lighting design concept of the shopping mall	4.47	0.88
presence of carpark	4.88	0.34	HVAC comfort in the shopping mall	4.44	0.99
accessibility of the shopping mall by handicapped people	4.81	0.40	accessibility of the shopping mall by handicapped people	4.40	0.95
physical comfort of resting areas	4.63	0.50	flexible architectural design acc.to weather conditions	4.28	1.00

The comparison of the building services variable reveals that the two highest ranked, thus most impactful performance factors are found identical in the pilot study and the main study for pre-pandemic period. As Table 4.16 exhibits, these performance factors are *the brand variety and the efficiency of cleaning services*. Similarly in the main study, the pilot study reflects that *the presence of entertainment center and the variety of management services in the shopping mall* contribute significantly to the building

services performance, conforming with the studies by Ahmadi et al. (2020) and Köksal and Tıǧlı (2018). This finding aligns with the observation that a significant proportion of shopping mall developments incorporate an entertainment or cultural center into the investment block.

Table 4.16: Comparison of building services performance findings between the pilot study and the main study for pre-pandemic period.

Building Services Performance Latent Variable's Top Five Ranking Factors					
1. Pilot Study			2. Main Study for Pre-pandemic Period		
Factors	Mean	St Dev	Factors	Mean	St Dev
brand variety	5.00	0.00	brand variety	4.59	0.97
efficiency of cleaning services	4.75	0.58	efficiency of cleaning services	4.49	0.96
branch mix in the shopping mall	4.69	0.48	presence of a cultural center	4.40	1.06
presence of an entertainment center	4.63	0.50	variety of management services	4.37	0.98
variety of management services	4.56	0.63	presence of an entertainment center	4.34	1.00

4.2.3.2 Comparison of findings between the pilot study and the main study for the pandemic period

The pandemic impacted all aspects of daily life and thus, the observation of the performance factors was also affected by this fact. When one compares the retail store performance latent variable findings in the pilot study and in the main study for the pandemic period, one can observe that *the location of the retail store in the shopping mall* attained the highest ranking in the main study whereas it shared the highest rank with 2 other factors (*the lighting design of the retail store* and *the shopwindow design of the retail store*) in the pilot study (see Table 4.17). Another interesting finding aligning with the research by Köksal and Tıǧlı (2018), is that *the proximity of the retail store to main cores* is measured among the top 5 most impactful factors in the main study for the pandemic period, even though it was only ranked at the bottom level in the pilot study. This implies that the factors associated with the spatial positioning of the retail store in the shopping mall increased their significance in the pandemic period.

Table 4.17: Comparison of retail store design performance findings between the pilot study and the main study for pandemic period.

Retail Store Design Performance Latent Variable's Top Five Ranking Factors					
1. Pilot Study			2. Main Study for Pandemic Period		
Factors	Mean	St Dev	Factors	Mean	St Dev
shop window design of the retail store	4.75	0.58	location of the retail store in the shopping mall	4.28	1.12
lighting design of the retail store	4.75	0.45	visibility of the retail store	4.20	1.12
location of the retail store in the shopping mall	4.75	0.58	lighting design of the retail store	4.13	1.19
floor level of the retail store	4.69	0.48	floor level of the retail store	4.08	1.23
visibility of the retail store	4.63	0.62	proximity of the retail store to the main cores	4.01	1.20

The HVAC comfort in the shopping mall was ranked as the most important performance factor among the factors in the building design performance latent variable in the main study for pandemic period. This finding aligns with common expectations and also with the study by Jalil Abdullah and Jian (2019) as the pandemic increased the importance of effective HVAC systems. As indicated in Table 4.18, the pilot study reflects that *the presence of carpark* and *the HVAC comfort in the shopping mall* as the most impactful building design performance factors with equal mean scores. The third and forth ranks are dedicated to *the lighting design concept of the shopping mall* and *the accessibility of the shopping mall by handicapped people* both in the pilot study and the main study. A significant finding in the main study for the pandemic period is that the *flexible architectural design according to weather conditions* increased its significance among the other factors from 13th rank in the pilot study to 5th rank in main study for pandemic period. Given the increased preference for open-air environments during the pandemic for health-related reasons, incorporating a flexible architectural design that allows conversion into an open-air venue is quite significant for building design performance. This finding aligns perfectly with the study by Aslantamer and Ilgin (2024) who emphasizes the importance of outdoor and semi-outdoor architectural design during the pandemic period.

Table 4.18: Comparison of building design performance findings between the pilot study and the main study for pandemic period.

Building Design Performance Latent Variable's Top Five Ranking Factors					
1. Pilot Study			2. Main Study for Pandemic Period		
Factors	Mean	St Dev	Factors	Mean	St Dev
HVAC comfort in the shopping mall	4.94	0.25	HVAC comfort in the shopping mall	4.52	0.95
lighting design concept of the shopping mall	4.94	0.25	presence of carpark	4.48	0.97
presence of carpark	4.88	0.34	lighting design concept of the shopping mall	4.41	0.95
accessibility of the shopping mall by handicapped people	4.81	0.40	accessibility of the shopping mall by handicapped people	4.37	0.99
physical comfort of resting areas	4.63	0.50	flexible architectural design acc.to weather conditions	4.34	1.02

The building services performance latent variable's findings demonstrate that *the efficiency of the cleaning services* became the most impactful performance factor in the main study for pandemic period. Conversely, the pilot study ranked *the brand variety* factor with full scoring 5.00. This finding supports the research published by Kusumowidagdo et al. (2011) and the study by El-Adly and Eid (2016). Table 4.19 demonstrates a significant difference between the pilot study and the main study for pandemic period: the *branch mix in shopping mall* factor decreased in rank in the main study for pandemic period compared to the pilot study. This finding aligns with the fact that during the pandemic customers tend to do functional shopping, therefore the branch mix, which aims to create a synergy for bigger shopping flow, has lost its significance. Another difference between the pilot study and the main study is found in the fact that *the presence of entertainment center*, ranked as the forth most impactful factor in the building services performance variable, attained lower mean score in the main study. This finding aligns also with the common expectations as the entertainment and cultural centers were all closed during the pandemic for health reasons.

Table 4.19: Comparison of building services performance findings between the pilot study and the main study for pandemic period.

Building Services Performance Latent Variable's Top Five Ranking Factors					
1. Pilot Study			2. Main Study for Pandemic Period		
Factors	Mean	St Dev	Factors	Mean	St Dev
brand variety	5.00	0.00	efficiency of cleaning services	4.54	0.96
efficiency of cleaning services	4.75	0.58	brand variety	4.47	1.07
branch mix in the shopping mall	4.69	0.48	variety of management services	4.31	1.04
presence of an entertainment center	4.63	0.50	whether the carpark is free of charge or not	4.22	1.19
variety of management services	4.56	0.63	presence of ATM machines	4.22	1.15

4.2.4 Comparison of findings between the pre-pandemic period and the pandemic period in the main study

Since the data collection phase of the main study coincides with the end of the pandemic COVID-19, the scope of the research was extended to include data from both the pandemic and pre-pandemic periods, enabling the thesis to examine potential differences and similarities between these periods. In this section, findings of the main study from the pre-pandemic and the pandemic periods will be discussed to reveal the differences or similarities.

Analysis of the first latent variable group, which is the retail store design performance variable, reveals that four of the top five performance factors remain consistent across both in the pre-pandemic and pandemic periods. As observed in Table 4.20, these performance factors include *the location of the retail store in the shopping mall*, *the lighting design of the retail store*, *the visibility of the retail store* and *the floor level of the retail store*. Contrary to the common sense, this finding suggests that the pandemic did not significantly affect the ranking of these factors on the retail store design performance. However, *the shopwindow design of the retail store factor*, ranked forth highest in the pre-pandemic period, declined in ranking during the pandemic. On the other hand, *the proximity to main cores* significantly increased its scoring during the pandemic and was ranked on the fifth highest level of impact in the retail store design

performance variable, which is a quite interesting finding suggesting that during the pandemic customers focused more on functional shopping and on minimum time spent in the shopping mall.

Table 4.20: Comparison of retail store design performance main study findings between the pre-pandemic and the pandemic periods.

Retail Store Design Performance Latent Variable's Top Five Ranking Factors					
Main Study for Pre-pandemic Period			Main Study for Pandemic Period		
Factors	Mean	St Dev	Factors	Mean	St Dev
location of the retail store in the shopping mall	4.38	1.03	location of the retail store in the shopping mall	4.28	1.12
lighting design of the retail store	4.34	1.03	visibility of the retail store	4.20	1.12
visibility of the retail store	4.33	1.00	lighting design of the retail store	4.13	1.19
shop window design of the retail store	4.21	1.21	floor level of the retail store	4.08	1.23
floor level of the retail store	4.19	1.17	proximity of the retail store to the main cores	4.01	1.20

The building design performance latent variable's findings reflect that the top highest level performance factors remained consistent across the pre-pandemic and the pandemic periods. However, their impact rating and scoring have changed. The most important finding is observed as *the HVAC comfort in the shopping mall* increasing significantly its ranking from the third rank in the pre-pandemic period to the first rank in the pandemic period (Table 4.21). This finding aligns with the expectations since the fresh and purified air circulation became crucial for healthy environments during the pandemic. Contrary to expectations and to the study by Aslantamer and Ilgin (2024), the factor *open-air vs enclosed mall concept* conserved its medium-level ranking across both periods (4.05 mean score in the pre-pandemic period, 4.15 mean score in the pandemic period). According to these findings, no significant difference was observed between these two periods. Bakhshizadeh et al. (2017) underlined the importance of *open-air vs enclosed mall concept* among the design performance factors even before the pandemic period.

Table 4.21: Comparison of building design performance main study findings between the pre-pandemic and the pandemic periods.

Building Design Performance Latent Variable's Top Five Ranking Factors					
1. Main Study for Pre-Pandemic Period			2. Main Study for Pandemic Period		
Factors	Mean	St Dev	Factors	Mean	St Dev
presence of carpark	4.50	0.93	HVAC comfort in the shopping mall	4.52	0.95
lighting design concept of the shopping mall	4.47	0.88	presence of carpark	4.48	0.97
HVAC comfort in the shopping mall	4.44	0.99	lighting design concept of the shopping mall	4.41	0.95
accessibility of the shopping mall by handicapped people	4.40	0.95	accessibility of the shopping mall by handicapped people	4.37	0.99
flexible architectural design acc.to weather conditions	4.28	1.00	flexible architectural design acc.to weather conditions	4.34	1.02

The last latent variable, building services performance, includes more changes across the pandemic than the other variables. Throughout the top five performance factors, *the efficiency of cleaning services* achieved a higher score in the main study for the pandemic period and was ranked as the most impactful performance factor, leaving behind *the brand variety*, which was ranked at highest level in all the previous studies such as the expert judgement, the pilot study and the main study for the pre-pandemic period. Another important comparison point is observed since the presence of cultural center and *the presence of entertainment center* factors declined in the pandemic period to lower ranks, as aligned with expectations due to the pandemic restrictions. Conforming with the study by Jalil Abdullah and Jian (2019), *the presence of ATM machines* factor raised in the scoring in the pandemic period, ranked the fifth most impactful factor in the building services performance variable as shown in Table 4.22, which constitutes quite a diverging point from the expectations since the contactless payment technologies and habits have largely evolved during the pandemic.

Table 4.22: Comparison of building services performance main study findings between the pre-pandemic and the pandemic periods.

Building Services Performance Latent Variable's Top Five Ranking Factors					
1. Main Study for Pre-Pandemic Period			2. Main Study for Pandemic Period		
Factors	Mean	St Dev	Factors	Mean	St Dev
brand variety	4.59	0.97	efficiency of cleaning services	4.54	0.96

Table 4.22 (continued): Comparison of building services performance main study findings between the pre-pandemic and the pandemic periods.

efficiency of cleaning services	4.49	0.96	brand variety	4.47	1.07
presence of a cultural center	4.4	1.06	variety of management services	4.31	1.04
variety of management services	4.37	0.98	whether the carpark is free of charge or not	4.22	1.19
presence of an entertainment center	4.34	1.00	presence of ATM machines	4.22	1.15

4.2.5 Evaluation of the complete set of performance factors in the main study

This section primarily discusses the complete set of the performance factors taking into consideration all 48 performance factors without the segregation into the latent variables. According to the mean scores of each factor's evaluation, the ranking and the importance of each factor is discussed. As findings differ for the pre-pandemic period and the pandemic period, for more adequate comparison and discussion, this section is divided into 2 sub-sections.

4.2.5.1 Evaluation of the performance factors in the main study for the pre-pandemic period

The main study in the pre-pandemic period reveals the highest ranked performance factor as *the brand variety*, which belongs to the building services performance variable (BSP) with 4.59 mean score and $\sigma=0.97$ standard deviation. Respondents in the main study suggest that the variety of brands presented in the shopping mall is the most impactful performance factor influencing the sales performance for the pre-pandemic period. The consensus of the respondents on the evaluation of this factor emphasizes its impact and consolidates its evaluation. *The brand variety* includes an adequate and effective category mix of brands in the shopping mall but also the presence of anchor stores in the shopping mall. This finding reflects that retail store sales performance depends mostly on this factor, leaving behind all building design performance factors and all retail store design performance factors, aligning with the studies published by Ahmad (2012) and Calvo-Porral and Lévy-Mangín (2018).

The second most important performance factor is determined as *the presence of carpark* by the participants of the main study for the pre-pandemic period. This finding aligns perfectly with the common expectations since shopping mall investments are always conceived with large carpark capacity. Taking into consideration the significant importance of *the presence of carpark* in the shopping malls, which belongs to the building design performance latent variable, it would be very beneficial to integrate the carpark levels into the architectural layouts. A good example of an effective design of shopping mall integrated with the carparks is Primemall Gaziantep (designed by Erginoğlu & Çalışlar Architects), the plans of which are shared in Figure 4.3. As presented in the schematic plans and sections below (see Figure 4.3 and Figure 4.4), the carparks of the shopping mall are truly integrated into the building design from 3 levels, with the support of topographic features. The shopping mall offers 3 levels of carparks to its customers, such as the underground carpark (as usual), the ground floor open carpark and the roof carpark (as less usual). The 3 levels of carparks (on the basement, second and fourth floors) enhance customer circulation on all shopping floors, thus beneficial for the retail stores' performance. As a result of this customer circulation enhancement, the retail stores close to these entrances and the ones situated at these levels are more demanded by successful brands/anchors and their rental store price is higher.

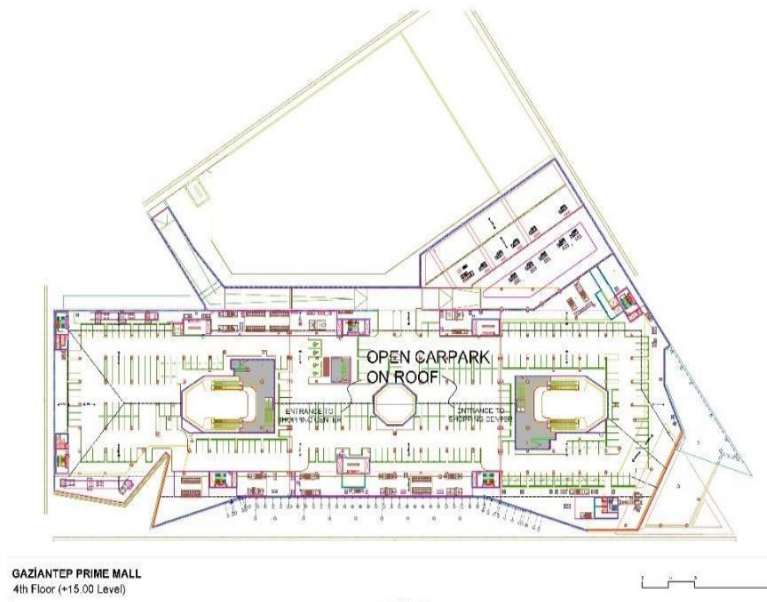


Figure 4.7: Floor Plans of Primemall Gaziantep (Basement, Second, Fourth Floors).



Figure 4.7 (continued): Floor Plans of Primemall Gaziantep (Basement, Second, Fourth Floors).

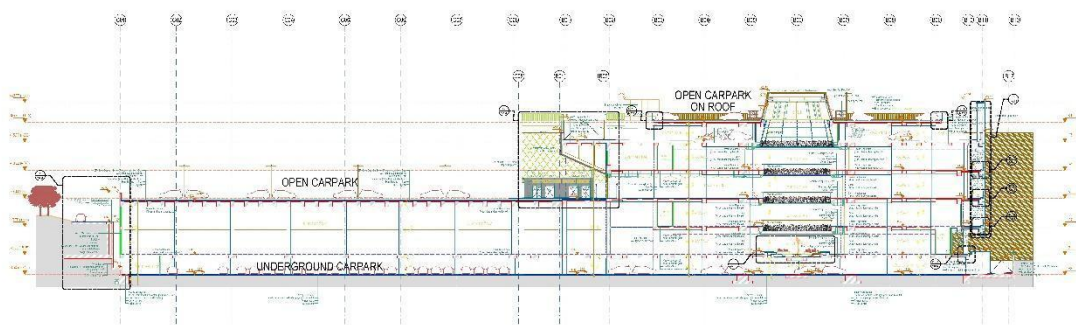


Figure 4.8: Longitudinal Section of Primemall Gaziantep.

As exhibited in Table 4.22, the third highest rank is again reserved for another building services performance factor, indicated as *the efficiency of cleaning services*. Opposite to the expectations, this performance factor influences significantly the sales performance of retail stores. It is noteworthy that *the efficiency of cleaning services*

emerges as a more influential factor than both retail store design and building design performance factors.

Findings from the main study for the pre-pandemic period demonstrate that *the lighting design concept of the shopping mall* is measured as the forth most impactful performance factor on the retail store sales performance (Table 4.22). The importance of this performance factor was also underlined by the articles published by Kusumowidagdo et al. (2011) and by Webber et al. (2018). Additionally, to the findings in these cited articles, this research reflects that the lighting *design concept of the shopping mall* is more impactful than *the lighting design of the retail store* on retail store sales performance. This observation is particularly noteworthy, as it runs counter to the anticipated expectations. Parallel to the forth rank, the fifth highest scoring is also observed as a building design performance factor, which lays as *the HVAC comfort in the shopping mall* as seen on Table 4.22. This result reflects that customers take into consideration the well-being and the healthy environment within the shopping mall. This factor aligns also with the second-ranked factor, which is *the efficiency of cleaning services*. These 2 factors from 2 different dependent variables (the building design performance variable and the building services performance variable) complete each other as two of the most impactful factors for retail store sales performance.

According to the findings of the main study for the pre-pandemic period, the building services performance factors and the building design performance factors constitute the top 5 ranks of the complete list of factors, meaning that they are found as more significant than the retail store design performance factors for the retail store sales performance. The fact that each top five ranked performance factor has a standard deviation lower than 1 ($\sigma < 1$) reflects the consensus of the participants on the evaluation of these factors. Additionally, the lowest 3 scorings are measured on 3 retail store design performance factors, which are all related to the location of the retail store in the shopping mall (Table 4.23). Under the light of this discussion, it can be suggested that the sales performance of retail stores situated in a shopping mall depends mostly on the building services provided by the shopping mall management and on the building design factors of the shopping mall in which the retail store is situated.

Table 4.23: Ranking of all performance factors regardless of the latent variable in the main study for the pre-pandemic period.

All Performance Factors in the Main Study for Pre-pandemic Period			
#	Factors	Mean	St Dev
BSP07	brand variety	4.59	0.97
BDP17	presence of carpark	4.50	0.93
BSP06	efficiency of cleaning services	4.49	0.96
BDP12	lighting design concept of the shopping mall	4.47	0.88
BDP11	HVAC comfort in the shopping mall	4.44	0.99
BDP15	accessibility of the shopping mall by handicapped people	4.40	0.95
BSP12	presence of a cultural center	4.40	1.06
RDP06	location of the retail store in the shopping mall	4.38	1.03
BSP01	variety of management services	4.37	0.98
RDP03	lighting design of the retail store	4.34	1.03
BSP10	presence of an entertainment center	4.34	1.00
RDP07	visibility of the retail store	4.33	1.00
BSP08	branch mix in the shopping mall	4.30	1.05
BDP01	flexible architectural design acc.to weather conditions	4.28	1.00
BDP14	physical comfort of resting areas	4.25	1.01
BSP02	whether the carpark is free of charge or not	4.25	1.19
BDP13	noise level in the shopping mall	4.23	1.02
BSP03	presence of ATM machines	4.23	1.14
BDP07	shopping mall corridor width	4.22	1.01
BSP14	marketing activities	4.22	1.10
RDP02	shop window design of the retail store	4.21	1.21
BDP20	direct relationship of the mall with the public spaces	4.20	1.11
RDP08	floor level of the retail store	4.19	1.17
BDP02	smart building technologies used in the shopping mall	4.18	1.02
BDP10	physical comfort in the shopping mall	4.15	1.03
RDP09	proximity of the retail store to the main cores	4.10	1.15
BSP13	marketing billboards in the mall	4.09	1.08
RDP01	retail store interior design	4.07	1.31
BDP06	efficiency of the guidance signboards	4.07	1.05
BDP05	open-air vs enclosed mall concept	4.05	1.06
BSP04	presence of x-ray machines and security guards	4.04	1.18
BDP18	daylight perception in the shopping mall	4.00	1.16
BDP09	shopping mall floor height	3.99	1.05
BSP05	presence of info desk	3.97	1.12
RDP04	retail store dimensions	3.96	1.17
BDP08	building materials used in the shopping mall	3.94	1.09

Table 4.23 (continued): Ranking of all performance factors regardless of the latent variable in the main study for the pre-pandemic period.

BDP19	abundant use of landscape in the shopping mall	3.94	1.14
BSP11	social responsibility projects, social activities	3.93	1.16
BDP03	efficient use of water and energy	3.89	1.14
RDP12	proximity of the retail store to the vertical circulation	3.85	1.21
BDP16	efficiency of the fire escape scenario	3.85	1.18
RDP05	floor height of the retail store	3.78	1.21
BSP09	presence of kiosques	3.75	1.17
RDP11	proximity of the retail store to the entrances	3.73	1.26
BDP04	number of floor levels of the shopping mall	3.73	1.17
RDP14	proximity of the retail store to the kids playground	3.38	1.24
RDP10	proximity of the retail store to the supermarket	3.26	1.28
RDP13	proximity of the retail store to the carpark	3.12	1.21

4.2.5.2 Evaluation of the performance factors in the main study for the pandemic period

The second part of the main study evaluates the same performance factors under the conditions of the pandemic COVID-19. This section explains in detail the evaluation of the performance factors regardless of the latent variable group where they belong to. The top ranked and the lowest ranked performance factors are observed in detail with the reasons behind and in comparison with the literature. This section also discusses the differences and the similarities demonstrated between the pre-pandemic and the pandemic periods.

The main study for the pandemic period exhibits the highest scoring also on a building services performance factor, as previously observed in the main study for the pre-pandemic period. The highest ranked factor is measured as *the efficiency of cleaning services* with 4.54 mean score and $\sigma=0.96$ standard deviation, meaning that the participants of the main study had consolidated views on the evaluation of this factor. The importance of this factor was also underlined in the research by Köksal and Tıgılı (2018). The effect of pandemic raised the scoring of this performance factor from the third rank to the first rank, suggesting that *the efficiency of cleaning services* factor influences the retail store sales performance more than all other factors.

The HVAC comfort in the shopping mall rose from the fifth rank to the second rank across the pandemic, aligning with the expectations since the air quality and the healthy environments mattered more than before during the pandemic. Technical requirements were implemented such as increased ventilation with at least 5 ACH (air changes per hour), enhanced filtration with HEPA (High-Efficiency Particulate Air Filter) or other upgraded filters, air flow management, additional engineering controls for humidity control to prevent viruses expanding. People were informed of these requirements; therefore, customers paid more attention to healthy environments during the pandemic. Another building design performance factor, *the presence of carpark* declined from the second rank to the third, as being left behind *the HVAC comfort in the shopping mall* factor. Another building design performance factor, *the lighting design concept of the shopping mall* is observed on the fifth rank in Table 4.23. The ranking change of this factor is only one rank decrease, which is not a quite significant change.

The brand variety factor, which was the highest ranked factor in the main study for the pre-pandemic period, declined to the fourth rank across the pandemic period (Table 4.24). This decline is explained by customers' tendency to do functional shopping during the pandemic rather than spending more time visiting several corridors of the shopping mall. Even if this factor received less scoring than in the pre-pandemic period, it is still overcoming all other performance factors in the retail store design performance latent variable. It conserves its importance among the performance factors, as similarly discussed in the studies by Nebati and Ekmekçi (2019) and Köksal and Tıǧlı (2018).

The lowest ranked performance factors remained the same as well as the top five ranked factors both in the pre-pandemic period and the pandemic period. As observed in Table 4.24, the only significant change is the scoring and ranking within the top five ranks. According to the findings of the main study for the pandemic period, building services performance factors and building design performance factors occupy the top five positions in the overall ranking of factors, indicating that they are considered more significant than retail store design performance factors in influencing retail store sales performance.

Table 4.24: Ranking of all performance factors regardless of the latent variable in the main study for the pandemic period.

Top Ten Performance Factors in the Main Study for Pandemic Period			
#	Factors	Mean	St Dev
BSP06	efficiency of cleaning services	4.54	0.96
BDP11	HVAC comfort in the shopping mall	4.52	0.95
BDP17	presence of carpark	4.48	0.97
BSP07	brand variety	4.47	1.07
BDP12	lighting design concept of the shopping mall	4.41	0.95
BDP15	accessibility of the shopping mall by handicapped people	4.37	0.99
BDP01	flexible architectural design acc.to weather conditions	4.34	1.02
BSP01	variety of management services	4.31	1.04
RDP06	location of the retail store in the shopping mall	4.28	1.12
BDP07	shopping mall corridor width	4.28	0.99
BSP02	whether the carpark is free of charge or not	4.22	1.19
BSP03	presence of ATM machines	4.22	1.15
BSP08	branch mix in the shopping mall	4.21	1.13
BSP12	presence of a cultural center	4.21	1.19
RDP07	visibility of the retail store	4.20	1.12
BDP14	physical comfort of resting areas	4.20	1.07
BDP02	smart building technologies used in the shopping mall	4.19	1.02
BDP13	noise level in the shopping mall	4.19	1.08
BDP20	direct relationship of the mall with the public spaces	4.19	1.13
BDP10	physical comfort in the shopping mall	4.16	1.05
BDP05	open-air vs enclosed mall concept	4.15	1.10
BSP10	presence of an entertainment center	4.15	1.15
RDP03	lighting design of the retail store	4.13	1.19
BSP14	marketing activities	4.12	1.15
RDP08	floor level of the retail store	4.08	1.23
BDP06	efficiency of the guidance signboards	4.07	1.04
BDP18	daylight perception in the shopping mall	4.04	1.17
BSP04	presence of x-ray machines and security guards	4.04	1.19
BDP09	shopping mall floor height	4.03	1.08
RDP09	proximity of the retail store to the main cores	4.01	1.20
BSP13	marketing billboards in the mall	4.01	1.13
RDP02	shop window design of the retail store	4.00	1.32
BDP19	abundant use of landscape in the shopping mall	3.93	1.17
RDP01	retail store interior design	3.91	1.37
BDP03	efficient use of water and energy	3.91	1.18
BDP08	building materials used in the shopping mall	3.90	1.11

Table 4.24 (continued): Ranking of all performance factors regardless of the latent variable in the main study for the pandemic period.

BSP05	presence of info desk	3.9	1.20
BSP11	social responsibility projects, social activities	3.87	1.18
BDP16	efficiency of the fire escape scenario	3.86	1.16
RDP04	retail store dimensions	3.81	1.26
RDP12	proximity of the retail store to the vertical circulation	3.77	1.28
RDP05	floor height of the retail store	3.73	1.24
RDP11	proximity of the retail store to the entrances	3.72	1.29
BSP09	presence of kiosques	3.68	1.18
BDP04	number of floor levels of the shopping mall	3.67	1.18
RDP10	proximity of the retail store to the supermarket	3.29	1.30
RDP14	proximity of the retail store to the kids playground	3.26	1.25
RDP13	proximity of the retail store to the carpark	3.17	1.23

4.2.6 Evaluation of the three latent variables in the main study

The last section of the 4th chapter discusses the evaluation of the latent variables in integrity and compares the rankings of these latent variables affecting the sales performance of the retail stores located in a shopping mall. As discussed in previous chapters, the performance factors subject to this research are gathered into 3 latent variables. Table 4.25 demonstrates that the building services performance and the retail store design performance variables each include 14 factors, whereas the building design performance variable covers 20 factors. In this section, the average scoring of the performance factors in each variable is calculated both for the pre-pandemic period and the pandemic period separately as shown in Table 4.25.

The building services performance latent variable received the highest average scoring in the main study. Table 4.25 exhibits that 14 building services performance factors' average is calculated as 4.21 for the pre-pandemic period and 4.14 for the pandemic period. As discussed in the previous section, the building services performance factors left all the design performance factors behind. The results in this study reflect that the building services performance factors such as *efficiency of cleaning services* or *brand variety* impact the design performance more than the retail design performance factors. This finding contradicts significantly the expectations and the common point of view revealed in the current literature such as studies by Köksal and Tıǧlı (2018), Kusumowidagdo et al. (2011) and Bakhshizadeh et al. (2017).

The building design performance latent variable is ranked as the second most impactful variable according to the mean score calculated in the main study for pre-pandemic and pandemic periods. This finding aligns with the study by Riaz et al. (2024) underlining the impact of spatial efficiency and layout planning on shopping mall success. The average of the building design performance factors remained identical in both periods as indicated in Table 4.25. However, the previous sections explained that some building design performance factors altered in the ranking. The building design performance variable hosts 3 factors in the highest 5 ranking, whereas the building services performance variable places 2 factors in the highest 5 ranking.

The main study reveals that the retail store design performance latent variable is overpassed by the other variables, when the mean score calculation is observed for both the pre-pandemic and the pandemic periods. Contrary to the expectations, the findings reflect the design performance is less impacted by the retail store design performance factors. The building services performance factors affect the building design performance more significantly. The study suggests this is a quite interesting input for the effective shopping mall design.

Table 4.25: Ranking of latent variables in the main study.

Latent variable name	# Factors in variable	# Factors in top 5 rank	Mean score for pre-pandemic period	Mean score for pandemic period
Building Services Performance	14	2	4.21	4.14
Building Design Performance	20	3	4.14	4.14
Retail Store Design Performance	14	0	3.91	3.81



5. CONCLUSION AND RECOMMENDATIONS

5.1 Conclusion

This study's primary objective was to construct a structural model which identifies the essential design performance factors for more efficient shopping mall investments in Türkiye. The structural model was constructed, estimated and evaluated through the findings of the main study. The indicators of the model were revealed from a thorough literature review. The research categorized these factors into three distinct latent variables: 'building design performance', 'retail store design performance', 'building services performance'. These factors are formalized into a questionnaire for an expert judgement study. At the outset, the expert judgement method involved a panel consisting of seven retail industry experts and three retail customers who assessed a list of 52 assessment parameters with a Five-Point Likert scale, accompanied by open-ended questions. The study subsequently deliberated the evaluation scores assigned to each factor in terms of their impact on the sales performance of retail stores. Following this, the study considered additional factors proposed by participants through unrestrictive questions, as well as removed factors with mean scores falling below 3.00 points. This process resulted in a refined list of assessment parameters that demonstrated substantive validity. Finally, the research determined the rating of fifty-two factors influencing sales performance of retail stores. Moreover, this study discussed the ranks between the dependent variables.

Following the expert judgement, the pilot study was prepared for instrument refinement, reliability and consolidation of the expert judgement. The pilot study group consisted of sixteen retail store managers with more than 15 years' experience from the shopping mall in Gaziantep, Türkiye. The sixteen retail stores belong to diverse retail branch mix such as textile, prêt-à-porter, food & beverage, cosmetics, personal care, electronics. The pilot study used the same methodology such as the Five-Point Likert scale for evaluation. This study discussed the statistically significant findings of the pilot study in detail, and it compared these results to the findings of the

expert judgement. A comprehensive and detailed explanation of the significance level for each factor was provided, with a comparison of findings among previous researches published in literature.

The evaluation of the pilot study eliminated the performance factors who received less than 3.00 mean score to form a final questionnaire for the main study. Thus, the main study measured 14 retail store design performance factors, 20 building design performance factors and 14 building services factors. In the main study, 204 retail store managers from 4 different shopping malls in Türkiye have participated. The data was collected adequately and analyzed carefully to be able to derive important results to reach the target of identifying major performance factors for effective shopping mall design. The structural model was estimated using the dataset from the main study. The estimation and evaluation of the model revealed interesting results about the performance variables. Under the light of these results, the conclusion chapter will be discussed from 4 different perspectives such as model validation and reliability perspective, retail store design performance perspective, building design performance perspective and building services performance perspective.

5.1.1 Conclusion from model validation and reliability perspective

This study placed considerable emphasis on establishing the model's validity and reliability. Multiple tests and methodological procedures were undertaken to ensure that the final model met necessary standards of accuracy. Empirical findings from the pilot and main studies revealed that the retail stores sales performance construct could not be reliably operationalized as a single latent variable. The very low internal consistency value (Cronbach's $\alpha = 0.185$) indicated that the indicators associated with sales performance do not represent a unidimensional construct. Retail store sales performance is a complex, context-dependent outcome shaped not only by spatial, architectural, and service-related factors but also by external influences such as brand strength, pricing, promotions, macroeconomic trends, seasonal demand, and managerial decisions. Retail store sales performance cannot be modelled as a reflective latent construct in SEM because these diverse influences noted above reduce internal consistency. Methodological guidance on SEM indicates that concepts with low internal coherence and high sensitivity to external factors are better treated as outcome variables rather than latent variables. Therefore, sales performance was excluded from

the structural model, allowing the analysis to focus on the relationships among the enabling performance dimensions—retail store design, building design, and building services—that together create the conditions under which sales performance emerges. This approach is consistent with prior research that views sales performance as an emergent outcome shaped by multiple environmental and managerial factors, rather than as a directly measurable latent construct. It provides a theoretically sound and methodologically reliable framework for understanding how these enabling performance dimensions interact to indirectly influence retail store sales performance.

The revised model consisted of 3 latent variables (retail store design performance-RDP, building design performance-BDP and building services performance-BSP). The internal consistency values of these variables in the final model were high ($\alpha > 0.70$) as per below, meaning that the model has very good reliability and that each latent variable is reflected by a coherent set of indicators.

- Cronbach's α RDP= 0.919
- Cronbach's α BSP= 0.945
- Cronbach's α BDP= 0.961

The model fit indices were measured as acceptable global values for the validity of the final model (CFI: ≈ 0.872 (acceptable threshold), SRMR: ≈ 0.064 (acceptable), RMSEA: 0.069 (acceptable), PCMIN/DF: 1.927 (good parsimony-adjusted fit). Moreover, the factor loadings of all performance factors in 3 latent variables are measured as λ greater than 0.50 and most of the factors with $\lambda > 0.70$ meaning that these performance factors are strong indicators of their latent variables. All items load strongly on their intended factors, supporting convergent validity, meaning that the latent variables are well-defined by their factors in the model and increasing the reliability of the model. This outcome reflects the integration of a thorough literature review, the strong experience of expert panels, and the researcher's substantial professional experience within the retail sector.

This study enhanced model reliability and predictiveness by combining the ANN approach with SEM. In ANN setup, retail store design performance variable (RDP) and building services design performance variable (BSP) were considered as inputs. The target consisted of building design performance variable (BDP). The ANN explained $\sim 83\%$ of variance in BDP on the data set, which reflected a very strong predictive performance for BDP. This aligns significantly with this study, which aims

to identify key performance factors for effective shopping mall design. The model predicts successfully the building design performance following the performance factors of retail store design and building services variables. Since the model's reliability is high, designers and investors in the retail sector may simulate several scenarios by altering the performance factors from input levels. This model aims to serve retail sector investors and designers to design and construct effective shopping mall projects.

5.1.2 Conclusion from retail store design performance perspective

As discussed in previous chapters, this study measured the 3 most significant retail store design performance factors as *the location of the retail store in the shopping mall*, *the lighting design of the retail store* and *the visibility of the retail store*, meaning that the participants of the study suggest that these factors affect the retail store performance more significantly than the other retail store design performance factors. This result also implies that these 3 performance factors have stronger impact on more effective shopping mall design. This result further indicates that two of the highest-ranked factors influencing retail store design performance are not intrinsic to the store's design itself but rather stem from spatial characteristics associated with its location within a shopping mall. This appears to be a very important input for brand managers in their decisions for a store rental process. Similarly, this input remains its significance for commercial project investors and shopping mall designers in the design process of an effective and financially sustainable shopping mall.

The study further reveals that the retail store design performance variable achieved a substantially lower score in total, positioning it behind the two other latent variables (the building design performance variable and the building services performance variable). This underscoring reflects its comparatively modest significance among the performance factors of all latent variables. This finding is particularly noteworthy as it contradicts prevailing assumptions and trends reported in the current literature.

The structural model fitted to the main study dataset reflects that retail store design performance and the building design performance are strongly correlated ($\phi=0.78$), implying that shopping mall investments or projects with higher retail store performance tend to have higher building design performance. Similarly, the strong correlation ($\phi =0.78$) between the retail store design performance latent variable and

the building services performance latent variable reveals that there exists a strong predictive relationship between these variables. However, according to the SEM model estimation the regression path from retail store design performance to the building design performance variable is calculated quite low ($\beta = 0.30$), implying that the retail store design performance does not impact the building design performance significantly. Moreover, since the model estimates strong influence path from the retail store design performance to the building services performance variable and from the building services performance to the building design performance variable, this implies an indirect impact power of the retail store design performance on the building design performance. From a shopping mall management perspective, these results suggest that improving retail store design performance will lead to better shopping mall design performance. The structural model allows retail sector investors or professionals to measure this improvement.

5.1.3 Conclusion from building design performance perspective

The presence of carpark emerged as the most important among the building design performance factors, followed successively by *the shopping mall's lighting design concept* and *HVAC comfort*. These building design performance factors are pointed out by the respondents as significantly influencing the retail store sales performance. Previous chapters presented the importance of *the presence of carpark* factor via effective shopping mall design layout examples and discussed it deeply as an important issue. Effective examples of shopping mall design layouts are presented to highlight the importance of these factors. The *lighting design concept* factor appears to be particularly important both in the building design and in the retail store design performance. Respondents ranked both lighting design factors with high scores. This is a particularly important finding in the sense that it outperformed architectural design factors such as building materials, space dimensions or interior design, indicating its relatively extended impact on the retail store sales performance.

The structural model demonstrates that the building design performance variable is very strongly correlated ($\phi = 0.86$) with the building services performance variable and that this latter variable has a strong regression path ($\beta = 0.71$) on the building design performance variable. This result is noteworthy in the sense that building design and building services performances are highly interrelated and that improvements in

building services will lead to improvements in the building design. This outcome is particularly important for investors aiming to optimize shopping mall investments. The values show that when a shopping mall is designed in accordance with the most significant factors, the retail stores located in that shopping mall are likely to experience enhanced sales performance. Since the performance variables are not independent from each other and they have strong correlations and substantial common variance, the present study suggests that design and service aspects of a shopping mall investment tend to move together. Improvements in one aspect will lead to improvements in the other aspect.

ANN strongly supports the SEM model in the sense that the model is very effective at predicting building design performance from retail design performance and building services performance. These two variables are strong predictors of building design performance. This consistency across methods strengthens the validity of the model which implies that building design performance is strongly predictable from building services performance and retail design performance. The significant implication lies in the point that if retail store design and mall management services performances are improved, then shopping mall design performance will also improve and the model offers the opportunity to measure and predict this aspect.

5.1.4 Conclusion from building services performance perspective

The building services performance variable consists of performance factors which received quite high scores in the research. The total mean score of the complete set is the highest compared to the mean scores of other 2 latent variables. The most significant factor is *the brand variety* which was ranked the highest among all the performance factors. This finding reveals that *the brand variety* outperformed all building design performance factors and all retail store design factors. This result is quite significant and challenging dominant design-oriented perspectives, in the sense that it contradicts the previous studies reported in the existing literature within this field. The top rank of *the brand variety* only changed in the second phase of the study which evaluated the pandemic period. In the second phase of the study, the pandemic period, the top rank was attributed to *the efficiency of cleaning services*, which similarly belongs to the building services performance variable. The evaluation in both

pre-pandemic period and the pandemic period, assigns the top ranks to building services performance factors.

Notably, the average score of the building service performance factors is the highest among the average score of the three latent variables (building design performance, retail store design performance and building service performance). The study found this an unexpected result because the general tendency in literature (as cited in the previous sections) is that the primary performance factors are those related to both building design and retail store design. This result is worth taking into consideration by mall management professionals and shopping mall investors. Maintaining the sustainable effectiveness of a shopping mall does not necessarily involve only adequate and successful shopping mall design or fancy retail store design. According to this study, building services are relatively more significant than building design and retail store design for the effective shopping mall design.

The importance of the building services performance does not lie only on the scores but also in its role on the causal model on predicting the building design performance variable. The building services performance is not only rated highest but also a strong predictor of the building design performance variable (in SEM, BSP strongly predicts BDP with $\beta = 0.637$ and in ANN, BSP combined with RDP explains 83% of BDP variance), thus it is considered as both high-performing and influential. Since the factor loading of the indicators in the model are quite high and the performance latent variables are quite well represented by the performance factors, the validity of the model is well supported, and the results are more noteworthy. Both statistical (SEM) and machine learning (ANN) approaches agree that building services performance, building design performance and retail store design performance are related to each other. The improvements in one will benefit for the other variables. Moreover, the building services performance is the strongest predictor of the building design performance and the strongest contributor to overall building design performance. This outcome is a very important point for retail industry investors targeting effective shopping mall design.

5.2 Limitations and Recommendations

This study was limited in the sense that the data collection covered a limited number of shopping malls in Türkiye and its experienced professionals with a limited number

of respondents. The respondents of the main study consisted of retail store managers with over 15 years of experience in the retail industry. The research only covered the retail stores located in a shopping mall. The location of the shopping malls was not considered as a performance factor in the study. The research focused only on the retail stores and the shopping mall itself. These limitations may potentially broaden in future studies. Subsequent research could increase the sample size and extend the application of the proposed scale to retail stores operating in a broader spectrum of shopping malls, encompassing both domestic and international contexts. This could facilitate a comparison of differences in performance indicators, considering both local and global perspectives. In that case, further studies may potentially examine the variations in the findings according to geographical or cultural contexts.

This study was conducted in large Turkish cities, where the retail market is saturated by a substantial number of active shopping malls. An important question for future research would be how the results might differ in a context where the retail market lacks major retail investment players or is dominated by a single shopping mall. The lack of competitiveness in the field may alter the results or reveal interesting differences or similarities.

Another potential further study subject lies in the retail store turnover performance evaluation. As explained previously, the turnover performance of the retail stores was constrained due to lack of respondents' transparency and due to ethical concerns. Further studies may find an easier way to collect proper data for the turnover performance factors. Achieving this would enable the integration of a fourth variable into the model, enhancing the robustness of the framework for effective shopping mall design. Thus, more detailed data analysis and evaluation would be accomplished by enhancing the model for effective shopping mall design. Such a model would offer deeper insights for retail sector investors, supporting informed decision-making and fostering investments characterized by greater viability and competitiveness. This greater model would prove quite an important value for shopping mall design management in the retail industry and also for better mall management results. In advancing this research trajectory, researchers will have the opportunity to bridge theoretical rigor with practical application, shaping models that not only inform investment strategies but also redefine the standards of retail industry projects. By pursuing these directions, future studies can contribute to a more resilient and adaptive

retail ecosystem, ensuring that shopping mall investments remain aligned with evolving market dynamics and consumer expectations. The integration of artificial intelligence into these models will bring very wide opportunities such as incredible speed and flexibility in testing and evaluating the models. The advanced version of this model, integrated with AI, will create very wide opportunities for retail industry designers and investors to simulate the feasibility of the investments not only from financial point of view but also from building design and materiality point of view. These AI-integrated models may in future innovatively transform the investment feasibility from two-dimensional financial sheets into three-dimensional investment simulations integrated with building design software.





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APPENDICES

APPENDIX A: Main Study Questionnaire

AVM İçinde Bulunan Mağazaların Ciro Performansını Etkileyen Faktörlerin Belirlenmesi

Sayın Yetkili,

Bu araştırma İstanbul Teknik Üniversitesi, Mimarlık Fakültesi, Proje Yapım ve Yönetim Doktora Programı'nda yürütülen "Alışveriş Merkezleri İçinde Bulunan Mağazaların Ciro Performansını Etkileyen Faktörler" konulu araştırma projesi çerçevesinde firmanıza uygulanmak üzere hazırlanmıştır. Araştırmanın amacı, alışveriş merkezleri içindeki mağazaların ciro performansını etkileyen faktörlerin belirlenmesi ve faktörler arasındaki ilişkinin modellenmesidir. Soruların büyük bölümü "Pandemi Öncesi-Normal Dönemde" ve "Pandemi Döneminde" olmak üzere 2 yanıtli sorular olarak planlanmıştır. Sorular literatüre bağlı kalınarak hazırlanmıştır. Bu çalışmada katılımınız tamamen gönüllülük esasına dayanır. Bu çalışmayla bağlantılı olarak elde edilen ve sizinle özdeşleşmiş her bilgi gizli kalacak, üçüncü kişilerle kesinlikle paylaşılmayacaktır. Gizlilik, tanımlanmış bir kodlama prosedürüyle sağlanacak ve kod çözümüne erişim yalnızca çalışmanın sorumlusu araştırmacıyla sınırlı kalacaktır. Araştırma sonuçları tüm gizlilik ilkelerine uyularak sadece bilimsel çalışmalarda kullanılacaktır. Tüm veriler sınırlı erişime sahip güvenli ve şifreli bir veritabanında tutulacaktır.

Anketimizde 3 temel soru kalıbı bulunmaktadır:

- 5'li Likert skalası soruları: Bu sorularda cevaplar 1'den 5'e kadar puanlanır. 1 puan "kesinlikle katılmıyorum."; 3 puan "nötr/kararsız"; 5 puan "kesinlikle katılıyorum" anlamına gelir. Bazı sorularda hem pandemi öncesi zamanı hem de pandemi sürecini değerlendirmeniz beklenir.

- Çoktan seçmeli sorularda, size uygun olan cevabı seçmeniz beklenir.

- Açık uçlu sorularda ise yazmak istediğiniz cevabı sorunun altındaki metin kısmına yazmanız beklenir.

Anketimiz yaklaşık 15 dakika sürecektir.

Öğretim ve araştırmalarımıza verdiğiniz destekten dolayı şimdiden teşekkür eder, iyi çalışmalar dilerim.

Prof. Dr. H. Murat Günaydın
İstanbul Teknik Üniversitesi
Fen Bilimleri Enstitüsü
Mimarlık Ana Bilim Dalı
Proje Yapım ve Yönetim Doktora Programı

* Indicates required question

Marka Bilgileri

1. Markanızın sektörünü belirtiniz. *

Mark only one oval.

- ☐ Yeme-içme (Kafe, restoran, fastfood)
- ☐ Market
- ☐ Giyim
- ☐ Teknoloji
- ☐ Çocuk
- ☐ Eğlence
- ☐ Kuyumculuk
- ☐ Kozmetik / Kişisel bakım
- ☐ Çok markalı büyük mağaza
- ☐ Ev / Züccaciye
- ☐ Hizmet (Terzi, Kuaför, Kuru Temizleme, vs)

2. Markanızın yatırım modelini işaretleyiniz.

Mark only one oval.

- ☐ Merkezi
- ☐ Bayilik (franchise)

3. Mağazanızın alanını (metrekare olarak) işaretleyiniz. *

Mark only one oval.

- ☐ 700 m2 üzeri
- ☐ 200-700 m2
- ☐ 200 m2 altı

4. Mağazanızın bulunduğu şehri işaretleyiniz. *

Mark only one oval.

- ☐ Gaziantep
☐ İskenderun
☐ Antakya
☐ Sivas
☐ İstanbul

Mağaza Tasarım Performansı Soruları

5. 1) Mağazanın iç mekan tasarımı, mağazanın tasarım performansını etkiler. *

Check all that apply.

	1 (Kesinlikle katılmıyorum.)	2 (Katılmıyorum.)	3 (Nötr-Kararsız)	4 (Katılıyorum.)	5 (Kesinlikle katılıyorum.)
Pandemi Öncesi Dönem	☐	☐	☐	☐	☐
Pandemi Dönemi	☐	☐	☐	☐	☐

6. 2) Mağazanın vitrin tasarımı, mağazanın tasarım performansını etkiler. *

Check all that apply.

	1 (Kesinlikle katılmıyorum.)	2 (Katılmıyorum.)	3 (Nötr-Kararsız)	4 (Katılıyorum.)	5 (Kesinlikle katılıyorum.)
Pandemi Öncesi Dönem	☐	☐	☐	☐	☐
Pandemi Dönemi	☐	☐	☐	☐	☐

7. 3) Mağazanın aydınlatma tasarımı, mağazanın tasarım performansını etkiler. *

Check all that apply.

	1 (Kesinlikle katılmıyorum.)	2 (Katılmıyorum.)	3 (Nötr-Kararsız)	4 (Katılıyorum.)	5 (Kesinlikle katılıyorum.)
Pandemi Öncesi Dönem	☐	☐	☐	☐	☐
Pandemi Dönemi	☐	☐	☐	☐	☐

8. 4) Mağazanın boyutu, mağazanın tasarım performansını etkiler. *

Check all that apply.

	1 (Kesinlikle katılmıyorum.)	2 (Katılmıyorum.)	3 (Nötr-Kararsız)	4 (Katılıyorum.)	5 (Kesinlikle katılıyorum.)
Pandemi Öncesi Dönem	☐	☐	☐	☐	☐
Pandemi Dönemi	☐	☐	☐	☐	☐

9. 5) Mağazanın tavan yüksekliği, mağazanın tasarım performansını etkiler. *

Check all that apply.

	1 (Kesinlikle katılmıyorum.)	2 (Katılmıyorum.)	3 (Nötr-Kararsız)	4 (Katılıyorum.)	5 (Kesinlikle katılıyorum.)
Pandemi Öncesi Dönem	☐	☐	☐	☐	☐
Pandemi Dönemi	☐	☐	☐	☐	☐

10. 6) Mağazanın AVM'deki yeri, mağazanın tasarım performansını etkiler. *

Check all that apply.

	1 (Kesinlikle katılmıyorum.)	2 (Katılmıyorum.)	3 (Nötr-Kararsız)	4 (Katılıyorum.)	5 (Kesinlikle katılıyorum.)
Pandemi Öncesi Dönem	☐	☐	☐	☐	☐
Pandemi Dönemi	☐	☐	☐	☐	☐

11. 7) Mağazanın AVM koridorunda görünürlüğü, mağazanın tasarım performansını etkiler. *

Check all that apply.

	1 (Kesinlikle katılmıyorum.)	2 (Katılmıyorum.)	3 (Nötr-Kararsız)	4 (Katılıyorum.)	5 (Kesinlikle katılıyorum.)
Pandemi Öncesi Dönem	☐	☐	☐	☐	☐
Pandemi Dönemi	☐	☐	☐	☐	☐

12. 8) Mağazanın AVM'de bulunduğu kat, mağazanın tasarım performansını etkiler. *

Check all that apply.

	1 (Kesinlikle katılmıyorum.)	2 (Katılmıyorum.)	3 (Nötr-Kararsız)	4 (Katılıyorum.)	5 (Kesinlikle katılıyorum.)
Pandemi Öncesi Dönem	☐	☐	☐	☐	☐
Pandemi Dönemi	☐	☐	☐	☐	☐

13. 9) Mağazanın AVM'deki ana çekim noktalarına yakınlığı, mağazanın tasarım performansını etkiler. *

Check all that apply.

	1 (Kesinlikle katılmıyorum.)	2 (Katılmıyorum.)	3 (Nötr-Kararsız)	4 (Katılıyorum.)	5 (Kesinlikle katılıyorum.)
Pandemi Öncesi Dönem	☐	☐	☐	☐	☐
Pandemi Dönemi	☐	☐	☐	☐	☐

14. 10) Mağazanın AVM'deki süpermarkete yakınlığı, mağazanın tasarım performansını etkiler.

Check all that apply.

	1 (Kesinlikle katılmıyorum.)	2 (Katılmıyorum.)	3 (Nötr-Kararsız)	4 (Katılıyorum.)	5 (Kesinlikle katılıyorum.)
Pandemi Öncesi Dönem	☐	☐	☐	☐	☐
Pandemi Dönemi	☐	☐	☐	☐	☐

15. 11) Mağazanın AVM giriş kapılarına yakınlığı, mağazanın tasarım performansını etkiler. *

Check all that apply.

	1 (Kesinlikle katılmıyorum.)	2 (Katılmıyorum.)	3 (Nötr-Kararsız)	4 (Katılıyorum.)	5 (Kesinlikle katılıyorum.)
Pandemi Öncesi Dönem	☐	☐	☐	☐	☐
Pandemi Dönemi	☐	☐	☐	☐	☐

16. 12) Mağazanın AVM'deki düşey dolaşım elemanlarına (asansör, yürüyen merdiven, yürüyen bant) yakınlığı, mağazanın tasarım performansını etkiler. *

Check all that apply.

	1 (Kesinlikle katılmıyorum.)	2 (Katılmıyorum.)	3 (Nötr-Kararsız)	4 (Katılıyorum.)	5 (Kesinlikle katılıyorum.)
Pandemi Öncesi Dönem	☐	☐	☐	☐	☐
Pandemi Dönemi	☐	☐	☐	☐	☐

17. 13) Mağazanın otoparka yakınlığı, mağazanın tasarım performansını etkiler. *

Check all that apply.

	1 (Kesinlikle katılmıyorum.)	2 (Katılmıyorum.)	3 (Nötr-Kararsız)	4 (Katılıyorum.)	5 (Kesinlikle katılıyorum.)
Pandemi Öncesi Dönem	☐	☐	☐	☐	☐
Pandemi Dönemi	☐	☐	☐	☐	☐

18. 14) Mağazanın AVM'deki çocuk eğlence merkezine yakınlığı, mağazanın tasarım performansını etkiler. *

Check all that apply.

	1 (Kesinlikle katılmıyorum.)	2 (Katılmıyorum.)	3 (Nötr-Kararsız)	4 (Katılıyorum.)	5 (Kesinlikle katılıyorum.)
Pandemi Öncesi Dönem	☐	☐	☐	☐	☐
Pandemi Dönemi	☐	☐	☐	☐	☐

Bina Hizmet Performansı Soruları

19. 15) AVM'deki hizmet çeşitliliği, bina hizmet performansını etkiler. *

Check all that apply.

	1 (Kesinlikle katılmıyorum.)	2 (Katılmıyorum.)	3 (Nötr-Kararsız)	4 (Katılıyorum.)	5 (Kesinlikle katılıyorum.)
Pandemi Öncesi Dönem	☐	☐	☐	☐	☐
Pandemi Dönemi	☐	☐	☐	☐	☐

20. 16) AVM otoparkının ücretli olup olmaması, bina hizmet performansını etkiler. *

Check all that apply.

	1 (Kesinlikle katılmıyorum.)	2 (Katılmıyorum.)	3 (Nötr-Kararsız)	4 (Katılıyorum.)	5 (Kesinlikle katılıyorum.)
Pandemi Öncesi Dönem	☐	☐	☐	☐	☐
Pandemi Dönemi	☐	☐	☐	☐	☐

21. 17) AVM'de ATM'lerin bulunması, bina hizmet performansını etkiler. *

Check all that apply.

	1 (Kesinlikle katılmıyorum.)	2 (Katılmıyorum.)	3 (Nötr-Kararsız)	4 (Katılıyorum.)	5 (Kesinlikle katılıyorum.)
Pandemi Öncesi Dönem	☐	☐	☐	☐	☐
Pandemi Dönemi	☐	☐	☐	☐	☐

22. 18) AVM girişlerinde x-ray cihazı ve güvenlik bulunması, bina hizmet performansını etkiler. *

Check all that apply.

	1 (Kesinlikle katılmıyorum.)	2 (Katılmıyorum.)	3 (Nötr-Kararsız)	4 (Katılıyorum.)	5 (Kesinlikle katılıyorum.)
Pandemi Öncesi Dönem	☐	☐	☐	☐	☐
Pandemi Dönemi	☐	☐	☐	☐	☐

23. 19) AVM'de danışma bankosu bulunması, bina hizmet performansını etkiler. *

Check all that apply.

	1 (Kesinlikle katılmıyorum.)	2 (Katılmıyorum.)	3 (Nötr-Kararsız)	4 (Katılıyorum.)	5 (Kesinlikle katılıyorum.)
Pandemi Öncesi Dönem	☐	☐	☐	☐	☐
Pandemi Dönemi	☐	☐	☐	☐	☐

24. 20) AVM'deki temizlik hizmetinin etkin olması, bina hizmet performansını etkiler. *

Check all that apply.

	1 (Kesinlikle katılmıyorum.)	2 (Katılmıyorum.)	3 (Nötr-Kararsız)	4 (Katılıyorum.)	5 (Kesinlikle katılıyorum.)
Pandemi Öncesi Dönem	☐	☐	☐	☐	☐
Pandemi Dönemi	☐	☐	☐	☐	☐

25. 21) AVM'deki marka çeşitliliği, bina hizmet performansını etkiler. *

Check all that apply.

	1 (Kesinlikle katılmıyorum.)	2 (Katılmıyorum.)	3 (Nötr-Kararsız)	4 (Katılıyorum.)	5 (Kesinlikle katılıyorum.)
Pandemi Öncesi Dönem	☐	☐	☐	☐	☐
Pandemi Dönemi	☐	☐	☐	☐	☐

26. 22) AVM'deki markaların yerleşim düzeni, bina hizmet performansını etkiler. *

Check all that apply.

	1 (Kesinlikle katılmıyorum.)	2 (Katılmıyorum.)	3 (Nötr-Kararsız)	4 (Katılıyorum.)	5 (Kesinlikle katılıyorum.)
Pandemi Öncesi Dönem	☐	☐	☐	☐	☐
Pandemi Dönemi	☐	☐	☐	☐	☐

27. 23) AVM'de bulunan kiosklar (stantlar), bina hizmet performansını etkiler.

Check all that apply.

	1 (Kesinlikle katılmıyorum.)	2 (Katılmıyorum.)	3 (Nötr-Kararsız)	4 (Katılıyorum.)	5 (Kesinlikle katılıyorum.)
Pandemi Öncesi Dönem	☐	☐	☐	☐	☐
Pandemi Dönemi	☐	☐	☐	☐	☐

28. 24) AVM'de eğlence merkezinin bulunması, bina hizmet performansını etkiler. *

Check all that apply.

	1 (Kesinlikle katılmıyorum.)	2 (Katılmıyorum.)	3 (Nötr-Kararsız)	4 (Katılıyorum.)	5 (Kesinlikle katılıyorum.)
Pandemi Öncesi Dönem	☐	☐	☐	☐	☐
Pandemi Dönemi	☐	☐	☐	☐	☐

29. 25) AVM'de sosyal sorumluluk projelerine uygun mekanlar düzenlenmesi, semt sosyal aktivitelerine kapalı ve açık alanlar ayrılması bina hizmet performansını etkiler.

Check all that apply.

	1 (Kesinlikle katılmıyorum.)	2 (Katılmıyorum.)	3 (Nötr-Kararsız)	4 (Katılıyorum.)	5 (Kesinlikle katılıyorum.)
Pandemi Öncesi Dönem	☐	☐	☐	☐	☐
Pandemi Dönemi	☐	☐	☐	☐	☐

30. 26) AVM'de sinema, tiyatro gibi bir kültürel faaliyet salonunun bulunması, bina hizmet performansını etkiler. *

Check all that apply.

	1 (Kesinlikle katılmıyorum.)	2 (Katılmıyorum.)	3 (Nötr-Kararsız)	4 (Katılıyorum.)	5 (Kesinlikle katılıyorum.)
Pandemi Öncesi Dönem	☐	☐	☐	☐	☐
Pandemi Dönemi	☐	☐	☐	☐	☐

31. 27) AVM'deki reklam panoları, bina hizmet performansını etkiler. *

Check all that apply.

	1 (Kesinlikle katılmıyorum.)	2 (Katılmıyorum.)	3 (Nötr-Kararsız)	4 (Katılıyorum.)	5 (Kesinlikle katılıyorum.)
Pandemi Öncesi Dönem	☐	☐	☐	☐	☐
Pandemi Dönemi	☐	☐	☐	☐	☐

32. 28) AVM'deki pazarlama aktiviteleri, bina hizmet performansını etkiler. *

Check all that apply.

	1 (Kesinlikle katılmıyorum.)	2 (Katılmıyorum.)	3 (Nötr-Kararsız)	4 (Katılıyorum.)	5 (Kesinlikle katılıyorum.)
Pandemi Öncesi Dönem	☐	☐	☐	☐	☐
Pandemi Dönemi	☐	☐	☐	☐	☐

Bina Tasarım Performansı Soruları

33. 29) AVM mimari tasarımının iklim koşullarına göre esnek olması (açılır-kapanır teraslar, koridorlar, vs.), bina tasarım performansını etkiler. *

Check all that apply.

	1 (Kesinlikle katılmıyorum.)	2 (Katılmıyorum.)	3 (Nötr-Kararsız)	4 (Katılıyorum.)	5 (Kesinlikle katılıyorum.)
Pandemi Öncesi Dönem	☐	☐	☐	☐	☐
Pandemi Dönemi	☐	☐	☐	☐	☐

34. 30) AVM'deki akıllı bina teknolojileri, binanın tasarım performansını etkiler. *

Check all that apply.

	1 (Kesinlikle katılmıyorum.)	2 (Katılmıyorum.)	3 (Nötr-Kararsız)	4 (Katılıyorum.)	5 (Kesinlikle katılıyorum.)
Pandemi Öncesi Dönem	☐	☐	☐	☐	☐
Pandemi Dönemi	☐	☐	☐	☐	☐

35. 31) AVM'de etkin enerji ve su kullanımı, binanın tasarım performansını etkiler. *

Check all that apply.

	1 (Kesinlikle katılmıyorum.)	2 (Katılmıyorum.)	3 (Nötr-Kararsız)	4 (Katılıyorum.)	5 (Kesinlikle katılıyorum.)
Pandemi Öncesi Dönem	☐	☐	☐	☐	☐
Pandemi Dönemi	☐	☐	☐	☐	☐

36. 32) AVM'nin kat sayısı, binanın tasarım performansını etkiler.

Check all that apply.

	1 (Kesinlikle katılmıyorum.)	2 (Katılmıyorum.)	3 (Nötr-Kararsız)	4 (Katılıyorum.)	5 (Kesinlikle katılıyorum.)
Pandemi Öncesi Dönem	☐	☐	☐	☐	☐
Pandemi Dönemi	☐	☐	☐	☐	☐

37. 33) AVM'nin açık veya kapalı konsept olması, binanın tasarım performansını etkiler. *

Check all that apply.

	1 (Kesinlikle katılmıyorum.)	2 (Katılmıyorum.)	3 (Nötr-Kararsız)	4 (Katılıyorum.)	5 (Kesinlikle katılıyorum.)
Pandemi Öncesi Dönem	☐	☐	☐	☐	☐
Pandemi Dönemi	☐	☐	☐	☐	☐

38. 34) AVM'deki yönlendirme tabelalarının etkinliği, bina tasarım performansını etkiler. *

Check all that apply.

	1 (Kesinlikle katılmıyorum.)	2 (Katılmıyorum.)	3 (Nötr-Kararsız)	4 (Katılıyorum.)	5 (Kesinlikle katılıyorum.)
Pandemi Öncesi Dönem	☐	☐	☐	☐	☐
Pandemi Dönemi	☐	☐	☐	☐	☐

39. 35) AVM'deki ortak alan müşteri koridorlarının genişliği, binanın tasarım performansını etkiler. *

Check all that apply.

	1 (Kesinlikle katılmıyorum.)	2 (Katılmıyorum.)	3 (Nötr-Kararsız)	4 (Katılıyorum.)	5 (Kesinlikle katılıyorum.)
Pandemi Öncesi Dönem	☐	☐	☐	☐	☐
Pandemi Dönemi	☐	☐	☐	☐	☐

40. 36) AVM'de kullanılan yapısal malzemeler, binanın tasarım performansını etkiler. *

Check all that apply.

	1 (Kesinlikle katılmıyorum.)	2 (Katılmıyorum.)	3 (Nötr-Kararsız)	4 (Katılıyorum.)	5 (Kesinlikle katılıyorum.)
Pandemi Öncesi Dönem	☐	☐	☐	☐	☐
Pandemi Dönemi	☐	☐	☐	☐	☐

41. 37) AVM ortak alanlarının tavan yüksekliği, binanın tasarım performansını etkiler. *

Check all that apply.

	1 (Kesinlikle katılmıyorum.)	2 (Katılmıyorum.)	3 (Nötr-Kararsız)	4 (Katılıyorum.)	5 (Kesinlikle katılıyorum.)
Pandemi Öncesi Dönem	☐	☐	☐	☐	☐
Pandemi Dönemi	☐	☐	☐	☐	☐

42. 38) AVM'deki genel fiziksel konfor, binanın tasarım performansını etkiler. *

Check all that apply.

	1 (Kesinlikle katılmıyorum.)	2 (Katılmıyorum.)	3 (Nötr-Kararsız)	4 (Katılıyorum.)	5 (Kesinlikle katılıyorum.)
Pandemi Öncesi Dönem	☐	☐	☐	☐	☐
Pandemi Dönemi	☐	☐	☐	☐	☐

43. 39) AVM'deki iklimlendirme konforu (soğutma, ısıtma, havalandırma), binanın tasarım performansını etkiler. *

Check all that apply.

	1 (Kesinlikle katılmıyorum.)	2 (Katılmıyorum.)	3 (Nötr-Kararsız)	4 (Katılıyorum.)	5 (Kesinlikle katılıyorum.)
Pandemi Öncesi Dönem	☐	☐	☐	☐	☐
Pandemi Dönemi	☐	☐	☐	☐	☐

44. 40) AVM'nin genel aydınlatma konsepti, binanın tasarım performansını etkiler. *

Check all that apply.

	1 (Kesinlikle katılmıyorum.)	2 (Katılmıyorum.)	3 (Nötr-Kararsız)	4 (Katılıyorum.)	5 (Kesinlikle katılıyorum.)
Pandemi Öncesi Dönem	☐	☐	☐	☐	☐
Pandemi Dönemi	☐	☐	☐	☐	☐

45. 41) AVM'deki gürültü kapasitesi, binanın tasarım performansını etkiler. *

Check all that apply.

	1 (Kesinlikle katılmıyorum.)	2 (Katılmıyorum.)	3 (Nötr-Kararsız)	4 (Katılıyorum.)	5 (Kesinlikle katılıyorum.)
Pandemi Öncesi Dönem	☐	☐	☐	☐	☐
Pandemi Dönemi	☐	☐	☐	☐	☐

46. 42) AVM'nin bekleme ve dinlenme alanlarının konforu, binanın tasarım performansını etkiler. *

Check all that apply.

	1 (Kesinlikle katılmıyorum.)	2 (Katılmıyorum.)	3 (Nötr-Kararsız)	4 (Katılıyorum.)	5 (Kesinlikle katılıyorum.)
Pandemi Öncesi Dönem	☐	☐	☐	☐	☐
Pandemi Dönemi	☐	☐	☐	☐	☐

47. 43) AVM'nin engelli kişiler açısından etkin ulaşılabilirliği, binanın tasarım performansını etkiler. *

Check all that apply.

	1 (Kesinlikle katılmıyorum.)	2 (Katılmıyorum.)	3 (Nötr-Kararsız)	4 (Katılıyorum.)	5 (Kesinlikle katılıyorum.)
Pandemi Öncesi Dönem	☐	☐	☐	☐	☐
Pandemi Dönemi	☐	☐	☐	☐	☐

48. 44) AVM'nin yangın kaçış senaryosunun etkinliği, binanın tasarım performansını etkiler.

Check all that apply.

	1 (Kesinlikle katılmıyorum.)	2 (Katılmıyorum.)	3 (Nötr-Kararsız)	4 (Katılıyorum.)	5 (Kesinlikle katılıyorum.)
Pandemi Öncesi Dönem	☐	☐	☐	☐	☐
Pandemi Dönemi	☐	☐	☐	☐	☐

49. 45) AVM'de otopark bulunması, binanın tasarım performansını etkiler. *

Check all that apply.

	1 (Kesinlikle katılmıyorum.)	2 (Katılmıyorum.)	3 (Nötr-Kararsız)	4 (Katılıyorum.)	5 (Kesinlikle katılıyorum.)
Pandemi Öncesi Dönem	☐	☐	☐	☐	☐
Pandemi Dönemi	☐	☐	☐	☐	☐

50. 46) Gün ışığının AVM içinde hissedilmesi, bina tasarım performansını etkiler. *

Check all that apply.

	1 (Kesinlikle katılmıyorum.)	2 (Katılmıyorum.)	3 (Nötr-Kararsız)	4 (Katılıyorum.)	5 (Kesinlikle katılıyorum.)
Pandemi Öncesi Dönem	☐	☐	☐	☐	☐
Pandemi Dönemi	☐	☐	☐	☐	☐

51. 47) Peyzaj alanlarının AVM içinde büyük oranda kullanılması, bina tasarım performansını etkiler. *

Check all that apply.

	1 (Kesinlikle katılmıyorum.)	2 (Katılmıyorum.)	3 (Nötr-Kararsız)	4 (Katılıyorum.)	5 (Kesinlikle katılıyorum.)
Pandemi Öncesi Dönem	☐	☐	☐	☐	☐
Pandemi Dönemi	☐	☐	☐	☐	☐

52. 48) AVM'nin kamusal alan ile iç içe olması, direkt bağlantıya sahip olması (direkt toplu taşıma sistemine bağlı olması veya bir parka açılması gibi), bina tasarım performansını etkiler. *

Check all that apply.

	1 (Kesinlikle katılmıyorum.)	2 (Katılmıyorum.)	3 (Nötr-Kararsız)	4 (Katılıyorum.)	5 (Kesinlikle katılıyorum.)
Pandemi Öncesi Dönem	☐	☐	☐	☐	☐
Pandemi Dönemi	☐	☐	☐	☐	☐

Mağaza Ciro Performansı Soruları

53. 49) Hangi tip AVM tasarım yaklaşımı mağaza ciro performansını daha olumlu etkiler? *

Check all that apply.

	Kapalı Kutu AVM'ler	Açık konsept AVM'ler
Pandemi Öncesi Dönem	☐	☐
Pandemi Dönemi	☐	☐

54. 50) Bir kentin sosyolojik yapısının mağazanın ciro performansına etkisi vardır. *

Mark only one oval.

	1	2	3	4	5	
Kesi	☐	☐	☐	☐	☐	Kesinlikle katılıyorum

55. 51) Mağazanızın yıllık büyüme oranını işaretleyiniz. *

Mark only one oval.

- ☐ %1-%5
☐ %5-%10
☐ %10-%20
☐ %20-%30
☐ %30 ve üzeri

56. 52) Mağazanızın ortalama yıllık brüt kâr marjını işaretleyiniz.

Mark only one oval.

- ☐ %1-%10
☐ %11-%20
☐ %21-%30
☐ %31-%40
☐ %41 ve üzeri

57. 53) Mağazanızda çalışan toplam personel sayısı ne kadardır?

58. 54) Covid-19 pandemi süreci mağaza ciro performansınızı nasıl etkiledi? *
Olumlu ise ciro artışınız yüzde kaçtır? Olumsuz ise ciro kaybınız yüzde kaçtır?

59. 55) Online satışlarınızın geleneksel (mağazadan) satışlarınıza oranını pandemi *
öncesi ve pandemi dönemi olarak değerlendiriniz.

Check all that apply.

	%1-5	%6-15	%16-30	%31-50	%51-70	Online satışımız yoktur.
Pandemi Öncesi Dönem	☐	☐	☐	☐	☐	☐
Pandemi Dönemi	☐	☐	☐	☐	☐	☐

60. 56) Online satışların aşağıdaki kriterlerden en çok hangisinden etkilendiğini *
düşünüyorsunuz?

Check all that apply.

	Sipariş gönderim hızı	Özenli paketleme ve kargolama	Kolay iade	Ödeme yöntemi güvenliği	Kapıda ödeme seç	Online sipariş sitesinin tasarımı ve işlemci hızı
Pandemi Öncesi Dönem	☐	☐	☐	☐	☐	☐
Pandemi Dönemi	☐	☐	☐	☐	☐	☐

61. 57) Online satışların mağazadan teslim alma ve mağazadan değişim/iade seçenekleri mağaza ciro performansını etkiler. *

Check all that apply.

	1 (Kesinlikle katılmıyorum.)	2 (Katılmıyorum.)	3 (Nötr-Kararsız)	4 (Katılıyorum.)	5 (Kesinlikle katılıyorum.)
Pandemi Öncesi Dönem	☐	☐	☐	☐	☐
Pandemi Dönemi	☐	☐	☐	☐	☐

62. 58) Mağazanızdaki dönüşüm oranını (alışveriş yapan müşteri sayısının mağazaya giren ziyaretçi sayısına oranı) işaretleyiniz. *

Mark only one oval.

- ☐ %1-5
☐ %6-10
☐ %11-20
☐ %21-40
☐ %41-70
☐ %71 ve üzeri

63. 59) Mağazanızdaki müşteri sadakatini müşteri takip sistemleri ile ölçümlüyor musunuz?

Mark only one oval.

- ☐ Evet
☐ Hayır

64. 60) 59.soruya cevabınız "evet" ise müşteri sadakatiniz yüzde kaçtır?

Mark only one oval.

- ☐ %20 ve altı
☐ %21 - %40
☐ %41 - %60
☐ %61 - %80
☐ %81 ve üzeri

65. 61) Mağazanızdaki müşteri trafiğini ölçümlüyor musunuz?

Mark only one oval.

- ☐ Evet
☐ Hayır

66. 62) 61. soruya cevabınız "evet" ise hafta içi ortalama günlük müşteri giriş sayınızı belirtiniz.

67. 63) Yukarıdaki kriterlerin dışında mağaza ciro performansını etkilediğini düşündüğünüz bina tasarım, mağaza tasarım ve bina hizmet faktörleri var mıdır? Varsa nelerdir?

68. 64) Müşterilerin pandemi sonrası değişen AVM alışkanları nelerdir?

69. 65) Müşteriler alışveriş yapmak veya gezmek için birçok AVM arasından seçim yaparken hangi özelliklere dikkat ederler?



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- 2008-2024: Prime Development Ltd. Sti. / Planning Director, Istanbul
- 2005-2008: Doğuş-GE Real Estate Investment Trust / Project Supervisor, Istanbul
- 2017: Best Developing Shopping Center by CNBC&SIMA Awards, London (Prime Mall Sivas project)
- 2013: Best European Retail Development by CNBC&SIMA Awards, London (Prime Mall Antakya project)

PUBLICATIONS AND PRESENTATIONS ON THE THESIS:

- **Yılmaz, Z., Günaydın, H.M., Öztürk, G.B.** 2020. Identifying design specific factors affecting the turnover performance of the retail stores within a shopping mall. 6th International Project and Construction Management Conference (IPCMC2020) - Istanbul Technical University, November 12-14, 2020, Istanbul, Turkey (Presentation Instance)
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