Smooth or sticky? An analysis of service variability

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Abstract

This study examines the impact of service variability on customer perceived service quality across various stages of the customer experience journey. Through a behavioral experiment, the findings reveal that the overall perceived service quality is influenced by the interplay between the mean and variability of service quality. Positive variability can elevate service quality at specific phases, yet its impact is contingent on the average service level. Moreover, the order in which positive and negative variability occur contributes to shaping overall perception. The research also indicates that new guests are more susceptible to variability than repeat customers. This study enriches the debate between consistency and unpredictability in service offerings, providing valuable insights to refine tourism service design and enhance overall customer satisfaction.

Keywords: Tourism design; Service quality; Customer experience journey; Consistency: Variability; Service management.

1. Introduction

Delivering consistent quality service is a central pursuit across tourism and hospitality industries, yet inherent variability of service challenges this goal. When service fluctuates across touchpoints in a customer's experience journey, does this variability excite customers with novel peaks or erode loyalty through unstable valleys? In industry practice, two dominant models have emerged for managing customer experience journeys - the "smooth" model and the "sticky" model (Siebert et al., 2020). The smooth model, which prioritizes consistency and predictability in customer experiences, posits that consistent experiences can build customer loyalty over time (Kuehnl, Jozic, & Homburg, 2019; Surprenant & Solomon, 1987). In contrast, the sticky model focuses on offering customers unpredictable and effortful journeys to keep them excited and engaged (Shen, Hsee, & Talloen, 2019), which maybe have positive variability in service (i.e., positive deviation from average service level). The Ritz-Carlton is a good example of how variability can be embraced to create a unique and memorable guest experience. By moving away from its highly prescriptive and rigid "20 rules" for customer service, Ritz-Carlton adopted a more flexible and improvisational approach based on 12 service values (Ritz-Carlton, 2022).

Unlike the sticky model, consistency is the primary focus of the smooth model, however, it is challenging for firms to deliver consistent service in every phase of the customer journey every time, particularly in a multi-agent and multi-phase service environment such as hotels, where variability in service is inevitable (Lee et al., 2017). In service management literature, variability is often defined as the fluctuating quality levels among multiple service encounters or multi-phase, and it can be measured by the dispersion or deviation from the mean, i.e., average service quality level (Lee et al., 2017; Sriram, Chintagunta, & Manchanda, 2015). While the sticky model highlights the advantages of high variability. But it is important to note that variability can take both positive and negative forms, i.e. the two directions of deviation from the mean.

Previous studies have examined the impact of service variability on customer behavior, such as perceived quality and retention rates. For example, Sriram et al. (2015) noted that services with low variability had a greater impact on retention. Voorhees et al. (2021) found

that increasing variability can erode customer confidence in service quality. Several studies showed that high variability can lead to fluctuations in customer beliefs, including downwardly biased beliefs about quality (DeCroix, Long, & Tong, 2021; van Ewijk, Gijsbrechts, & Steenkamp, 2022). While experiences at each phase of a customer journey may contribute to overall quality perceptions (Bellos & Kavadias, 2020), it is still unclear how positive and negative variability at different phases of the customer journey influence overall quality perceptions (Yang, Xu, & Jin, 2021).

In addition, to gain a holistic view of the customer experience journey, it is important to take into account the multiple cycles of services that customers have experienced (Zomerdijk & Voss, 2010). Inexperienced customers are at the initial service cycles, and therefore may be unsure of what level of service to expect. They may be more sensitive to any fluctuation in service quality. In contrast, experienced customers have gone through multiple service cycles, so they are more familiar with the services and can expect what the level of service is. The existing empirical literature has yet to investigate the role of the cycle of customer experience in the impact of service variability, i.e., experienced customers may exhibit lower sensitivity to the impact of variability.

This study examines the debate around consistency versus variability in service quality across the customer experience journey in tourism and hospitality industries, standing at the intersection between tourism operations and subjective customer experiences (Tomej & Xiang, 2020). Specifically, it investigates how positive and negative deviations from average service levels across different phases of the customer journey shape overall perceived quality and loyalty over time, considering both the smooth and sticky models (Siebert et al., 2020). In doing so, it aims to provide clarity on how to design tourism services and align operations to positively impact customers' subjective evaluations and build loyalty across early and later cycles of their experience journeys (Zomerdijk & Voss, 2010). Key questions include the interaction of average service and variability, the asymmetric impact of positive versus negative fluctuations, and differences for inexperienced versus experienced customers.

The study makes several key contributions to research on tourism service design and customer experience management (Gao et al., 2022; Lalicic et al., 2021; Pearce & Zare, 2017;

Stienmetz et al., 2021; Tomej & Xiang, 2020; Tussyadiah, 2014). First, it clarifies the ongoing debate between consistency and variability models by delineating the distinct impacts of positive versus negative deviations from average service levels. In particular, it uncovers that exceedingly high variability - in either direction - can negatively impact perceived quality. Second, it highlights the importance of the customer journey sequence, revealing that positive variability may temporarily raise expectations and perceived variance. Third, it differentiates between impacts on inexperienced versus experienced customers, who perceive variability differently depending on their stage in the service lifecycle. These findings provide guidance on calibrating operations and effectively managing customer expectations to enhance loyalty across the subjective customer journey. The study advances an integrated understanding of how alignment between backstage tourism operations and frontstage customer experiences evolves over cycles (Tomej & Xiang, 2020; Tussyadiah, 2014).

2. Theoretical background

2.1. Customer experience journey

To design optimal experiences, tourism and hospitality service providers must actively capture, integrate, and learn from data of customer experience along the experience journey (Stienmetz et al., 2021; Wong et al., 2024). A customer experience journey refers to the ongoing experience a customer has with a business or service provider across the various phases of a service cycle (Følstad & Kvale, 2018; Siebert et al., 2020), which has gained significant traction in recent years (Siebert et al., 2020). The customer experience journey can be broken down into distinct phases, each with its own set of touchpoints, interactions, and customer expectations. These phases are typically categorized as pre-purchase, purchase, and post-purchase (Cain, 2022; Homburg, Jozić, & Kuehnl, 2017) or as pre-core, core, and post-core service encounters (Voorhees et al., 2017). According to Voorhees et al. (2017), pre-core encounter is the period before the core service encounter, during which customers engage with the firm in various ways, such as seeking information, asking questions, and onboarding processes, e.g., check-in in hotel. Core service encounter is the delivery of the primary service offering, fulfilling their foundational need, e.g., the accommodation in a hotel. The focus is on interactions between customers, employees, technologies, and the service environment (Pan et

al., 2025). Post-core encounter is the period following the core service encounter, during which consumers assess and act on their experience in the previous two periods. The firm's goal during this period is to retain customers and improve future service experiences. Effective actions in the post-core service period can extend the experience loop into future pre-core service encounters, starting the next cycle of service experience (Voorhees et al., 2017).

Customer experiences evolve over multiple service cycles, with each cycle representing a new purchase or interaction (Lemon & Verhoef, 2016). Customers update their perceptions of service quality based on their prior cycles of interactions with a service. Therefore, a long-term view of customer experience journey includes both the multiple phases of a service cycle and the multiple cycles of repurchase and re-consumption (Zomerdijk & Voss, 2010).

2.2. The smooth model and the sticky model

The smooth model and the sticky model offer two distinct viewpoints on customer experience journeys (Siebert et al., 2020). The smooth model argues for consistency and predictability, to help customers reduce cognitive effort, increase the sense of control, and minimize risk (Kuehnl et al., 2019; Surprenant & Solomon, 1987). This model assumes that consistency and predictability are important for customer satisfaction and loyalty, and that minimizing cognitive effort and reducing risk can lead to a positive customer experience (Baker & Crompton, 2000). In contrast, the sticky model argues that uncertainty about what is next in the customer journey can keep customers engaged and invested in the experience, as the suspense and need for resolution can be exhilarating (Shen et al., 2019). This model suggests that a cyclical pattern of unpredictable experiences, conceptualized as an involvement spiral, can increase customer involvement over time. It is suggested that the smooth model is suitable for instrumental services that aim to fulfill specific jobs, and the sticky model is more suitable for recreational services that enable an endless exploration of experiences (Siebert et al., 2020).

The smooth model and sticky model both have their own set of challenges when it comes to managing customer experience journeys. The smooth model aims for consistency throughout the customer journey, which can be difficult to achieve in practice. Service quality may inevitably vary due to factors such as changes in personnel, changes in processes or technology, and other unpredictable events (Pan et al., 2025; Wong et al., 2023). On the other hand, the

sticky model aims to create excitement and enthusiasm among customers through a high degree of variability in the service experience, it carries the risk of customer disappointment or frustration in the case of negative variability (Siebert et al., 2020).

2.3. Service variability

The term "variability" is used by scholars to refer to the changes or fluctuations in the levels of service quality, which is a concept borrowed from the field of operations management (Frei, 2006; Morris & Johnston, 1987). Service variability is typically measured by the deviation from the mean quality, where a service's mean quality is the average level of service performance, often assessed through the average of all customer ratings (Sun, 2012). In fact, there are two directions for fluctuations: one is positive, meaning the deviation from the mean quality is positive, indicating that the perceived service quality is greater than the mean quality; the other is negative, indicating that the deviation from the mean quality is negative, and the perceived service quality is below the mean quality.

Research into service variability can be traced to the early studies on the heterogeneity problems in labor-intensive services (Zeithaml, Parasuraman, & Berry, 1985). In a customer experience journey, variability may result from differences in employees' professionalism, proficiency, attitudes, and emotions (Boulding, Kalra, & Staelin, 1999; Lee et al., 2017; Wong et al., 2023). Even for the same employee, her/his service performance may still vary across different service encounters with customers (Shi, Gordon & Tang, 2021; Wong et al., 2023). Customers are also a contributing factor to variability, due to the heterogeneity of their experiences, preferences, communication skills, mood, ability to provide accurate information, and willingness and ability to participate in the service process (Frei, 2006; Bai et al., 2023). Frequent variability during the early phases of service delivery can give rise to uncertainty about what to expect in the future, potentially leading to anxiety and an increased perception of risk in subsequent encounters (Voorhees et al., 2021). Customers frequently link variability with risk and uncertainty, which may negatively impact their assessment of the service (Kannan & Proença, 2010). The cumulative effect of variability may further propagate and ultimately influence the overall perceived quality of the service.

2.4. Expectation and disconfirmation

Service quality is about customer expectations and disconfirmation (Parasuraman, Zeithaml, & Berry, 1994). Customers typically evaluate the quality of a service by comparing their preconceived expectations of the service to their actual experience of it (Wang et al., 2023). This process, called disconfirmation, occurs when a customer's perception of the service quality is different from what they anticipated (Venkatesh & Goyal, 2010). The sequence of cause and effect is as follows: first, customers are exposed to information about the performance characteristics of a service, which leads to the formation of specific expectations. Second, customers evaluate the service subjectively by comparing their expectations with their actual experiences. Finally, the overall perceived quality of a service is determined by a combination of expectations and disconfirmation (Oliver, 1980).

Two types of disconfirmation exist, namely positive disconfirmation, which refers to better-than-expected outcomes, and negative disconfirmation, which refers to worse-than-expected outcomes (Oliver, 1980). When customers believe they deserving of certain benefits from the service, they will be disappointed when their expectations are not met (Venkatesh & Goyal, 2010). The mechanism by which disconfirmations arise in customers' decision-making is through perceived risk about future service, which can be linked to standard variation in statistics. The study's focus is on customer-perceived variability, which relates to potential future outcomes. Therefore, when evaluating overall perceived service quality, it is essential to consider the impact of service variability in conjunction with mean phase service quality.

2.5. Hypothesis development

Customers formulate their perceived service quality during a service encounter, influenced by the diverse service qualities experienced, ultimately contributing to an overall perceived service quality (Ojasalo, 2008). This perception is directly shaped by the experience of delivered service quality, which is based on service expectations. Delivered service quality represents the actual level of quality provided by a service enterprise, independent of customer perception. It is determined by the behavioral willingness and service ability of providers, subject to fluctuations due to uncontrollable factors (Boulding et al., 1999). The mean of perceived service quality represents the average assessment customers make across different phases of the service process, integrating their overall experiences and expectations. In a multi-

phase service process, customers promptly assess perceived service quality based on expectations and delivered service quality during each phase (Sivakumar et al., 2014), adjusting expectations as they progress.

The quality evaluation process begins in the initial phase and evolves through subsequent phases, forming 'evaluated aggregated quality' perceptions of the overall experience. However, customer behavior is influenced by the mean service quality and the variability in each phase (Sriram et al., 2015). Analyzing the mean of service perception helps gauge the overall level of service quality, while the variance reflects the stability and consistency of the service. Tsikriktsis and Heineke (2004) explored the impact of process variability on customer dissatisfaction, finding that the relationship depends on the overall quality level of the enterprise. Additionally, an interaction effect may exist between variability (i.e., the deviation of a customer's rating of a service from the average customer rating) and mean quality (i.e., the average customer rating) on decision-making (Sun, 2012).

While excellent delivered service quality (above-average service level) can enhance beliefs about future service, variability in past service quality experiences introduces potential uncertainty into this expectation (Voorhees et al., 2021). Consequently, an increase in variability across accumulated experiences with a service provider can undermine consumer confidence in the consistency of delivered service quality (Voorhees et al., 2021). Thus, the variability in delivered service quality at each phase influences the formation of both perceived service quality in the current phase and expectations for the next phase. The cumulative variability of multi-phase service processes continues to propagate as the service task unfolds. In summary, both the mean and variability in service quality impact overall perceived service quality, forming the basis for the following hypothesis:

H1: The interaction between the mean and variance of perceived service quality influences overall customer-perceived service quality.

The relationship between a consumer and a service provider constantly evolves as the consumer gains experience (Voorhees et al., 2021; Bai et al., 2024). Through ongoing tasks and access to external information, customers gradually develop an understanding of service provisions and form expectations about prevailing quality levels. In other words, customers

become increasingly sophisticated as their experience grows, and this accumulated information helps reduce variability (Helson, 1964).

In this context, Sivakumar, Li, and Dong (2014) proposed perceived service quality as a function where initial quality variability has a significant effect on consumer evaluations, but this effect flattens after an initial shock. Cumulative variability in service quality over multiple tasks and across accumulated experiences reduces consumer confidence, as the consistency of service delivery may be questioned (Voorhees et al., 2021). Positive variability (i.e., positive deviation from the average service level) enhances consumer confidence, while negative variability may carry more weight in influencing overall satisfaction compared to positive variability in the same context (Kahneman & Tversky, 1979; Sivakumar et al., 2014). Moreover, negative variability increases the perception of risk (Ostrom & Iacobucci, 1998) and diminishes customer satisfaction (Golder, Mitra, & Moorman, 2012), indicating that negative variability in service quality encounters affects customer perceptions more than positive variability (Kahneman & Tversky, 1979). Therefore, the following hypothesis is proposed:

H2: The positive and negative variability have different impact on perceived service quality.

Inexperienced and experienced customers perceive variability during a service task differently. Specifically, experienced customers are inherently more familiar with the service provision, possessing a relatively good understanding and expectation of what the service entails. Service providers tend to maintain strong relationships with them and these stronger relationships likely have a significant impact on variability perceptions (Voorhees et al., 2021). As customers accumulate more experience, their expectations of the service evolve over multiple service cycles (Voorhees et al., 2021). They become more sophisticated and less sensitive to variability in service (Helson, 1964). Therefore, inexperienced and experienced customers may perceive the same service variability differently.

Experienced customers are typically more familiar with the service and have a better understanding of what to expect, making them less sensitive to minor fluctuations in service quality (Boulding et al., 1999). In contrast, inexperienced customers are less familiar with the service and often lack a clear reference point to judge variability (Golder et al., 2012), making

them more sensitive to fluctuations, and their perception of service quality appears relatively volatile (Golder et al., 2012). A perceived loss or gain by experienced customers is expected to have a relatively weaker effect on perceived service quality than inexperienced customers (Boulding et al., 1999). This leads us to the following hypothesis:

H3: During a service cycle, inexperienced customers perceive the variability in service quality in multi-phase to a greater extent than experienced customers.

3. Research design

A behavioral experiment was designed that simulates a three-phase customer experience journey in the hotel services context, including the check-in experience (pre-core, onboarding encounter), the accommodation experience (core encounters), and the check-out experience (post-core encounter, Figure 1). The experiment was conducted in a boutique hotel in Shanghai in China as a scenario. Prior to the main experiment, the experimental stimulus was refined through a pre-experiment to ensure its reliability. The main experiment assessed the relationship between the mean and the variability of the delivered service quality at each phase, as well as the final overall perceived service quality.

(Insert Figure 1 About Here)

3.1. Pre-test

3.1.1. Experimental scenario

The key events affecting the evaluation of customer-perceived service quality was first identified from online comments by real hotel customers. Critical incident technique was utilized for recording and analysis. The purpose was to replicate a real hotel accommodation context as much as possible, including the safety and integrality of the hotel's ancillary facilities and equipment, cleanliness, noise level, and staff responsiveness. These features were arranged in a vignette as shown in Figure 1 (E indicates the customer's expectation, while DSQ and PSQ represent the delivered and perceived service quality, respectively, across the three phases). Eight faculty members specializing in hospitality studies reviewed the design and content of the experimental scenarios and provided feedback, which yielded the final scenarios for use in the experiment.

3.1.2. Scenario design

To increase the real-life feature of the simulation, the following three approaches were assessed to determine the scenario design (Lerner, Li, & Weber, 2012): a) text description, b) video (capturing scenarios that hotels utilize to train their staff) plus text description, and c) scene and role play. To determine the effect of the three approaches, 30 postgraduate students (with an average age of 24 years) participated in the pre-text. The participants were asked to evaluate the three approaches via a 5-point Likert scale anchored at "very bad" (value=1) and "very good" (value=5). An independent sample test was performed to assess whether there were significant differences between the three approaches, yielding significant differences at the 0.01 level (p=0.003). The mean and standard deviation of the three presentation methods are 2.335 and 0.670, 3.827 and 0.918, 4.077 and 1.490, respectively. Given the text description approach could be biased and the high cost of the role play approach, the video plus text approach was chosen for the main experiment (Bai et al., 2023).

3.1.3. Inexperienced versus experienced customers

Following Childers et al. (2001), participants at different cycles of service experience were divided into two groups: inexperienced customers (i.e., customers who had stayed in a hotel up to three times) and experienced customers (i.e., customers who had stayed in a hotel more than three times). To determine the feasibility of the grouping, 30 graduate students (with an average age of 25 years) were recruited to participate in a pre-test to test for significant differences between the two types of customers according to their actual hotel stays. In addition, the formation of initial expectations is controlled for by the hotel brand, opinions about the hotel price, and online reviews. Specifically, all participants answered three questions without any prior information: sorting currently well-known boutique hotels, expressing their opinions on the provided price, and indicating their personal consumption frequency at the target hotel.

The Kruskal-Wallis test was used to test for significant differences between the two types of customers (McDonald, 2014), with the result suggesting that the difference in hotel brand recognition between inexperienced customers and experienced customers was statistically significant (p =0.013<0.05). Tests were conducted to determine whether there were any significant differences in (1) customers who had stayed in a hotel more than three times, (2)

customers who had stayed in a hotel more than four times, and (3) customers who had stayed in a hotel more than five times. The comparison indicated that the overall distribution of the three groups is the same, and there is no significant difference among them (p=0.266). This provides support for the groupings. Further tests showed that the differences between the participants' views on prices and the formation of initial expectations were not statistically significant (p=0.190 and p=0.311, respectively).

3.2. The experiment

3.2.1. Sample and data

An ideal true experiment would involve respondents experiencing each phase firsthand and providing feedback throughout the process. Such field experiments, however, are often prohibitively costly and challenging to execute. Consequently, to address these constraints, a total of 1260 senior undergraduate students majoring in hotel management from Fuzhou, Quanzhou, and Xiamen in Fujian Province, China, participated in the experiment. Their average age is 23 years old, with 36% of males and 64% of females.

Their average age is 23 years old, with 36% of males and 64% of females. This specific sample was chosen because their specialized training in hotel management provides relevant insights into the industry-specific scenarios being tested. Their familiarity with the subject matter enhances the reliability of the feedback and ensures that the results are applicable to real-world contexts within the hospitality industry. This approach balances the need for practical implementation with the goal of obtaining valid and applicable data.

They were assigned to eighteen different experimental scenarios (3x3x2=18 scenarios), as outlined in Table 1. With 154 questionnaires being deemed unusable, due to incomplete responses or failing validity checks, a final number of 1116 valid questionnaires served as the foundation for the analysis, with each scenario having at least 40 records.

(Insert Table 1 About Here)

3.2.2. Procedure

Participants were informed that the experiment's purpose is to better understand how hotel service quality is perceived. A brief video with the hotel's advertising and the service evaluation

information on the online travel agent's website was then shown. They were then asked to evaluate their expectation of the hotel service.

Participants were asked to consider the situation as illustrated in a video shown, and then capture their perceived service quality at each phase (check in (A), accommodation (B), check out (C)), together with their expectations for the next phase. The specific scenarios are provided in the appendix. Participants were asked to indicate the number of times they have stayed in a hotel in recent three years. In the end, participants were asked to evaluate the overall perceived service quality. In addition, participants were asked to provide relevant demographic information and their thoughts on the experimental purpose.

3.2.3. Experimental design

The experimental design is a three-phase customer journey of hotel service. Phases A, B, and C represent the three phases of check-in, accommodation, and check-out, respectively. The delivered service quality in Phases A and B is assessed at three levels: low (value=1), indicating poor quality of facilities and staff performance (e.g., for accommodation this could be an unclean room or poor service attitude of the staff); moderate (value=2), indicating acceptable quality; and high (value=3), indicating excellent quality. The assessment of delivered service quality in Phase C included two levels (high and low). The different levels of delivered service quality in the three phases were randomly combined, as shown in Table 2, which also shows the mean number of experiences for each cell.

The experimental design also allowed us to study the impact of positive and negative variability on subsequent perceived service quality. Specifically, positive variability exists when the service quality level of the three phases continues to increase (Cells 2, 3, 4, 7, and 8), and negative variability exists when the service quality level of the three phases continues to decline (Cells 5, 6, 9, 10, and 11). Positive variability followed by negative variability (Cells 13, 14, and 15), and negative variability followed by positive variability (Cells 16, 17, and 18) were further considered. The positive variability scenarios included 227 participants, consisting of 112 experienced customers and 115 inexperienced customers. The negative variability scenarios included 230 participants, consisting of 110 experienced customers and 120 inexperienced customers. The scenario where a positive variability was followed by a negative

variability included 219 participants, consisting of 107 experienced customers and 112 inexperienced customers. The scenario where a negative variability was followed by a positive variability included 216 participants, consisting of 108 experienced customers and 108 inexperienced customers.

3.2.4. Experimental controls

Following Boulding et al. (1999), information about the hotel, online reviews by prior customers, and other information were presented to the experimental participants to establish their initial expectations prior to the experiment. In each experimental scenario, the average of the perceived service quality of all participants was used as a measure of delivered service quality, as shown in Table 2.

(Insert Table 2 About Here)

3.2.5. Measurement

Expectations were measured before the first phase, i.e., after providing relevant information about the target hotel and before entering the service encounter in Phase A. Following Hamer et al. (1999), the questions in the questionnaire were set and adjusted accordingly, taking into account the Chinese context. The initial expectation was measured by the following question: “Overall, what is your service expectation at this hotel?” After the “check-in” service experience in Phase A, the participants were asked a similar question: “What is your service expectation for the next phase at this hotel?”

The measurement of service quality adopts the SERVPERF model and focuses solely on a single dimension. The question measuring the perceived service quality at each phase read as follows: “Evaluating the service quality at the current phase, how many scores would you give?” The delivered service quality is considered a control variable, and its level is determined from textual explanations. The specific value is derived from the average perceived service quality of all participants at each service level, as explained in the preceding control section. Finally, when leaving service contact, the overall perceived service quality was measured by the following question: “What is your overall evaluation of the hotel’s service quality?” The

answers to all the questions range from 0 to 100, with 100 being indicative of excellent service (Hamer et al., 1999).

4. Experimental results

4.1. The effect of the mean and the variability

The variance of perceived service quality, calculated by the average deviation across the three phases, is denoted by *D,* using Equation (1). In quality engineering, variance is a metric used to describe variability, reflecting the dispersion of data points relative to the mean. Using variance to characterize the fluctuation of service quality is reasonable, as it quantifies the variability in service quality.

$$D = \frac{1}{3}\sum_{t=1}^{3}\left(Qc_t - \overline{Qc}\right)^2 \quad (1)$$

where Qc_t denotes the customer perceived service quality at phase t, and $\overline{Qc}$ denotes the mean perceived service quality at phase *t*.

The homogeneity of variance test result confirms that the data variability in different groups reflecting positive and negative variability is consistent ($F=46.76 > F_{.05}$ (n1, n2), $p=0.039$).

Polynomial regression analysis was used to assess the interaction between the mean and the variance (Table 3). For both the negative and positive variability conditions, Model 1 tests the effect of the mean and the variance of each of the phases' perceived service quality on the overall perceived service quality, with Model 2 adding the interaction effect. The addition of the interaction term added 19 and 22.2 percent to the variance explained for the negative and positive variability conditions, respectively. As such, irrespective of the variability's direction, overall perceived service quality can be determined using the mean and variability of the perceived service quality at different phases. The implication is that the formation of overall service quality is dynamic. In the case of positive variability, the coefficient of the interaction effect is negative, suggesting that even with positive variability, the interaction with the mean may have a negative effect on the overall perceived quality.

(Insert Table 3 About Here)

An investigation was also conducted into whether the service quality variability has the same effect on overall perceived service quality under both high and low-quality levels, i.e. those that fall above and below the mean quality, respectively. As shown in Table 4, in the case of consistently high mean quality levels across the three phases, the overall perceived service quality was lower under conditions of high variability when compared to low variability conditions. In contrast, in the case of consistently low mean quality levels across the three phases, the overall perceived service quality was higher under conditions of high variability when compared to low variability conditions. The mean score plots visually indicate that an interaction effect is present (Figure 2), illustrating that overall perceived service quality is influenced by the interaction effect of the mean and the variability of quality. Statistical tests show that there is a significant interaction between the mean and variability of quality.

(Insert Table 4 About Here)

(Insert Figure 2 About Here)

4.2. Experienced versus inexperienced customers

To further scrutinize the changes in perceived service quality at different phases for different participants, an adjustment value of perceived service quality (denoted as ASQ) for each phase was computed based on the initial expectation : $ASQ_t = (Qa_t - E_0)/E_0 \times 100$, where Qa_t denotes the actual service quality regular at phase i. The standard deviation of perceived service quality for customer j at phase t ($STDSQ_t$) ($j = 1,2,3,\cdots$; t=1,2,3) is given as

$$STDSQ_t = \sqrt{\frac{1}{3}\sum_{t=1}^{3}\left(Qc_{tj} - \overline{Qc_t}\right)^2} \quad (2)$$

Through one-way ANOVA, the p-value of 0.019 (<0.05) indicates a significant difference in STDSQ between the two types of customers. An unpaired t-test comparison indicated that the difference was statistically significant (t=4.231, p=0.033, i.e., < 0.05). This suggests that there is a significant difference in the mean of STDSQ between the two types of customers. The mean of STDSQ for inexperienced customers is 14.650, while the mean for experienced customers is 8.233. Consequently, the variability in perceived service quality among experienced customers is significantly lower than that among inexperienced customers,

supporting hypothesis 3.

In BOX's M test, p=0.377>0.05. The test reveals that the variance among different types of customer groups is equal. The p values of the ASQ for the three phases are 0.232, 0.144, and 0.439, respectively, which are all greater than 0.05, indicating that the between-group variance of ASQ by type of customer at each phase is equal. The multivariate test for the residual variance correlation rendered p=0.006, which further suggests that there is no correlation and significant difference for the within-group effect. In other words, no matter what type of customer, individuals will adjust their perceived service quality with the changes in the delivered service quality. In summary, a distinction in the magnitude of changes in perceived service quality is evident between inexperienced and experienced customers when the delivery service quality undergoes equal changes. Experienced customers, with more consumption experiences, exhibit a smaller magnitude of changes, while inexperienced customers, with no prior consumption history, show the largest magnitude of changes, thus confirming hypothesis 3.

In the case of positive variability in delivered service quality, the variability in perceived service quality decreased gradually from Phase A to Phase C (Cells 2, 3, 4, 7, and 8 in Table 5). This may be explained by customers having become more familiar with the service provision, reducing their perceived uncertainty associated with the services. In addition, for the same positive variability, inexperienced customers perceived the variability to be larger than experienced customers. For experienced customers, the variability in their perceived service quality was relatively stable, given their previous experiences and brand impressions.

(Insert Table 5 About Here)

In the case of negative variability, the results show that the variability in the customer-perceived service quality in Phase B was greater than that in other Phases (Cells 5, 6, 9, 10, and 11 in Table 5). Although increasingly more service information becomes available, the quality perception falls short of expectations, and the variability in Phase B increases due to loss aversion (Kahneman & Tversky, 1979). In addition, for the same negative variability, inexperienced customers perceived the variability to a greater extent than experienced customers. This also demonstrates that inexperienced customers possess greater sensitivity to

the variability in service quality.

In the case of positive variability followed by negative variability, the results show that the variability in the customer-perceived service quality in Phase C was greater than that in other phases (Cells 13, 14 and 15 in Table 5), suggesting that the better-delivered service quality in Phase B will raise customers' expectations. When a lower delivered service quality occurs subsequently, customers experience a large drop in expectations (i.e., a more severe loss), resulting in high variability in customer perceived service quality, even for experienced customers. It was found that, despite their relatively good understanding of the service, for the experienced customers, a sudden deterioration of quality increased their uncertainty. However, for the same variability, inexperienced customers perceived the variability to be larger than experienced customers.

In the case of negative variability followed by positive variability, the results show that the variability in the customer-perceived service quality in Phase B was larger than that in other phases (Cells 16,17 and 18 in Table 5), but then became smaller in Phase C due to the occurrence of higher delivered service quality. Also, for the same variability, inexperienced customers perceived the variability to be larger than experienced customers. Additionally, it was discovered that a lower delivered service quality followed by a better delivered service quality has a lesser adverse effect on variability than better delivered service quality followed by lower delivered service quality. Hypothesis 2 is validated.

4.3. The influencing factor of differences in perceived variability

Service quality is determined by the match between expectations and actual experience. Customers update their beliefs or expectations about quality based on their experiences, and disconfirmations can trigger variability (Kannan & Proença, 2010). Hence, customer expectations and subsequent disconfirmations are further investigated.

The perceived service quality at phase t (Qc_t) is jointly determined by the delivered service quality (Qa_t) and associated expectation (E_{t-1}) at this phase. Therefore, the perceived service quality model at phase t for customer type i can be constructed as follows:

$$Qc_{it} = \alpha_{it}E_{it-1} + \beta_{it}Qa_t + \varepsilon_{it} \quad (3)$$

The results for when the disconfirmation, i.e., $\Delta Q = Qa_t - Qc_{t-1}$ is positive are shown in Table 6. In Phase A, it is observed that as the experience increases, the ratio of the expectation coefficient to the delivered service quality coefficient increases. Similar dynamics are present at Phase B and Phase C, which indicates that inexperienced customers rely more on delivered service quality, with the importance of service expectations gradually increasing relative to the delivery of service quality as customers' experience increases. All in all, within the context of positive disconfirmation, the expectation is shown to be more important to the formation of perceived service quality.

(Insert Table 6 About Here)

When the disconfirmation ΔQ is negative, as shown in Table 7, from Phase A to Phase C, the ratio of the expectation coefficient to the delivered service quality coefficient decreases. This suggests that customers pay more attention to delivered service quality over time, in hopes that the delivered service quality meets their expectations. This also implies that during the formation of perceived service quality, the impact of delivered service quality on perceived service quality becomes increasingly stronger in the case of negative disconfirmation.

(Insert Table 7 About Here)

In addition, the expectation coefficient of experienced customers is still greater than that of inexperienced customers, and the ratio of the expectation coefficient to the delivered service quality coefficient of experienced customers is also greater than that of inexperienced customers. This suggests that experienced customers are more affected by expectations than inexperienced customers.

When the disconfirmation ΔQ is first positive and then negative (Table 8), the high service quality in Phase B raises customers' expectations, which is however followed by customers experiencing a large drop between expectations and perceptions (i.e., a more severe loss). As a result, the combined effect of a positive variability followed by a negative variability on the overall perceived quality becomes more negative, making the failure's effect more damaging. The expectation coefficient in Phase C is also negative, which suggests that the expectation at phase C has a serious negative effect on the perceived service quality in Phase C, due to the rapid change of delivered service quality.

(Insert Table 8 About Here)

When the disconfirmation ΔQ is first negative and then positive (Table 9), the decline of service quality in Phase B leads to lower customer expectations relative to the initial reference point. However, ΔQ is positive in Phase C, which leads customers to experience a larger expectation – perception gap, resulting in a greater perceived gain. As a result, the combined effect of a failure followed by a good experience becomes less negative. In addition, in this case, the coefficient of delivered service quality in Phase B is negative, which indicates that the two types of customers pay more attention to the delivered service quality in this phase. Furthermore, from Phase A to Phase C, the ratio of the expectation coefficient for the delivered service quality coefficient decreases, indicating that customers pay more attention to delivered service quality over time, likely fueled by the hope that the delivered service quality meets their expectations.

(Insert Table 9 About Here)

5. Discussion and conclusion

This study aims to contribute to the ongoing debate between the smooth and sticky models of the customer journey by investigating the influence of service variability on customers' overall perception of service quality in the hotel setting. Both positive and negative variability and their impact on perceived service quality across a multi-phase customer journey, were examined, taking into account the experience cycle of both inexperienced and experienced customers. The findings reveal that high variability can have both positive and negative effects on perceived quality, depending on the underlying average performance – elevating impressions when means are low but diminishing evaluations when means are already high. Furthermore, while positive variability offers some buffering, negative variability generally exerts a more significant impact, particularly when experienced later in a trip after expectations have been elevated. The findings carry both theoretical and practical implications.

5.1. Theoretical implications

This study provides fresh insights into how variability interacts with mean quality across

the key phases of a service cycle in influencing overall perceived quality, and how service variability influences customers differently depending on their experience cycles. The theoretical implications are as follows.

First, the study sheds light on how overall perceived service quality is influenced by both the mean and variability of the service quality across the various phases of a customer experience journey. The evidence shows that, in the case of high mean quality levels across the three phases, the overall perceived service quality was lower under conditions of high variability when compared to low variability conditions. This is probably because customers have high expectations for service providers that already have a high mean-quality level, and high variability is likely to fall below these expectations (Frei et al., 1999; Rust et al., 1999). Conversely, it was found that in the case of low mean quality levels across the three phases, the overall perceived service quality was higher under conditions of high variability when compared to low variability conditions. An explanation is that for low mean-quality service providers, such as lower-ranked hotels, customers do not have high expectations of service quality, and when experience high positive variability, their actual experience is more likely to exceed their expectations, leading to higher levels of perceived overall quality. The evidence suggests that the beneficial effect of high variability is restricted to situations where mean quality levels are low.

Second, the study further provides valuable insights into the effects of positive and negative variability on overall perceived service quality. The findings suggest that even with positive variability, there could be a negative impact on perceived quality due to its interaction with the mean. While previous studies have mainly focused on negative variability (Aflaki & Popescu, 2014; Gaur & Park, 2007), this study highlights that too much variability or a high magnitude of variability can lead to negative effects, regardless of the direction of variability. Therefore, the study largely supports the smooth model’ s argument (Wirtz & Zeithaml, 2018) in the context of hotel service, and provides a more nuanced understanding of the impact of service variability on perceived service quality.

Third, the study results highlight the impact of the sequence of variability on perceived service quality. Specifically, a lower delivered service quality followed by a better delivered

service quality (i.e., the negative variability followed by positive variability) has a lesser adverse effect on perceived service quality than better-delivered service quality followed by lower delivered service quality (i.e., the positive variability followed by negative variability). Previous research has shown that customer confidence can be increased by enhancing the quality of service during the latest interaction and the diminishing effect of cumulative variability is most pronounced in the beginning stages before leveling off (Voorhees et al., 2021). This study adds to this line of inquiry by showing that positive variability can partially improve perceived quality at a specific phase. however, improving service quality also raises customer expectations as well as perceived variability of the service. The positive variability gradually decreases over time in a customer journey, while negative variability has a greater impact in the subsequent phase before subsiding. These findings thus contribute to the marketing literature by providing insights into the dynamics of variability and service quality across the multiple phases of the customer experience journey.

Finally, this study shows that for the same consecutive positive or negative variability, and for the same variability, customers in the early cycle of their experience journeys (inexperienced customers) perceived the variability to be larger than customers who are in the later service cycles (experienced customers). This may be due to the fact at the early cycle of service experience, inexperienced customers may not have formed clear expectations of the service, and thus are more likely to be sensitive to new stimuli during the service process (Boulding et al., 1999). In contrast, experienced customers have formed a high spectrum of expectations of the service through experiencing multiple cycles of the service. Nevertheless, it was also show that despite their relatively good understanding of the service, experienced customers can still be shocked by a high magnitude of negative variability. These findings thus contribute to the literature by providing a holistic understanding of service variability in both the phases and cycles of customer experience journeys.

5.2. Managerial implications

The findings of this study have several practical implications for tourism and hospitality service operations. First, this study found that overall perceived service quality can be determined using the mean and variability of the perceived service quality at different phases

of the customer experience journey. In the case of consistently high (low) mean quality levels across the phases, the overall perceived service quality was lower (high) under conditions of high variability when compared to low variability conditions. Therefore, for tourism and hospitality services with high mean quality, such as in the opening case of Ritz-Carlton, customers' expectations are set at a high level, and as a result, their focus shifts to the variability of the service. Customers expect consistent high-quality service across all phases of the service journey, and any deviation from this expectation can lead to dissatisfaction. Reducing variability becomes a priority for the service provider to meet the customers' expectations and provide a more consistent and predictable service experience. This can be achieved by standardizing processes, providing clear guidelines and training to employees, and closely monitoring service delivery to ensure consistency. In contrast, for low-quality services, the mean quality receives greater attention from customers. A focus on improving the mean quality can help service providers to increase customer satisfaction, and this can be achieved by improving the quality of the service across all phases of the service journey.

Second, for many tourism firms, simply focusing on providing high-quality service may not be the best approach, as this could lead to resource depletion and increased variability in service quality (Guenther & Guenther, 2021). The study finds that a decrease in service quality (negative variability) followed by an improvement (positive variability) has less of a negative impact compared to a quality improvement (positive variability) followed by a decrease in quality (negative variability). This implies for managers who adopt a sticky model could provide pleasing surprises at the end phase of the customer experience journey (e.g., offering a branded gift at check-out) rather than at the early phase (e.g. offering a warm cookie at check-in). By doing so, they could achieve higher service effectiveness with fewer resources, optimizing the customer experience as a whole.

Third, the finding shows that even with positive variability, its interaction with the mean may have a negative effect on the overall perceived quality, and even experienced customers can feel uncertain in such a situation, despite their familiarity with the service. Therefore, tourism service providers should be aware that too much variability, regardless of its direction, can have negative effects on perceived service quality. It is important to strike a balance between providing consistently high-quality service and offering enough positive variability to

surprise and delight customers without overwhelming them.

Finally, it was observed that for the same degree of variability, inexperienced customers perceived the variability to be larger than experienced customers, and they rely more on delivered service quality over time. Tourism service providers should take a holistic view of customer experience journeys, and recognize the differing effects of variability on customers in the different cycles of services. Therefore, for inexperienced customers, service providers should provide accurate and honest information about services without exaggeration in their promotional materials during the pre-experience phase, to help them establish realistic expectations, reducing the level of perceived variability. It is also important to provide clear and consistent service from the initial phases and cycles of service journeys to establish a positive perception and build trust. For experienced customers, on the other hand, the focus should be on maintaining consistency in service delivery to reinforce positive prior experiences and prevent negative ones from eroding their perception of service quality.

5.3. Limitations and future research

While significant contributions were made, as with any research, limitations must be noted, which however provide opportunities for future research. First, this study provides valuable insight into service quality variability by analyzing its variance, which is a critical feature of statistical distributions. However, factors such as skewness and kurtosis may also help explain service variability, and future studies could enhance the effectiveness of service variability research by incorporating these additional characteristics. Alternatively, volatility analysis, especially in time series data, can be used to measure the variability of service quality over time, which is particularly effective for analyzing long-term trends and stability in service quality. Service quality is not solely reflected by the perceived mean and variance but also includes Therefore, in addition to mean and variance, other service quality indicators, such as customer satisfaction scores and Net Promoter Score, can be incorporated to provide a comprehensive assessment of service quality. Service quality is not solely reflected by the perceived mean and variance; therefore, incorporating other indicators, such as customer satisfaction scores and the Net Promoter Score, would provide a more comprehensive assessment of service quality.

Second, the study focuses on the customer experience only, future research could examine the effect of the behavioral orientation of service providers, customer emotional experiences and subjective evaluations on service variability at each stage of the customer's experience journey, ultimately affecting the overall perceived quality. Other moderating variables, such as customer requirement ambiguity, level of customer involvement, and value co-creation behavior, could also be included in future studies.

Third, while scenario-based experiments are useful, they have limitations such as lacking real-life experience and potential simplifications of complex situations. Future research could address these limitations by incorporating real-world testing or using immersive technologies to create more authentic and engaging scenarios. While this study provides valuable insights into boutique hotels, its findings may not be directly applicable to other hotel types like economy chain or luxury hotels. Future research should investigate how different customer segments and industry trends, such as digital transformation and sustainability, affect brand perception across various hotel types.

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Competing interests

The authors declare no competing interests.

Data availability

The datasets generated during and/or analysed during the current study are not publicly available but are available from the corresponding author on reasonable request.

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Ethical statements

This study was approved by the Ethics Committee of College of Economics and Management, Fujian Agriculture and Forestry University and followed all relevant ethical guidelines applicable in China. Since the study involved a low-risk behavioral experiment without any sensitive or identifiable personal data, the school's ethics committee confirmed that no additional national ethics review was necessary. Approval was granted on October 10, 2023, covering the experimental procedures and data handling practices.

Informed Consent

Informed consent was obtained orally from all participants, who were senior undergraduate students majoring in hotel management from Fuzhou, Quanzhou, and Xiamen in Fujian Province, China. This approach was adopted due to the practicality and efficiency within the university environment where face - to - face communication with the students was easily accessible during class hours.

The oral consent process was recorded using audio - recording devices. Each session of obtaining consent was documented with the date, time, and name of the researcher conducting the process. Immediately after the oral consent was obtained, a written note was made by the researcher summarizing the key points of the consent discussion.

A script was used during the oral consent process to ensure consistency across all participants. The script detailed the study's purpose, which was to conduct a scenario -

based experiment where participants would experience hotel services within a simulated environment and then provide evaluations based on their experiences. The procedures involved such as guiding the participants into the specifically designed experimental scenarios to interact with the virtual hotel services and filling out evaluation forms afterwards. And the intended outcomes included obtaining comprehensive and objective feedback on the various aspects of the hotel services presented in the scenarios to further analyze and improve the design of hotel service models. It also emphasized that all data collected would be used solely for academic research and publication purposes, with strict confidentiality maintained. Participants were clearly informed that their participation was voluntary and that they could withdraw at any time without any negative impact on their academic standing. A copy of this script is attached for review.

Respect for Participants and Fair Treatment

The study was conducted with respect for all participants' rights, ensuring they were treated fairly and equally throughout the experiment. There was no form of discrimination, and all participants were treated with respect and consideration.

Transparency and Data Confidentiality

The research purpose, procedures, and expected outcomes were fully transparent to participants, ensuring their informed consent. All collected data were anonymized, securely stored, and used only for scientific analysis and publication, with no personal information disclosed.

Author Contributions

Jianlan Zhong: Conceptualization, methodology, data analysis, and writing—original draft.

Zhibin Lin: Literature review, data interpretation, and writing—review & editing.

Fu Jia: Supervision and writing—review & editing.

Tobias Schoenherr: Writing—review & editing.

Figures

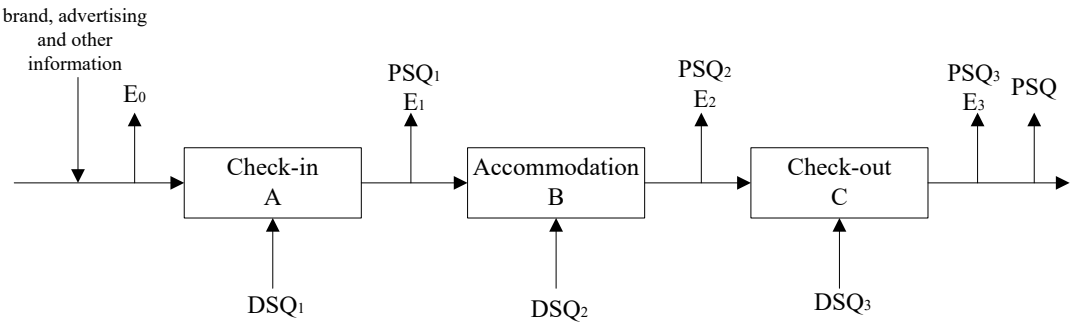

Figure 1. Flowchart of the experimental design

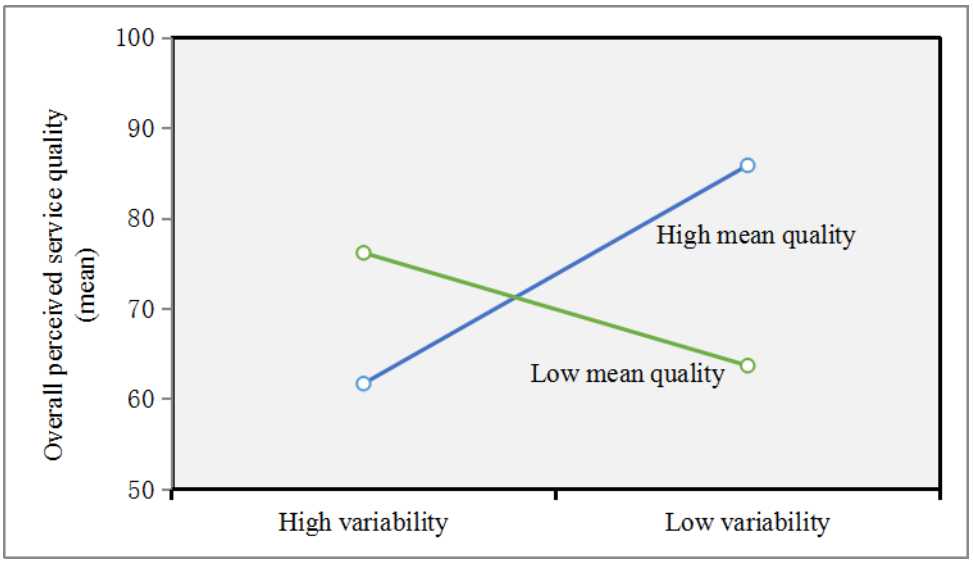

Figure 2. Interaction effect between mean and variability

Tables

Table 1. Means and S.D. of the three presentation methods

Presentation Format	Mean	S.D.
Literary language description	2.335	0.670
Video plus literary description	3.827	0.918
Scene performance	4.077	1.490

Table 2. Scenarios

Cell	Scenario	Samples	Experience	Cell	Scenario	Samples	Experience	Cell	Scenario	Samples	Experience
1	A1B1C1	119	4.442	7	A2B2C2	44	4.501	13	A1B2C1	69	4.379
2	A1B1C2	46	4.511	8	A2B3C2	42	4.481	14	A1B3C1	74	4.419
3	A1B2C2	49	4.404	9	A3B1C1	46	4.404	15	A2B3C1	76	4.433
4	A1B3C2	46	4.605	10	A3B2C1	46	4.366	16	A2B1C2	68	4.491
5	A2B1C1	48	4.379	11	A3B3C1	45	4.399	17	A3B1C2	74	4.422
6	A2B2C1	45	4.336	12	A3B3C2	105	4.380	18	A3B2C2	74	4.445

Table 3. Delivered service quality across the eight different treatments

Symbol	Mean	S.D.	Explanation	Symbol	Mean	S.D.	Explanation
A1	45	14.550	Low delivered service quality in Phase A	B2	65	7.845	Moderate delivered service quality in Phase B
A2	62	7.751	Moderate delivered service quality in Phase A	B3	87	5.503	High delivered service quality in Phase B
A3	85	5.363	High delivered service quality level in Phase A	C1	37	14.858	Low delivered quality in Phase C
B1	39	12.048	Low delivered service quality in Phase B	C2	87	6.224	High delivered quality in Phase C

Note: The level of delivered service quality is different, and the comparison between group meets the requirements of $p< 0.05$.

Table 4. Regression results for the overall perceived service quality

Variable	Dependent variable: overall perceived service quality			
	Negative variability condition		Positive variability condition	
	Model 1	Model 2	Model 1	Model 2
Constant	8.425	9.179	10.625	11.873
Mean quality	1.226***	1.317***	1.079***	1.252***
Variability of quality	-0.826*	-0.751***	0.559***	0.513*
Mean quality × Variability of quality		-0.084*		-0.039*
R^2	0.362	0.550	0.316	0. 498
Adjusted R^2	0.317	0.507	0.263	0.485
F	10.96	25.93	12.60	28.36

Note: *** p<0.001 and * p<0.05

Table 5. Interaction effect between mean and variability of overall perceived service quality

	Overall perceived service quality (mean)	
	High variability	Low variability
High mean quality levels	61.66	85.83
Low mean quality levels	76.14	63.65

Table 6. Variability in customers' perceived service quality of subsequent services

		Phase A		Phase B		Phase C	
		Mean	S.D.	Mean	S.D.	Mean	S.D.
Cells 1 and 12	experienced customers	6.30	0.64	5.71	0.64	5.32	0.46
	inexperienced customers	10.39	0.66	9.08	0.90	7.68	0.77
Cells 2, 3, 4, 7 and 8	experienced customers	6.61	0.49	6.56	0.87	6.20	0.69
	inexperienced customers	10.09	0.77	9.50	0.97	8.28	0.91
Cells 5, 6, 9, 10, and 11	experienced customers	6.37	0.48	6.84	0.44	6.49	0.87
	inexperienced customers	10.29	0.65	11.60	0.62	10.58	0.75
Cells 13, 14 and 15	experienced customers	6.42	0.75	6.39	0.65	8.09	0.82
	inexperienced customers	10.27	0.81	10.02	0.67	12.32	0.81
Cells 16,17 and 18	experienced customers	6.56	0.63	6.94	0.89	6.62	0.78
	inexperienced customers	10.11	0.71	10.46	0.79	10.19	0.84

Table 7. The influence of the expected and delivered service quality on perceived service quality for two types of customers when ΔQ is positive

		Phase A			Phase B			Phase C		
		Coefficient	t-value	Ratio	Coefficient	t-value	Ratio	Coefficient	t-value	Ratio
Expectation	Inexperienced Customers	0.225	10.813***		0.282	22.945***		0.355	17.800***	
	Experienced customers	0.390	6.631**		0.410	12.351***		0.467	10.844***	
Delivered service quality	Inexperienced Customers	0.850	2.506*	0.265	1.005	2.433*	0.281	0.935	2.465*	0.379
	Experienced Customers	0.740	2.582*	0.527	0.716	2.715*	0.573	0.765	2.659*	0.610

Note: *** p<0.001 and * p<0.05

Table 8. The influence of the expected and delivered service quality on perceived service quality for two types of customers when ΔQ is negative

		Phase A			Phase B			Phase C		
		Coefficient	t-value	Ratio	Coefficient	t-value	Ratio	Coefficient	t-value	Ratio
Expectation	Inexperienced Customers	0.303	10.656*		0.318	3.144*		0.334	21.560***	
	Experienced customers	0.413	9.723*		0.487	9.385***		0.501	13.217***	
Delivered service quality	Inexperienced Customers	0.522	7.454***	0.580	0.729	2.276***	0.436	0.826	4.872**	0.404
	Experienced Customers	0.586	6.374***	0.705	0.703	2.964***	0.693	0.872	5.682**	0.574

Note: *** p<0.001 and * p<0.05

Table 9. The influence of the expected and delivered service quality on perceived service quality for two types of customers when ΔQ is first positive and then negative

		Phase A			Phase B			Phase C		
		Coefficient	t-value	Ratio	Coefficient	t-value	Ratio	Coefficient	t-value	Ratio
Expectation	Inexperienced Customers	0.402	9.631***		0.213	18.569***		-0.169	13.760***	
	Experienced customers	0.563	6.300***		0.382	6.144**		-0.245	9.217**	
Delivered service quality	Inexperienced Customers	0.794	2.561*	0.506	0.906	7.985*	0.235	0.910	7.282*	-0.187
	Experienced Customers	0.778	3.374*	0.724	0.677	2.854**	0.564	0.787	4.353*	-0.311

Note: *** p<0.001 and *p<0.05

Table 10. The influence of the expected and delivered service quality on perceived service quality for two types of customers when ΔQ is first negative and then positive

		Phase A			Phase B			Phase C		
		Coefficient	t-value	Ratio	Coefficient	t-value	Ratio	Coefficient	t-value	Ratio
Expectation	Inexperienced Customers	0.546	13.761***		0.322	17.801***		0.213	18.594***	
	Experienced customers	0.563	6.318**		0.424	9.644**		0.384	6.185**	
Delivered service quality	Inexperienced Customers	0.911	2.561*	0.599	-1.010	2.441*	-0.319	0.960	2.363*	0.222
	Experienced Customers	0.697	2.952**	0.808	-0.679	2.827**	-0.624	0.794	2.719*	0.484

Note: *** p<0.001 and *p<0.05