

THE IMPACT OF THE PHYSICAL ENVIRONMENT ON RELATIONSHIP QUALITY WITH CUSTOMERS IN HOTEL INSTITUTIONS IN ALGERIA

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Abstract:

This study aims to investigate the impact of the physical environment on relationship quality and its associated dimensions (satisfaction, trust and commitment) in Algerian hotels. A descriptive analytical approach was adopted, with paper and electronic questionnaires serving as the primary tools for collecting practical data and information. The questionnaires were distributed to a non-probability sample of customers with experience of three-star and above hotel services in Algeria. A total of 300 valid responses were retrieved for analysis. SPSS v26 was used to describe and analyse the characteristics of the study sample and their responses to the survey questions. Partial Least Squares (PLS) was employed in Structural Equation Modelling (SEM), using SmartPLS4 statistical software, to analyse the relationships between the variables. The findings indicated that the physical environment positively influences relationship quality, having a greater impact on satisfaction than on trust and commitment. Furthermore, the effect of the physical environment on trust increased with satisfaction as a mediator, as did its impact on commitment with satisfaction and trust as mediators. Based on these results, we provide a set of recommendations, including the suggestion that hotel institutions operating in the Algerian service market pay attention to the physical environment of their services.

Keywords: physical environment, relationship quality, hotel institutions

JEL Classification: M10, M31, Z30

1. Introduction:

Hotels have become the backbone of the tourism industry and one of the most important economic sectors, both nationally and internationally. They are no longer just a place to stay in a particular country or tourist area; they are an attraction in their own right, representing a significant portion of clients' (tourists') travel budgets, regardless of their type or segment. This transformation has made hotels a fundamental component of tourism demand in countries. Consequently, these institutions are striving to enhance their performance by continuously developing their services, particularly in highly competitive markets. In hospitality services, the physical environment is a platform for customer interaction with the institution, significantly impacting behavioural outcomes.

According to Shostack's definition, interactive relationships are characterised by direct customer interaction with the service. This interaction involves engagement with the elements of the physical service environment, as well as personal relationships with service providers and other customers. Consequently, service marketing managers must consider the impact of both personal interactive relationships and the physical service environment on customer perceptions and behaviours (Al-Alaq & Al-Taie, 2008, p. 161). In this context, building design, cleanliness and employee appearance provide important tangible cues that may be the sole basis on which customers differentiate between service providers.

In light of the above, this study aims to answer the following research question:

What impact does the physical environment of hotel institutions in Algeria have on their relationships with customers?

To address this question, the following hypotheses will be formulated:

- The physical environment of hotel institutions in Algeria directly impacts the quality of their relationships with customers.
- The physical environment of hotel institutions in Algeria has an indirect impact on the quality of their relationships with customers.

1.1 Research objectives:

The primary objectives of this study are:

- Study the relationship between the physical environment and relationship quality, and the contributions of researchers in this field, in order to achieve more realistic results in the Algerian context.
- Determine the nature of the relationship between the physical environment of Algerian hotels and the quality of their customer relationships.
- Test the relationship between dimensions of relationship quality (satisfaction, trust and commitment) in the hospitality service sector.
- Produce a set of results and recommendations that can be used to increase customer trust and commitment, encourage interaction between customers and the institution, and improve customer satisfaction.

2. Literature review:

2.1 Hotel Institutions:

According to Article 2 of Algerian Executive Decree No. 19-158, dated 30 April 2019, a hotel institution is defined as follows: 'Any commercial institution that receives transient or resident customers without making it their permanent residence and that primarily provides accommodation services alongside related services.' Depending on its type and location, the hotel institution may be equipped with facilities offering catering, entertainment, recreation, wellness, comfort, sports, conferences, marinas and other tourism-related activities." Examples of Algerian hotel institutions include hotels, tourist complexes or holiday villages, hotel apartments or lodging residences, motels or roadside inns, and tourist camps.

2.2 Physical environment:

According to research in environmental psychology, human behaviour is closely linked to the physical environment and this has a significant impact on service quality. Specifically, Mehrabian and Russell's (1974) theory indicates that individuals generally interact with the environment in two opposing ways: approach and avoidance. Approach behaviours are seen as positive responses to the environment, such as the desire to stay, work and belong, while avoidance behaviours are negative responses, such as the desire not to stay, work or belong. Clearly, the institution's services and environment promote approach behaviours and reduce avoidance behaviours. The significance of the physical environment and service quality in influencing behavioural patterns has recently been emphasised in many consumer behaviour studies (Uboegbulam & Ezurume, 2020, p. 120).

(Bitner, 1990) coined the term 'servicescape' to describe the physical environment in which service products are delivered. She identified three dimensions of the servicescape that affect customer satisfaction: 1) ambient conditions, 2) spatial and functional design, and 3) signs, symbols, and artefacts. These three factors are frequently included in research related to the physical environment and are the most relevant dimensions for studying customer behaviour in service environments. (Turley & Milliman, 2000) noted that the internal atmosphere comprises elements of the internal and external environments of the service that create emotional and psychological reactions among customers.

2.3 Relationship quality:

The success of many services depends on interacting with customers in a way that leads to their satisfaction. The service provider must therefore consistently build trust and commitment with customers to significantly increase satisfaction, the three pillars of which are essential for strengthening the relationship and ultimately leading to customer retention (Balla & et al, 2015, p. 2). According to attachment theory, when an institution achieves trust and commitment with the customer, forming a relationship based on satisfaction, we can say that the institution and the customer share a relationship. In their article titled 'Developing Buyer-Seller Relationships', Dwyer et al. (Dwyer & et al, 1987, p. 14) introduced the concept of relationship quality with the customer, considering it to be the essence of relationship marketing. This concept reflects a set of behaviours, emotions, feelings and communication methods arising from both parties in the relationship.

Kotler and Dubois (P.Kotler & B.Dubois , 2009, p. 179) described this relationship as 'relational capital', which they defined as follows: 'the sum of knowledge and experiences accumulated through the customer's relationship with the institution, reflecting the customer's willingness to remain loyal to the brand through trust, commitment and satisfaction — considered prerequisites for brand attachment and loyalty development'. Fournier (Fournier, 1998, p. 244) defines relationship quality as: 'the assurance of maintaining a successful reciprocal relationship between the customer and the institution, where customer trust and satisfaction are fundamental components for measuring relationship quality'.

From these definitions, we can conclude that there are three dimensions of relationship quality.

▪ **Customer satisfaction:**

(Ray , 2002, p. 22) suggested that a satisfied customer is one who has experienced a service or product that meets or exceeds their expectations. (Kotler & Kevin , 2009, p. 124) argue that customers experience pleasure or frustration when they compare the performance of a tangible product with their expectations. If the performance fails to meet expectations, the customer will be dissatisfied; if it meets expectations, the customer will be satisfied; and if it exceeds expectations, the customer will be highly satisfied.

Customer satisfaction is a key indicator of performance in any institution, especially if it is quality-oriented. (Hoffman & Bateson, 2010, p. 288) emphasise the importance of complaints and feedback received by institutions, considering them valuable input that can enhance services and prevent customers from switching to competitors. Satisfied customers will talk to others about the institution, generating new custom, and they will be quick to return.

▪ **Trust:**

Trust can be defined as one party's confidence in the reliability, durability, and integrity of the other relationship members, and the belief that their actions are in the best interest of the trusting party and will produce positive outcomes (Peppers & Rogers, 2004, p. 43). Moorman et al. (1992) define trust as a willingness to rely on an exchange partner in whom one has confidence. This definition explains trust from two different perspectives: the first is from an affective approach, which is one party's confidence in the other party; in other words, it is about belief; the second is from a behavioral intention perspective, which is one party relying on the other party. Moorman et al. (1992) explain trust with two dimensions: cognitive trust, which means a rational view and a willingness to rely on vendors based on competency and reliability, and affective trust, which is a more emotional perspective that motivates one partner to stay and maintain the relationship (Andreas & et al, 2018, p. 181).

▪ **Commitment:**

According to (Morgan & Hunt, 1994, p. 23), commitment is the belief by one party that maintaining a continuous relationship with the other party is very important, ensuring that maximum effort is

exerted to preserve it. It is the customer's ongoing desire to maintain a relationship with the institution, accompanied by a willingness to make efforts to do so (Lacey, 2007, p. 316).

Investing in commitment to relationships is crucial, especially in highly competitive markets. In these markets, institutions have shifted their focus from customer satisfaction to customer commitment. Satisfaction meets customer needs in the short term, but commitment requires a long-term relationship and creates loyalty. Satisfied customers, on the other hand, feel happy but remain independent of the institution. In contrast, committed customers develop a collaborative relationship with the institution and remain loyal to it. They also form a reciprocal relationship with the institution by sharing its values, supporting it, and expressing a desire to remain members.

3. Hypotheses Development:

Based on the review of previous studies and the theoretical framework, the study hypotheses were developed and formulated to test the relationship between the independent and dependent variables.

3.1 The physical environment of the hotel institution has a statistically significant direct effect on the dimensions of relationship quality:

The service environment in hotels is one of the most important service characteristics, especially for customers seeking entertainment and an exciting consumption experience that generates positive feelings and commitment, and encourages them to return to the same institution in future. Customers are no longer just seeking services; they are searching for excitement and entertainment, as well as the satisfaction derived from creating value through the experience provided by the institution. According to researchers Faizan and Muslim (2014), customers with higher perceptions of the physical environment are more likely to experience positive feelings, increasing customer satisfaction and behavioural intentions. Therefore, hotels and resorts need to focus on developing their facilities to evoke positive emotions and maintain customer satisfaction. Similarly, (Ding & et al, 2022) indicated that customer satisfaction is an important factor affecting the hotel sector and booking intentions. Numerous tangible and intangible factors influence customer satisfaction, including service quality, price, location, hotel rating and the surrounding environment. (Kisang & et al, 2012), (SAIDI, 2018), (Heesup & Sunghyup, 2017) and (Wibisono & et al, 2022) found that the physical environment of the hotel is a fundamental factor in customer satisfaction. Based on the above, we propose the following sub-hypothesis:

H1: There is a statistically significant relationship at the ($\alpha \leq 0.05$) level of significance for the physical environment of hotel institutions in Algeria and customer satisfaction.

Few studies have examined the relationship between the physical environment and trust in a service context. (P. Guenzi & et al, 2009) obtained interesting results concerning the effect of the store environment on customer trust in retail settings. Additionally, (Temessek & Ben Dahmane , 2017) conducted an empirical study of fitness centre customers, revealing the positive impact of both the service setting and social relationships on customer trust and loyalty. Similarly, research by (Yong & Liu , 2020) on restaurant services in South Korea found that physical environment quality, food quality and service quality all had a significant positive effect on customer trust. Based on these findings, we propose the following sub-hypothesis:

H2: There is a statistically significant relationship at the ($\alpha \leq 0.05$) level of significance for the physical environment of hotel institutions in Algeria and customer trust.

The study by (Hooper & et al, 2013) confirmed the significant impact of the physical environment on customers' behavioural intentions regarding the frequency of their visits. The study emphasised that service providers should pay attention to physical environment factors due to their influence on service quality and, consequently, customer behavioural intentions. Bitner (1982) documented that the service environment in hospitality companies significantly affects customers' intentions to return (Ryu & et al, 2012, p. 203). By logical extension, we can conclude that:

H3: There is a statistically significant relationship at the ($\alpha \leq 0.05$) level for the physical environment of Algerian hotels on customer commitment.

3.2 Second main hypothesis: there is a statistically significant indirect effect of the physical environment of hotel institutions on relationship quality dimensions.

(Morgan & Hunt, 1994) indicated that trust leads to the consolidation and sustainability of the relationship between customers and institutions. A relationship built on trust and commitment between a customer and an institution is considered positive from the customer's perspective, as even if the customer is reserved by the institution, this is due to their trust and personal willingness.

(Garbarino & Johnson, 1999) conducted research into the different roles of satisfaction, trust and commitment in customer relationships. They concluded that satisfaction affects trust, and trust affects commitment; customers are unlikely to commit unless trust has been established. (Bouhafs, 2024) emphasised that relationships are crucial for the success of any hotel. Guests interact directly with hotel staff, facilities and technology, and their experience is affected by two distinct yet integrated factors: service quality and relationship quality. Guests who do not receive a warm welcome, friendly service and high-quality amenities are less likely to return to the hotel. Bouhafs found that customers' emotional commitment depends heavily on their satisfaction and trust in the hotel, with satisfaction having a more evident effect on emotional commitment through trust.

In the same context, (Kigen & de Villiers, 2024) found that, in the banking services sector, satisfaction had a positive but weak and marginally significant effect on commitment, as well as a very strong and significant positive effect on trust. Meanwhile, trust was found to have a significant positive effect on commitment.

By logical extension, we can conclude that:

H4: There is a statistically significant relationship at the ($\alpha \leq 0.05$) level for customer satisfaction in Algerian hotels on trust.

H5: There is a statistically significant relationship at the significance level ($\alpha \leq 0.05$) between the trust of customers of Algerian hotels and their commitment.

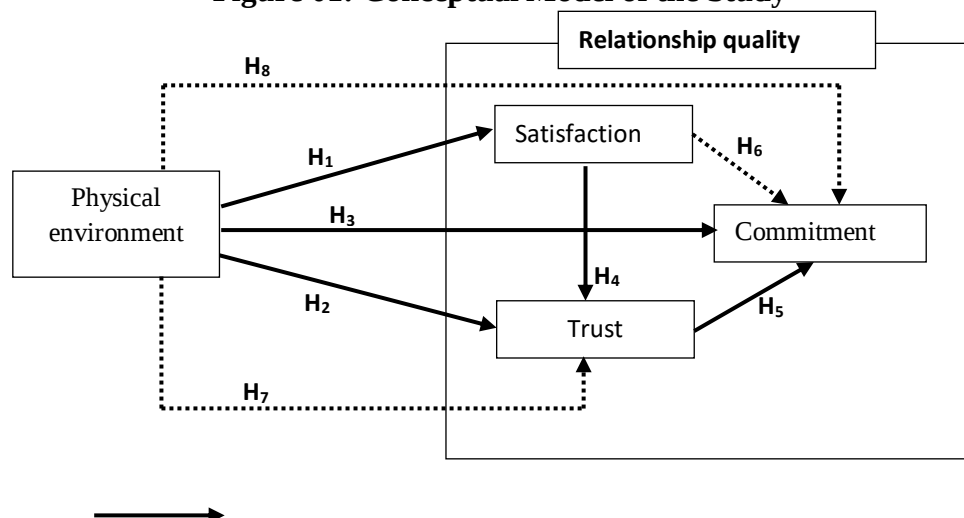
H6: There is a statistically significant relationship at the significance level ($\alpha \leq 0.05$) between customer satisfaction and commitment in hotel institutions in Algeria, with trust acting as a mediating variable.

H7: There is a statistically significant relationship at the significance level ($\alpha \leq 0.05$) between the physical environment of hotel institutions and customer trust, with satisfaction acting as a mediator.

H8: There is a statistically significant relationship at the significance level ($\alpha \leq 0.05$) between the physical environment of the hotel institution and customer commitment, with satisfaction and trust acting as two mediating variables.

Based on these hypotheses, we propose the study model illustrated in Figure 1.

Figure 01: Conceptual Model of the Study



Source : Prepared by the researchers

4. Research methodology

4.1. Study community and sample:

This study used a non-probability sampling method to select 300 respondents who were customers of classified hotel institutions (such as hotels, tourist complexes, holiday villages, hotel residences, motels and tourist camps) in Algeria, and who had spent at least one night in one of these institutions. Direct communication with the sample was established using a paper questionnaire, while indirect communication was conducted via electronic means using an online questionnaire to increase the sample size.

4.2. Study method:

This study employs a descriptive analytical approach, deemed the most suitable method for investigating the phenomenon in question. This approach not only describes the phenomenon, but also analyses its reality and interprets the results in order to draw significant conclusions, ultimately leading to an analysis of the phenomenon under study.

4.3. Sources and methods of data collection

Information was gathered from several sources, including:

- Primary sources: Literature review on the study topic, collecting results from various academic sources, and obtaining information from books, articles, conference proceedings, previous studies on the topic, specialised scientific and professional journals, and official publications. This informed the identification of the study problem and its hypotheses.
- Observation: To make a direct diagnosis of what occurs within the hotel institution, visits were made to various hotels of different classifications. This resulted in numerous observations about the hotel's physical environment (cleanliness and the overall appearance of staff), how guests were treated, customer impressions of hotel service and how quickly staff responded to customer requests.
- Questionnaire: Based on data and information gathered from previous studies and consultations with business management and marketing specialists, a questionnaire was formulated. Its questions were designed to be easy, clear and unambiguous, with closed responses to facilitate answering. A five-point Likert scale was used to evaluate the responses of the sample (customers), with the responses weighted as follows: Strongly Agree = 5, Agree = 4, Neutral = 3, Disagree = 2, Strongly Disagree = 1.

4.4. Statistical methods used:

SPSS v26 software was used to describe and analyse the characteristics of the study sample and their responses to the survey questions. The partial least squares (PLS) approach was employed in structural equation modelling (SEM) to analyse the relationships between variables using SmartPLS4 statistical software.

5. Description of the study sample characteristics:

Table 1 indicates the demographic characteristics of the study sample of 300 individuals, along with the frequencies and percentages of the demographic variables in terms of gender, age group, marital status and educational level.

Table 01: Characteristics of the Study Sample

Participant information	Survey response	Frequency	percentage	Participant information	Survey response	Frequency	percentage
Gender/sex	male	100	33.33 %	Marital status	Single	160	53.33 %
	female	200	66.67 %		Married	140	46.67 %
Age group	Under 30	107	35.67 %	Education level	Primary school	00	00.00 %
	30-39	100	33.33 %		Middle school	04	01.33 %
	40-49	71	23.67 %		High school	70	23.33 %
	50 or old	22	07.33 %		university	226	75.33 %

Source: Prepared by the researchers based on the results of SPSS v26.

By analysing the respondents' opinions using SPSS v26, we extracted the percentage of responses, the mean and the standard deviation.

Table 02: Presentation and analysis of the study sample members' answers

Factors	Strongly Disagree	Disagree	Neutrally	Agree	Strongly Agree	Mean	Std. Deviation	Rank
Physical Environment (Faizan & Muslim , 2014, p. 258), (Janet , Brenda, & David, 2006, p. 5).								
PE1 :The hotel establishment has a clean environment.	06	43	65	136	50	3.60	0.99	4
	%2.0	%14.3	%21.7	%45.3	%16.7			
PE2 :The hotel's architecture is impressive.	3	22	51	143	81	3.92	0.91	1
	%1.0	%7.3	%17.0	%47.7	%27.0			
PE3 :The colours within the hotel are integrated and harmonious.	00	38	48	154	60	3.78	0.91	2
	% 00	%12.7	%16.0	%51.3	%20.0			
PE4 :The appearance of the staff uniforms, colour scheme and	04	40	56	136	64	3.72	0.99	3
	%1.3	%13.3	%18.7	%45.3	%21.3			

sound effects blend together to create an elegant atmosphere.								
Satisfaction (Phil & Stan, 2013, p. 235).								
S1: I have very positive feelings towards the hotel's services.	06	37	38	157	62	3.77	0.97	3
	%2.0	%12.3	%12.7	%52.3	%20.7			
S2: I am satisfied with this hotel and find what I am looking for	07	44	65	132	52	3.59	1.01	4
	%2.3	%14.7	%21.7	%44.0	%17.3			
S3: Overall, I am satisfied with the hotel and its services	07	32	38	155	68	3.81	0.97	1
	%2.3	%10.7	%12.7	%51.7	%22.7			
S4: I am satisfied with my hotel experience.	06	33	47	149	65	3.78	0.97	2
	%2.0	%11.0	%15.7	%49.7	%21.7			
Trust (Dwayne , P. Santos, & Alexandra, 2004, p. 1276), (Vithya, 2017, p. 454)								
T1: Overall, I trust this hotel.	06	30	59	152	53	3.72	0.93	2
	%2.0	%10.0	%19.7	%50.7	%17.7			
T2: When the hotel suggests a new service, it is because it is the best option for me.	06	22	46	167	59	3.83	0.89	1
	%2.0	%7.3	%15.3	%55.7	%19.7			
T3: The hotel treats me fairly in all its services	07	42	61	131	59	3.64	1.02	3
	%2.3	%14.0	%20.3	%43.7	%19.7			
Commitment (Yang & Hao, 2019, p. 11)								
C1: I am proud to be a customer of this hotel.	06	51	50	147	46	3.58	1.00	3
	%2.0	%17.0	%16.7	%49.0	%15.3			
C2: I care about the long-term success of my relationship with the hotel.	03	33	47	168	49	3.75	0.89	1
	%1.0	%11.0	%15.7	%56.0	%16.3			
C3: I am willing to go the extra mile to remain a customer of this hotel.	03	41	61	143	52	3.66	0.95	2
	%1.0	%13.7	%20.3	%47.7	%17.3			

Source: prepared by the researchers based on the results of SPSS v26.

Table 2 shows that the majority of responses regarding the physical environment variable were 'Agree', with a high mean ranging between 3.60 and 3.92. This suggests that hotel institutions pay

attention to their physical service environment, including cleanliness, décor, the overall atmosphere of the hotel and the appearance of staff. The highest mean value, 3.92, was recorded for statement (PE2), which states that the architecture of the hotel institution is impressive. The second most popular statement was (PE3), indicating that the colours inside the hotel are cohesive and harmonious, with an average score of 3.78. Statement (PE1) ranked last, with an average score of 3.60 indicating that 186 individuals in the sample believed the hotel institution's environment was clean.

The satisfaction variable measures the overall satisfaction of the study sample with the services provided by the relevant hotel institutions, as well as their comprehensive evaluation of these services. The mean response to item (S1) was 3.77, with a standard deviation of 0.97. Therefore, the study participants expressed positive feelings towards the services provided by the hotel institutions, indicating that these institutions meet customer requirements. This is also indicated by item (S2), which had a mean score of 3.59 and a standard deviation of 1.01. The mean response to statement (S3) was 3.81 with a standard deviation of 0.97, showing that the study participants were generally satisfied with the services of the hotel institutions in question. Their overall evaluation of their experiences with these institutions, as indicated by statement (S4), had a mean of 3.78 and a standard deviation of 0.97.

Table 2 shows that the mean responses for the trust variable range from 3.64 to 3.83, indicating that sample members generally agree with all items measuring this variable. The most important statement is (T2), with a mean of 3.83, indicating that customers trust the new offers proposed by the hotel, as they believe it always considers their best interests. Statement (T1) ranked second with a mean of 3.72, affirming customer trust in hotel institutions because they are honest in all their dealings with customers. The mean for the final statement (T3) was 3.64.

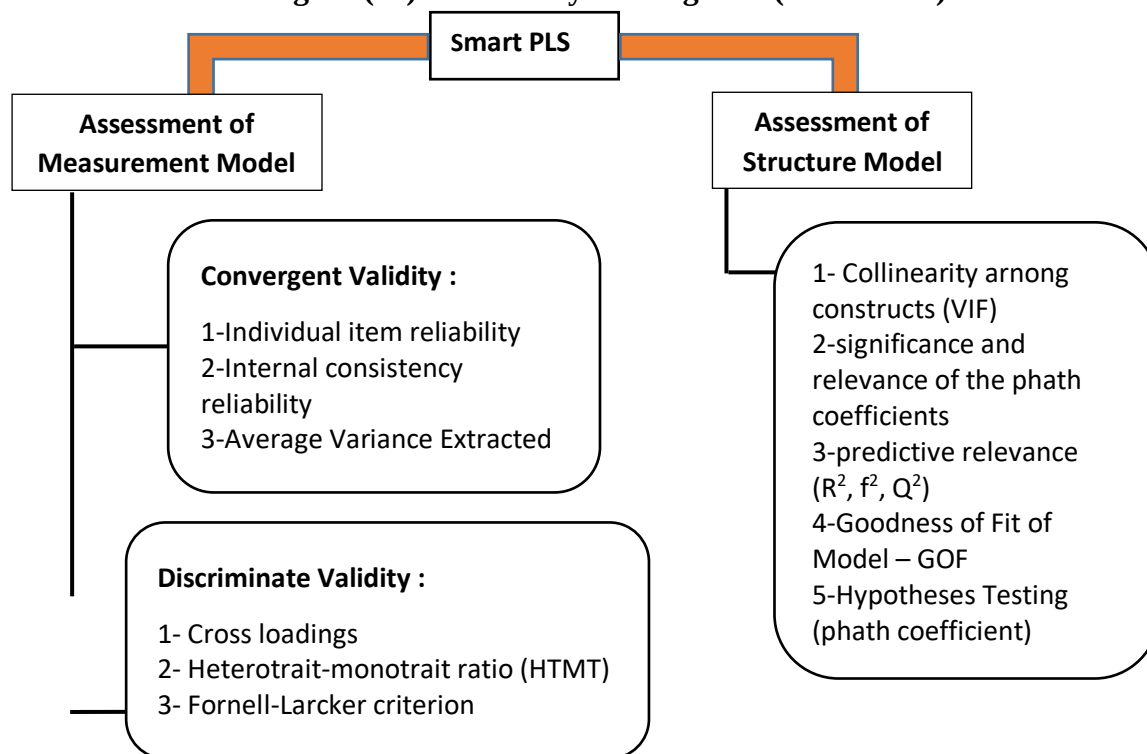
The commitment variable measures the responses of the study sample regarding their desire to maintain a long-term relationship with the hotel institution. The mean responses ranged from 3.58 to 3.75, indicating that sample members generally agree with all items measuring this variable. The most important statement is (C2), with a mean of 3.75, indicating that customers are interested in maintaining their relationship with the hotel institution and are willing to make an effort to do so. The mean for statement (C3) was 3.66, while statement (C1) ranked third with a mean of 3.58, indicating customers' emotional commitment.

6. Evaluation of the Measurement Models:

We will test the measurement model used by conducting reliability tests on the research questions (reliability tests) to ensure their ability to measure the intended variable (validity), as well as their capacity to measure under various conditions (reliability). This will be done by relying on the following: Indicator reliability, Internal consistency reliability, Convergent validity, Discriminant validity.

Additionally, we will examine multicollinearity among the variables by calculating collinearity statistics (VIF) and using the bootstrapping technique to evaluate the outer weights of the indicators involved in forming the variables, as well as examining the path coefficients. Finally, we will assess the model's goodness of fit (GoF) to determine its adequacy.

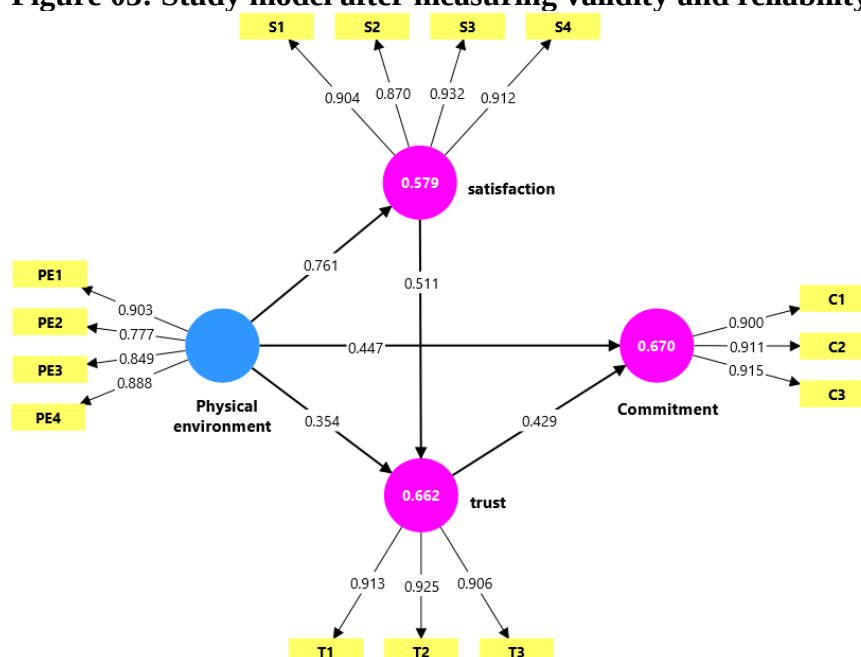
Figure (02): Data analysis using PLS (Smart PLS).



Source: Prepared by the researchers

After measuring validity and reliability, the evaluation of the study model resulted in Figure (03), which illustrates: Path coefficient, Outer weights/loading, R-square.

Figure 03: Study model after measuring validity and reliability



Source: SMART PLS 4 outputs

6.1. Reflective Measurement Model Evaluation

The reflective measurement model evaluation consists of a series of procedures to measure and assess the model, ensuring quality standards are met and the reliability of the indicators is verified, as well as the convergent and discriminant validity, as illustrated in the following table:

Table 3: Assessment of Reflective Measurement Model in SMART PLS 4

Criteria	Test	Threshold	Reference
Indicator reliability	Indicator loadings	≥ 0.70	(Henseler, Ringle, & Sinkovics, 2009)
Internal consistency reliability	Cronbach Alpha (a)	≥ 0.6 or 0.7 0.60-0.70 acceptable for exploratory research	(Cronbach, 1951)
	Composite reliability (rho_c)	≥ 0.6 or 0.7 0.60-0.70 acceptable for exploratory research	(Werts, Linn, & Jöreskog, 1974)
	Composite reliability (rho_a)	≥ 0.70	(Dijkstra & Henseler, 2015)
Convergent Validity	Average variance extracted (AVE)	≥ 0.5	(Fornell & Larcker, 1981)
Discriminant Validity	Cross loadings	An indicator's outer loading on the associated construct should be greater than any of its cross-loadings (i.e., its correlation) on other constructs.	(Hair, J.F, & et al, 2014)
	Heterotrait-monotrait ratio (HTMT)	≤ 0.90 The intersection point between the variable and the other variables must be less than 0.90 in the matrix	(Hair & al, 2021)
	Fornell-Larcker criterion	The square root of the AVE of each construct should be higher than its highest correlation with any other construct.	(Fornell & Larcker, 1981)

Source: Prepared by the researchers based on previous studies.

6.1.1. Reliability and Convergent Validity Assessment:

Convergent validity refers to the extent to which statements used to measure a variable or one of its dimensions converge by ensuring a strong and significant correlation between statements measuring the same variable. Table 4 shows that all the variables used in the study demonstrate reliability and internal consistency for the items they measure, as the outer loadings/weights, composite reliability, Cronbach's alpha and average variance extracted (AVE) values meet the required levels. Additionally, the variables satisfied all conditions for convergent validity.

Table 04: Validity and Reliability for Constructs

Item	Outer loadings	Outer weights	Cronbach's alpha	Composite reliability (rho_a)	Composite reliability (rho_c)	Average variance extracted (AVE)
Physical environment						
PE1	0,903	0,326	0,878	0,896	0,916	0,732
PE2	0,777	0,234				
PE3	0,849	0,270				
PE4	0,888	0,332				
Satisfaction						
S1	0,904	0,277	0,926	0,928	0,947	0,819
S2	0,870	0,257				
S3	0,932	0,278				
S4	0,912	0,292				
Trust						
T1	0,913	0,389	0,902	0,905	0,939	0,836
T2	0,925	0,353				
T3	0,906	0,352				
Commitment						
C1	0,900	0,342	0,894	0,898	0,934	0,825
C2	0,911	0,368				
C3	0,915	0,390				

Table 05: Heterotrait-Monotrait Ratio (HTMT) Matrix

	PE	S	T	C
PE				
S	0,828			
T	0,823	0,855		
C	0,850	0,728	0,841	

Source: Outputs of statistical analysis using Smart PLS4 software

6.1.2. Discriminant validity assessment:

Discriminant validity refers to the extent to which each dimension or variable differs from others. This is verified through the heterotrait-monotrait (HTMT) matrix, the cross-loadings matrix and extraction of the square root of the average variance extracted (Fornell–Larcker criterion).

The results in Table 5 indicate that the correlation coefficients between each variable and the other variables are significantly less than 0.9, demonstrating that discriminant validity is achieved according to the HTMT criterion.

Table 06: Cross Loadings

	PE	S	T	C
PE1	0,903	0,713	0,691	0,750
PE2	0,777	0,507	0,528	0,508
PE3	0,849	0,590	0,596	0,597

PE4	0,888	0,755	0,704	0,729
S1	0,674	0,904	0,722	0,609
S2	0,613	0,870	0,685	0,556
S3	0,686	0,932	0,715	0,586
S4	0,773	0,912	0,703	0,654
T1	0,756	0,686	0,913	0,776
T2	0,632	0,737	0,925	0,652
T3	0,643	0,721	0,906	0,653
C1	0,675	0,538	0,614	0,900
C2	0,677	0,639	0,714	0,911
C3	0,734	0,632	0,740	0,915

Source: Outputs of statistical analysis using Smart PLS 4 software

Table (06) shows that the loading factors of the variables on the factors did not fall below 0.7 and that no variable was significantly loaded onto more than one factor. Additionally, the saturation of each statement on the variable it measures is greater than its saturation on other variables. This indicates that all items of the variables are characterised by independence and belonging to the dimension they represent, demonstrating that all study variables possess conceptual validity.

Table 07: Fornell-Larcker criterion

	PE	S	T	C
PE	0,856			
S	0,761	0,905		
T	0,743	0,781	0,914	
C	0,766	0,666	0,762	0,908

Source: Outputs of statistical analysis using Smart PLS 4 software

From Table 07, we can see that the values on the diagonal of the matrix are the square roots of the average variance extracted for each variable. These values are greater than the correlation coefficients with other variables at row and column level. This indicates that the correlation of each variable with itself is greater than its correlation with the other variables, confirming the achievement of discriminant validity.

6.2. Structural Measurement Model Evaluation:

At this stage, the relationships between the internal and external latent variables in the model are clarified. This involves identifying dependent relationships based on theoretical assumptions and a set of indicators, as illustrated in Table 8.

Table 08: Assessment of Structural Measurement Model in SmartPLS4

Criterion	Test	Metrics and thresholds	Reference
(VIF) variance inflation factor	Collinearity between latent variables	Collinearity is not a problematic issue if $VIF < 5$	(Hair & al, 2021)
Significance and relevance of the path	Apply bootstrapping to assess the significance of the path coefficients on the ground of	1.65 (significant level at 10%) 1.96 (significant level at 5%)	(Hair, Ringle, & Sarstedt,

coefficients	t-values or confidence intervals. Assess the magnitude of path coefficients		2013)
(R²) Coefficient of determination	It represents the variance explained in each of the endogenous constructs and is a measure of the model's explanatory power	R ² >0.75substantial 0.75>R ² >0.5 moderate 0.50>R ² >0.25 weak R ² <0.25 Not acceptable	
(f²) Effect Size	F-Square is the change in R-Square when an exogenous variable is removed from the model	F ² >0.35 large effect 0.35 > F ² > 0.15 medium effect 0.15 > F ² > 0.02 small effect F ² < 0.02 no effect	(Cohen , 1988)
(Q²) Blindfolding and predictive Relevance	An indicator of the model's predictive power	Q ² >0 suggest that the model has predictive relevance for a certain endogenous construct Q ² ≤0 lack of predictive relevance	(Hair, Ringle, & Sarstedt, 2013)

Source: Prepared by the researchers based on previous studies.

6.2.1. Variance Inflation Factor (VIF):

From Table 9, we can see that all the VIF values between the constructs are less than the threshold value of 5. The same applies to all statements, indicating that there is no multicollinearity among the variables.

Table 9: Collinearity Statistics (VIF)

	VIF		VIF
PE1	3,444	PE -> S	1,000
PE2	2,033	PE -> T	2,375
PE3	2,479	PE -> C	2,233
PE4	3,194	S -> T	2,375
S1	3,170	T -> C	2,233
S2	2,577		
S3	4,321		
S4	3,499		
T1	2,682		
T2	3,272		
T3	2,782		
C1	2,631		
C2	2,736		
C3	2,687		

Source: outputs of statistical analysis using SmartPLS 4 software.

6.2.2. Analysis of Q² and R² values:

From Table 10, we can see that all R² values are between 0.5 and 0.75, indicating moderate values. Additionally, the Q² values (0.575, 0.546 and 0.582) are greater than zero, demonstrating that the model has predictive validity.

We will discuss the path coefficients and the effect size (f²) when analysing the results and testing the hypotheses.

Table (10): Measuring Predictive Relevance

	R-square	R-square adjusted	Q ² predict
Satisfaction	0.579	0.578	0.575
trust	0.662	0.660	0.546
Commitment	0.670	0.668	0.582

Source: outputs of statistical analysis using Smart PLS 4 software.

6.3.3. Model Fit Assessment:

It is essential to examine the overall quality of the research model using the Goodness of Fit (GoF) index, as this is a key value for testing the PLS model. Wetzels and Odekerken (2009, p. 187) proposed the following formula for deriving GoF:

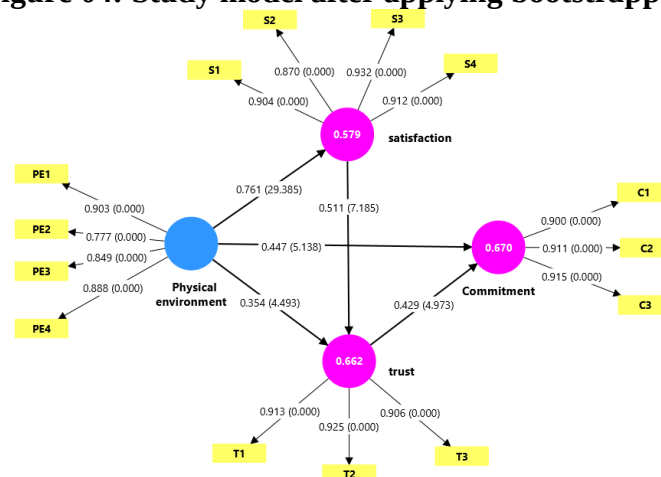
- If $GoF < 0.36$, the model is inadequate.
- If $0.36 \leq GoF < 0.50$, the model is of poor quality.
- If $0.50 \leq GoF < 0.70$, the model has moderate quality.
- If $GoF \geq 0.70$, the model has high quality.

Since our calculated GoF value is significantly higher than 0.36 at 0.641, this indicates that the model fits the data strongly and excellently. This means that the model can explain the dependent variables and their variances well, and there is good agreement between the model and the observed data.

7. Results of Hypothesis Testing:

Using the bootstrapping technique in partial least squares structural equation modelling (PLS-SEM) with SmartPLS4 allowed us to obtain the path coefficients shown in Figure 4, along with their statistical significance values (t-values). The figure also illustrates the R² coefficients for the dependent variables (satisfaction, trust and commitment), as well as the outer weights/loadings and p-values for the statements used to measure the variable.

Figure 04: Study model after applying bootstrapping



Source: SMART PLS4 outputs

After ensuring there is no multicollinearity among the constructs (VIF), evaluating the adequacy of the path coefficients and confirming the values of the confidence intervals (CI) and effect size (F^2), we will test the hypotheses. The alternative hypothesis will be accepted if the following two conditions are met: the α value is statistically significant and the T-value is greater than 1.96 at the 0.05 significance level. If either condition is not met, the null hypothesis is accepted.

7.1. Analysis of Direct Relationships

Table 11: Specific Direct Effects

Hypothesis	Path	Original sample (O)	T statistics (O/STDEV)	P values	Confidence intervals 95%	f-square	Supported ?
H ₁	PE -> S	0,761	29,385	0,000	[0,707-0,809]	1,375	YES
H ₂	PE -> T	0,354	4,493	0,000	[0,202-0,508]	0,156	YES
H ₃	PE -> C	0,447	5,138	0,000	[0,273-0,609]	0,272	YES
H ₄	S -> T	0,511	7,185	0,000	[0,369-0,647]	0,326	YES
H ₅	T -> C	0,429	4,973	0,000	[0,268-0,605]	0,250	YES

Source: Outputs of statistical analysis using Smart PLS 4 software.

Based on Table 11, the results of the sub-hypotheses can be interpreted as follows:

The effect sizes (F^2) of the physical environment on satisfaction, trust and commitment are 1.375, 0.156 and 0.272 respectively, all of which are greater than 0.02. This indicates that the physical environment impacts the dimensions of relationship quality, with satisfaction being the most affected. Furthermore, the T-values and path coefficients are positive and the P-value is 0, which is less than the maximum threshold of 0.05. This indicates that the confidence intervals (CI) do not include zero. Therefore, the physical environment of hotel establishments in Algeria has a significant positive effect on the dimensions of relationship quality. Consequently, we accept the following sub-hypotheses:

H1: There is a statistically significant effect of the physical environment of hotel establishments in Algeria on customer satisfaction at the $\alpha \leq 0.05$ level.

H2: There is a statistically significant effect of the physical environment of hotel establishments in Algeria on customer trust at the $\alpha \leq 0.05$ level.

H3: There is a statistically significant effect of the physical environment of hotel establishments in Algeria on customer commitment at the $\alpha \leq 0.05$ level.

The estimated path coefficient from satisfaction to trust is 0.511, with a T-value of 7.185, which is greater than the critical value of 1.96. The p-value is 0, which is less than the maximum threshold of 0.05, indicating that the confidence intervals (CI) [0.369, 0.647] do not include zero. The effect size (F^2) is 0.326, which is greater than the required minimum value of 0.02. This shows that satisfaction moderately explains the variance of the trust variable. Therefore, we accept the following sub-hypothesis:

H4: There is a statistically significant effect of customer satisfaction in hotel establishments in Algeria on trust at the $\alpha \leq 0.05$ level.

Trust has a significant positive effect on commitment, with a moderate effect size of 0.250. The path coefficient is positive (0.429) with a T-value of 4.973 and a P-value of 0; all of these meet the measurement conditions. Thus, we accept the following sub-hypothesis:

H5: There is a statistically significant effect at the $\alpha \leq 0.05$ level of customer trust in hotel establishments in Algeria on commitment.

7.2 Analysis of Indirect Relationships:

We will analyse the impact of the mediator variable on the relationship between the study variables. It is important to mention the types of mediation represented (Hair et al., 2021, p. 142):

- Complementary mediation: The indirect and direct effects are both significant and point in the same direction.
 - Competitive mediation: the indirect and direct effects are significant, but point in opposite directions.
 - Indirect-only mediation: the indirect effect is significant, but not the direct effect.
- Additionally, they identify two types of non-mediation:
- Direct-only non-mediation: the direct effect is significant, but not the indirect effect.
 - No-Effect Non-Mediation: Neither the direct nor the indirect effect is significant.

Table (12): Specific Indirect Effects

	Original sample (O)	T statistics (O/STDEV)	P values	Confidence intervals 95 %	Type of mediation
S -> T -> C	0,220	4,998	0,000	[0,136-0,305]	Indirect-only mediation
PE -> S -> T	0,389	6,873	0,000	[0,280-0,499]	Médiation complementary
PE -> T -> C	0,152	2,860	0,004	[0,066-0,272]	
PE -> S -> T -> C	0,167	4,677	0,000	[0,101-0,237]	

Source: Outputs of statistical analysis using Smart PLS 4 software.

Table 12 shows that the path coefficient for ‘satisfaction → trust → commitment’ is 0.220, while the T-value is 4.998, which is greater than the threshold of 1.96. The p-value is 0, which is less than the maximum threshold of 0.05. The confidence interval [0.136, 0.305] does not include zero. Thus, trust mediates the relationship between customer satisfaction and commitment. As there is no direct effect of satisfaction on commitment, and an indirect effect through trust, the type of mediation is classified as indirect-only mediation. Therefore, we accept the following sub-hypothesis:

H6: There is a statistically significant effect at the $\alpha \leq 0.05$ level of customer satisfaction on commitment in hotel establishments in Algeria, with trust as a mediating variable.

There is an indirect relationship between the physical environment of the hotel establishment and customer trust, mediated by satisfaction. Additionally, there is an indirect relationship between the physical environment of the hotel establishment and customer commitment, mediated by satisfaction and trust. Since the direct effects are also significant, the type of mediation is classified as complementary mediation.

Table 13: Total Effects

Hypotheses	Path	direct effects(O)	Indirect effects(O)	Total effects (O)	T statistics (O/STDEV)	P values	Supported ?
H ₆	S ---> C	-	0,220	0,220	4,998	0,000	YES
H ₇	PE ---> T	0,354	0,389	0,743	19,269	0,000	YES
H ₈	PE ---> C	0,447	(0,152+0,167)=0,319	0,766	20,969	0,000	YES

Source: Outputs of statistical analysis using Smart PLS4 software

The indirect effect has resulted in a change in the strength of the relationships between the variables, while the direction of the relationships remains positive. This is illustrated by the total effect in Table 13 as follows:

The strength of the relationship between the physical environment of the hotel establishment and customer trust increased from 0.354 to 0.743, with an indirect effect value of 0.389 through customer satisfaction as a mediating variable. As the direction of the relationship remains positive, we accept the following sub-hypothesis:

H7: There is a statistically significant effect at the $\alpha \leq 0.05$ level of the physical environment of the hotel establishment on customer trust, with satisfaction as a mediating variable.

Similarly, the strength of the relationship between the physical environment of the hotel establishment and customer commitment increased from 0.447 to 0.766, with a value of 0.319 representing the indirect effect through both customer satisfaction and trust as mediating variables. The direction of the relationship remains positive; therefore, we accept the following sub-hypothesis:

H8: There is a statistically significant effect at the $\alpha \leq 0.05$ level of the physical environment of the hotel establishment on customer commitment, with satisfaction and trust acting as mediating variables.

8. Conclusion:

When addressing the impact of the physical environment on the relationship quality between Algerian hotels and their customers, our aim was to demonstrate the role of the physical service environment in achieving customer satisfaction, fostering trust and cultivating long-term commitment. For the sake of accuracy and reliability of information, we discussed the topic from the customer's perspective rather than that of hotel establishments, as customers are the primary stakeholders.

Field visits to some hotel establishments and interviews with relevant parties revealed that, though to varying degrees, hotels pay attention to the physical environment. Statistical analysis of the data and the field study produced the following results:

There is a relationship between the physical environment and relationship quality. However, this relationship has many nuances due to the existence of dimensions of the variable 'relationship quality', which lead to variations in the degree of influence and response of these dimensions.

There is a significant positive relationship between the physical environment and the dimensions of relationship quality (satisfaction, trust and commitment) in Algerian hotels. The model successfully explained 57.9%, 66.2% and 67% of the variance in the dependent variable, respectively.

Customer satisfaction is the dimension of relationship quality that is most affected by the physical environment. The design of buildings, cleanliness, and staff appearance are important physical factors that distinguish one service provider from another, contributing to a positive customer impression.

Trust mediates the relationship between satisfaction and customer commitment. When customers trust a hotel, they feel comfortable and reassured; their perceived risks regarding future experiences decrease; and they are more willing to commit to and return to the hotel.

Including satisfaction as a mediating variable in the relationship between the physical environment (the independent variable) and customer trust (the dependent variable) strengthened this connection.

Including both satisfaction and trust as mediating variables in the relationship between the physical environment (the independent variable) and customer commitment (the dependent variable) strengthens this relationship.

9. Recommendations:

Based on the results obtained, we present the following suggestions, which we consider essential for hotel establishments in particular:

- Maintain high standards of cleanliness, ensuring pleasant aromas and modern décor.

- Use soundproofing materials in rooms and corridors to ensure quietness and privacy for guests.
- Uniform appearance of staff: Ensure that all staff wear clean, well-pressed uniforms to create an impression of professionalism and order.
- Integrate smart control systems for lighting, curtains and temperature to enhance customer comfort and provide a modern experience.
- Introduce natural elements: Incorporate natural elements, such as plants and flowers, into the interior and exterior design of the hotel, as these have a positive impact on the overall mood.

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