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When customer feedback sparks innovation: Self-efficacy as a psychological pathway in the tourism industry

Kai Yao[1], Thaunjai Sangthong[1], Ubonwan Khunthong[1], Wei Chen[1*]
[1]Faculty of Business and Finance Management, Rattana Bundit University, Bangkok, 10240, Bangkok, Thailand;
aziz202408@163.com (K.Y.) thaunjais@yahoo.com (T.S.) ubonwank@gmail.com (U.K.) weichen4359@gmail.com (W.C.).

Abstract: This study investigates how customer feedback stimulates employee innovative behavior in the tourism sector, with self-efficacy serving as a mediator and interpersonal sensitivity and work autonomy acting as moderators. Drawing on social cognitive theory and self-determination theory, a mixed-methods design was employed, combining PLS-SEM analysis with qualitative interviews. The results demonstrate that customer feedback exerts a significant positive effect on both self-efficacy and innovative behavior, confirming its central role in fostering employee innovation. Self-efficacy was identified as a strong mediator, while interpersonal sensitivity enhanced the translation of customer feedback into self-efficacy. Additionally, work autonomy strengthened the impact of self-efficacy on innovative behavior. Qualitative insights further illustrated how employees reinterpret customer input and generate creative solutions when empowered with autonomy and interpersonal attunement. Importantly, the empirical study was conducted in Xi'an, one of China's most dynamic tourism destinations, where the vibrant tourism market underscores the practical relevance of feedback-driven innovation. The findings contribute to the literature on the micro-foundations of innovation in tourism by linking external market signals with individual-level psychological mechanisms. They also offer practical implications for enhancing competitiveness through feedback systems, employee empowerment, and organizational support.

Keywords: *Customer feedback, Innovation behavior, Interpersonal sensitivity, Self-efficacy, Work autonomy, Xi'an tourism.*

1. Introduction

Tourism enterprises today operate in an environment characterized by intense competition, rapid changes in consumer expectations, and mounting pressures for service differentiation. In such a context, innovation has become a decisive factor in maintaining and strengthening competitiveness within the tourism industry [1, 2]. Recent studies further confirm that innovation contributes to service differentiation, value creation, and long-term competitive advantage in tourism destinations [3, 4]. However, the mechanisms through which innovation is stimulated at the employee level remain underexplored, particularly regarding how customer-related processes shape innovation outcomes.

Among the multiple drivers of innovation, customer feedback represents a critical yet underutilized resource. Traditionally regarded as a tool for service evaluation, customer feedback can also act as a catalyst for employee learning and creative problem-solving [5, 6]. Emerging research shows that engaging with customers fosters innovative behavior by providing employees with information, encouragement, and opportunities to test new ideas [7, 8]. Despite this, few studies have linked customer feedback explicitly to innovation-driven competitiveness in tourism.

To address this gap, the present study draws on social cognitive theory Bandura [9] and self-determination theory [10, 11]. From a social cognitive perspective, customer feedback enhances employees' self-efficacy, thereby motivating them to attempt and persist in innovative behaviors. From a

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* Correspondence: weichen4359@gmail.com

self-determination perspective, contextual conditions—such as interpersonal sensitivity and work autonomy—shape the degree to which feedback is internalized and translated into innovation [12, 13].

This study develops and tests a Feedback–Efficacy–Innovation (FEI) framework to investigate these mechanisms within the context of Xi'an's hospitality and tourism industry. Specifically, we examine (1) the mediating role of self-efficacy in linking customer feedback to employee innovation, (2) the moderating effect of interpersonal sensitivity in the feedback–efficacy relationship, and (3) the moderating effect of work autonomy in the efficacy–innovation relationship. By applying PLS-SEM analysis to data collected from 420 frontline employees and supplementing it with qualitative interviews, the study provides comprehensive insights into the micro-level processes that drive innovation in tourism.

The findings of this research contribute to the literature by advancing understanding of how customer feedback fosters employee innovation through psychological mechanisms and contextual moderators. More importantly, by linking employee innovation to tourism competitiveness, this study situates individual-level processes within a broader strategic framework. Practically, the results highlight the importance for tourism managers of cultivating feedback-rich organizational cultures, strengthening employee self-efficacy, and promoting work autonomy, thereby leveraging feedback-driven innovation to sustain competitive advantage in the tourism marketplace.

2. Literature Review

2.1. Customer Feedback and Employee Innovation Behavior

Customer feedback has shifted from being a mere evaluative tool to becoming a catalyst for employee innovation behavior. It provides employees with critical information, motivation, and opportunities to experiment with new ideas. Recent studies confirm this trend. Lim, et al. [8] conducted a meta-analysis and found that customer-oriented behaviors, including feedback integration, are among the most influential predictors of innovation in hospitality and tourism. Zhu, et al. [14] further emphasized that continuous interaction with customers fosters innovation, as employees use feedback to refine processes and generate novel solutions. More recently, Zhou, et al. [15] demonstrated that customer characteristics such as perfectionism can shape frontline employees' service innovation, illustrating the complexity of feedback as both a resource and a challenge. Despite these insights, the mechanisms through which feedback translates into innovation remain underexplored in tourism contexts.

2.2. Self-Efficacy as a Mediating Mechanism

Self-efficacy, a central concept in social cognitive theory, refers to individuals' beliefs in their capacity to perform tasks successfully [9]. High self-efficacy enhances persistence, resilience, and creative problem-solving, thereby facilitating innovation. Empirical evidence supports its mediating role in organizational settings. Prayag and Dassanayake [16] found that creative self-efficacy enhances both individual and organizational resilience in tourism, underscoring its importance in innovation processes. Similarly, Wan, et al. [7] showed that self-efficacy mediates the relationship between engagement and service innovation in hospitality. Naseem and Khan [17] also identified self-efficacy as a mediator between knowledge sharing and employee innovation. These findings indicate that self-efficacy is a crucial mechanism linking external input, such as customer feedback, to employee innovation behavior. However, explicit empirical tests of this mediation pathway in the tourism industry remain limited.

2.3. Employee Innovation Behavior

Employee innovation behavior refers to the intentional generation and implementation of new ideas, services, or processes by employees [18]. In tourism and hospitality, employee innovation behavior is essential for improving service quality, enhancing customer satisfaction, and achieving long-term competitiveness. Recent work highlights its multidimensional nature. Ma and Wang [19] found that green self-efficacy and motivation predict employees' green innovation behavior, expanding the

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construct into the sustainability domain. Folgado-Fernández [20] examined the role of "smart employees" in tourism and concluded that technological adaptation and interpersonal competencies significantly enhance innovation potential. Hatma, et al. [4] also demonstrated that organizational factors foster service innovation, which mediates the link between internal support and customer satisfaction. Collectively, these studies confirm that employee innovation behavior is a critical driver of competitiveness in tourism. Yet, few studies integrate psychological and contextual mechanisms into a unified model.

2.4. Interpersonal Sensitivity as a Moderator

Interpersonal sensitivity—the ability to perceive and respond to others' emotions—can determine how employees interpret and act on customer feedback. Employees with higher sensitivity are more likely to view feedback constructively, enhancing its impact on self-efficacy and, ultimately, on innovation. Zhou, et al. [6] showed that customer cooperation and interpersonal competencies significantly predict innovation outcomes in service industries. Although promising, the moderating role of interpersonal sensitivity in the feedback–innovation pathway remains underexplored in tourism research.

2.5. Work Autonomy as a Moderator

Work autonomy, rooted in self-determination theory [10, 11] provides employees with discretion over their tasks, fostering intrinsic motivation and innovation. Amabile, et al. [12] demonstrated that autonomy supports creativity by offering space for experimentation. Recent studies in tourism and hospitality reinforce this perspective. Yang, et al. [21] highlighted that developmental organizational culture and autonomy foster team-level service innovation. Hatma, et al. [4] found that supportive environments enhance service innovation, which improves customer satisfaction in the tourism industry. Work autonomy thus acts as a critical condition enabling employees to translate self-efficacy into innovation behavior.

2.6. Research Gap

This study integrates social cognitive theory and self-determination theory to explain how customer feedback fosters employee innovation behavior. Social cognitive theory clarifies the role of self-efficacy in translating external stimuli into behaviors [9] while self-determination theory emphasizes the motivational impact of autonomy [10, 11]. Although individual relationships among feedback, self-efficacy, innovation, and contextual moderators have been examined, few studies in tourism integrate these variables into a comprehensive framework. Moreover, limited research connects these micro-level mechanisms with the macro-level concept of tourism competitiveness [1, 3]. By developing and testing a Feedback–Efficacy–Innovation (FEI) model, this study addresses these gaps.

3. Research Hypotheses

3.1. Theoretical Foundations

Employee innovation behavior in the service industry can be best understood through the lens of social cognitive theory [9] which posits that individual behaviors are influenced by the interaction of personal cognition, environmental cues, and behavioral outcomes. In this context, customer feedback serves as a critical environmental cue that provides employees with evaluative information about their performance and service quality. By interpreting such feedback, employees develop a sense of competence and confidence, which can subsequently affect their innovative behavior.

Another relevant theoretical perspective is self-determination theory (SDT) [22] which emphasizes the role of autonomy, competence, and relatedness in fostering intrinsic motivation. Positive and constructive feedback may enhance employees' perceived competence and self-efficacy, thereby promoting innovative thinking. Conversely, negative feedback, when perceived as developmental, can also stimulate creative problem-solving by signaling areas of improvement [23].

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Furthermore, prior research in service innovation has highlighted that customer interaction is an essential driver of organizational learning and adaptation [24]. Employees' responses to customer feedback represent micro-level innovations that aggregate to organizational-level improvements in service delivery. Against this theoretical backdrop, this study integrates customer feedback, self-efficacy, and innovation behavior within a unified model, while also considering the moderating roles of interpersonal sensitivity and work autonomy.

3.2. Customer Feedback and Employee Innovation Behavior

Customer feedback, defined as information provided by customers about their service experiences, is an important antecedent of employee innovation. Such feedback may include compliments, complaints, or suggestions, and it helps employees identify unmet needs and service gaps. Previous studies indicate that external evaluations can stimulate employees to engage in creative behaviors by providing new perspectives and performance benchmarks [25, 26].

In the tourism industry, where service encounters are highly personalized and dynamic, employees often rely on customer feedback as an external signal to guide service improvements. Positive feedback can reinforce innovative actions by validating employees' creative efforts, while constructive criticism can trigger problem-solving behaviors aimed at enhancing customer satisfaction.

Hypothesis 1 (H1): Customer feedback has a positive effect on employee innovation behavior.

3.3. Customer Feedback and Self-Efficacy

Self-efficacy refers to an individual's belief in their ability to accomplish tasks and overcome challenges [9]. Feedback from customers plays a central role in shaping these beliefs by providing cues about employees' effectiveness in service delivery. Research has shown that constructive feedback can enhance employees' confidence in their ability to innovate, while negative but developmental feedback can also motivate self-reflection and growth [27].

Within the tourism context, employees who receive feedback that acknowledges their competence are more likely to develop higher self-efficacy, which in turn empowers them to attempt novel solutions and improvements in service processes.

Hypothesis 2 (H2): Customer feedback positively influences employee self-efficacy.

3.4. Self-Efficacy and Employee Innovation Behavior

The link between self-efficacy and innovative behavior is well established in organizational psychology. Employees with high self-efficacy are more willing to take risks, persist in the face of challenges, and generate novel ideas [28, 29]. In the service industry, employees who feel confident about their capabilities are more likely to proactively implement creative solutions to meet customer needs.

Hypothesis 3 (H3): Employee self-efficacy positively affects employee innovation behavior.

3.5. The Mediating Role of Self-Efficacy

Building on social cognitive theory, self-efficacy can be conceptualized as a mediator between external inputs and behavioral outcomes. Customer feedback provides evaluative cues that influence employees' beliefs about their competence, which then shape their willingness to engage in innovation [9]. Prior studies also suggest that self-efficacy partially mediates the relationship between feedback and creative performance [27].

Hypothesis 4 (H4): Employee self-efficacy mediates the relationship between customer feedback and employee innovation behavior.

3.6. The Moderating Role of Interpersonal Sensitivity

Interpersonal sensitivity refers to the extent to which individuals are attuned to the perceptions and evaluations of others. Employees high in interpersonal sensitivity are more likely to notice and

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interpret subtle cues in customer feedback [30]. This heightened awareness may strengthen the effect of feedback on self-efficacy, as sensitive individuals are more responsive to both praise and criticism. Conversely, employees low in interpersonal sensitivity may disregard such feedback, weakening its impact.

Hypothesis 5a (H5a): Interpersonal sensitivity moderates the relationship between customer feedback and self-efficacy, such that the relationship is stronger when interpersonal sensitivity is high.

3.7. The Moderating Role of Work Autonomy

Work autonomy refers to the degree of discretion and freedom employees have in carrying out their tasks [31]. Autonomy provides employees with the psychological empowerment to act upon their self-efficacy beliefs. In high-autonomy environments, employees are more likely to translate their confidence into innovative behaviors because they have the latitude to experiment with new ideas. In contrast, under low-autonomy conditions, even high self-efficacy may not result in innovation due to structural constraints.

Hypothesis 5b (H5b): Work autonomy moderates the relationship between self-efficacy and innovation behavior, such that the relationship is stronger when work autonomy is high.

3.8. Conceptual Model

Drawing on the above hypotheses, the study proposes a conceptual framework (Figure 1) in which customer feedback influences employee innovation behavior both directly and indirectly through self-efficacy. Interpersonal sensitivity and work autonomy are modeled as moderators that strengthen the pathways from feedback to self-efficacy and from self-efficacy to innovation behavior, respectively.

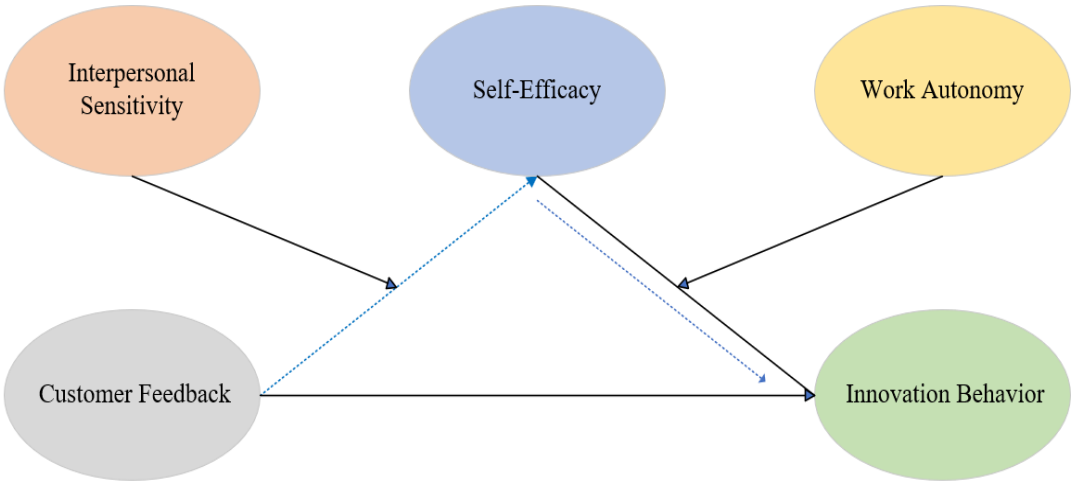

Figure 1.
Conceptual Framework.

4. Research Methodology

4.1. Research Design

This study employed a sequential explanatory mixed-methods design, combining quantitative and qualitative approaches to provide both breadth and depth in understanding the impact of customer feedback on employee innovation behavior. The quantitative phase tested the hypothesized structural relationships through a large-scale survey analyzed with Partial Least Squares Structural Equation

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Modeling (PLS-SEM), while the qualitative phase provided contextual explanations and insights through in-depth interviews.

4.2. Sample and Data Collection

4.2.1. Quantitative Phase

The quantitative study was conducted among frontline employees in the tourism industry in Xi'an, China. A total of 500 questionnaires were distributed through both online platforms and paper surveys, and 420 valid responses were retained after data cleaning, resulting in an effective response rate of 84%. The respondents represented a range of positions across hotels, travel agencies, scenic spots, and cultural tourism enterprises, ensuring sample diversity.

Demographic characteristics such as age, gender, education, organizational tenure, and job position were collected as control variables.

4.2.2. Qualitative Phase

Following the quantitative analysis, 20 semi-structured interviews were with frontline employees and managers. Each interview lasted approximately 45–60 minutes and aimed to explore participants' perceptions of customer feedback, their confidence in handling challenges, and the influence of autonomy and interpersonal sensitivity. Interviews were transcribed verbatim and supplemented by field notes on non-verbal cues.

4.3. Measures

All constructs were measured using validated multi-item scales on a five-point Likert scale (1 = strongly disagree, 5 = strongly agree). To ensure cross-cultural validity, the items were translated into Chinese using the translation–back translation method.

Customer Feedback: Items adapted from Tax, et al. [26].

Self-Efficacy: Items adapted from Tierney and Farmer [27].

Employee Innovation Behavior: Measured using Janssen [28] nine-item scale.

Interpersonal Sensitivity: Items adapted from Boyce, et al. [30].

Work Autonomy: Items adapted from Deci and Ryan [31].

Control Variables: Age, gender, education, tenure.

All construct exhibited high internal reliability, with Cronbach's α values exceeding 0.90 (overall α = 0.932). Convergent and discriminant validity were assessed through composite reliability (CR), average variance extracted (AVE), and Fornell–Larcker criterion.

4.4. Data Analysis

4.4.1. Quantitative Analysis

The quantitative data were analyzed using SmartPLS 4.0, which is suitable for complex models with mediating and moderating effects, and for studies emphasizing prediction rather than covariance-based fit. The analysis followed these steps:

Assessment of the measurement model: Item reliability, Cronbach's α, composite reliability, and AVE were examined to establish convergent validity, while discriminant validity was evaluated using the Fornell–Larcker criterion and HTMT ratios.

Assessment of the structural model: Path coefficients, t-values, and p-values were estimated through bootstrapping (5,000 resamples).

Mediation analysis: The indirect effects of self-efficacy on the relationship between customer feedback and innovation behavior were tested using bootstrapped confidence intervals.

Moderation analysis: Interaction terms were created to test the moderating effects of interpersonal sensitivity and work autonomy. Simple slope analysis was conducted to interpret significant interactions.

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Predictive relevance: Q^2 values and the coefficient of determination (R^2) were reported to evaluate the explanatory and predictive power of the model.

4.4.2. Qualitative Analysis

The interview transcripts were analyzed through content and thematic analysis. Coding was conducted iteratively, beginning with open coding to identify meaningful units, followed by axial coding to establish categories related to feedback interpretation, efficacy beliefs, and innovation behavior. Themes were compared against the quantitative findings to provide deeper explanations. Triangulation of data sources, researchers, and methods was employed to enhance credibility.

4.5. Ethical Considerations

Ethical approval was obtained from the university's research ethics committee. All participants were informed of the study's purpose and assured of confidentiality and anonymity. Participation was voluntary, and respondents were free to withdraw at any time. Consent was obtained prior to survey completion and interviews. Data were stored securely and used exclusively for academic research.

5. Research Results

5.1. Measurement Model Assessment

Before testing the hypothesized structural relationships, the reliability and validity of the measurement model were evaluated. All constructs were measured reflectively using multi-item Likert scales.

Reliability. Cronbach's α and composite reliability (CR) values for all constructs exceeded the recommended threshold of 0.70, indicating strong internal consistency. Specifically, Cronbach's α ranged from 0.902 (work autonomy) to 0.945 (innovation behavior), with an overall reliability of 0.932. Composite reliability values were similarly robust, ranging between 0.921 and 0.957.

Convergent validity. The average variance extracted (AVE) for each construct exceeded the recommended cut-off of 0.50, ranging from 0.648 (customer feedback) to 0.771 (self-efficacy). This suggests that the latent variables explained more than half of the variance in their indicators. All standardized item loadings were above 0.70 and statistically significant ($p < 0.001$). Table 1 presents the descriptive statistics, reliability indices, and correlations among the constructs.

Table 1.
Descriptive statistics, reliability, and correlations.

Construct	Mean	SD	Cronbach's α	CR	AVE	1	2	3	4	5
1. Customer feedback	3.74	0.62	0.918	0.934	0.648	0.805				
2. Self-efficacy	3.89	0.57	0.932	0.949	0.771	0.621	0.878			
3. Innovation behavior	3.95	0.59	0.945	0.957	0.749	0.544	0.693	0.865		
4. Interpersonal sensitivity	3.81	0.66	0.902	0.921	0.707	0.483	0.538	0.611	0.841	
5. Work autonomy	3.87	0.61	0.911	0.927	0.756	0.497	0.564	0.622	0.585	0.870

Note: Diagonal values represent √AVE (Fornell–Larcker criterion).

Discriminant validity. The Fornell–Larcker criterion was satisfied, as the square root of AVE for each construct was greater than the inter-construct correlations. Furthermore, the Heterotrait–Monotrait (HTMT) ratios were all below the conservative threshold of 0.85, confirming adequate discriminant validity. Discriminant validity was confirmed using the HTMT criterion, with all values below 0.85 (Table 2).

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Table 2.
HTMT ratios.

Construct	1	2	3	4	5
1. Customer feedback	–				
2. Self-efficacy	0.672	–			
3. Innovation behavior	0.598	0.745	–		
4. Interpersonal sensitivity	0.552	0.614	0.668	–	
5. Work autonomy	0.566	0.623	0.701	0.648	–

Together, these results indicate that the measurement model demonstrated satisfactory reliability and validity, and was thus suitable for testing the structural model.

5.2. Structural Model Assessment

The PLS-SEM analysis was conducted using SmartPLS 4.0 with bootstrapping (5,000 resamples). Several indices were examined to assess the structural model.

Coefficient of determination (R^2). The endogenous variables showed substantial explanatory power. Self-efficacy exhibited an R^2 value of 0.54, indicating that customer feedback explained 54% of the variance. Innovation behavior demonstrated an R^2 value of 0.67, suggesting that customer feedback and self-efficacy jointly explained 67% of the variance in innovation behavior. According to Hair, et al. [32] these values indicate moderate-to-substantial explanatory power.

Predictive relevance (Q^2). Using the blindfolding procedure, Q^2 values were greater than zero for both self-efficacy (0.41) and innovation behavior (0.48), demonstrating strong predictive relevance of the structural model.

Collinearity assessment. Variance inflation factor (VIF) values for all predictor constructs were below 3.3, suggesting that multicollinearity was not a concern.

Overall, the structural model demonstrated strong explanatory and predictive power, justifying the hypothesis testing. Figure 1 illustrates the PLS-SEM model with path coefficients and explained variance (R^2).

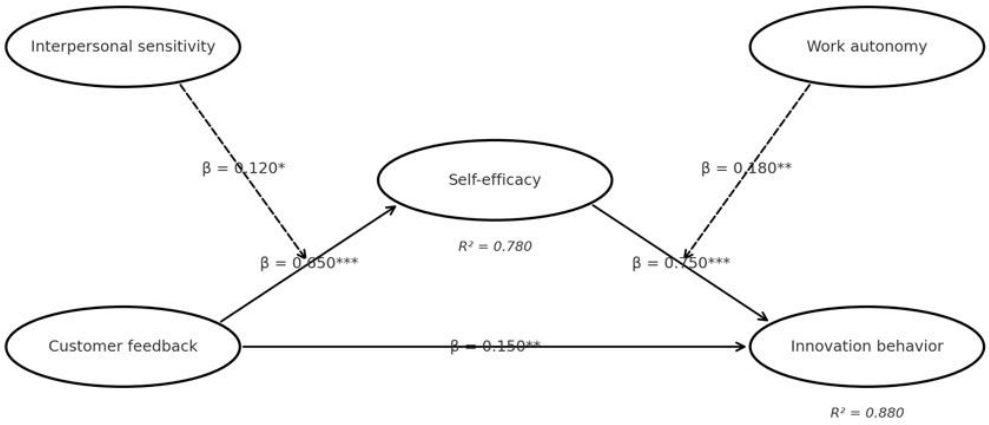

Figure 2.
PLS-SEM Structural Model.

5.3. Hypotheses Testing

Path coefficients, t-values, and p-values from bootstrapping were examined to test the proposed hypotheses. The structural model results show that customer feedback does not directly predict innovation behavior, but it strongly predicts self-efficacy, which in turn predicts innovation behavior. Detailed results are reported in Table 3.

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Table 3.
Hypotheses testing results (PLS-SEM structural model).

Hypothesis	Path	β	t-value	p-value	Result
H1	Customer feedback → Innovation behavior	0.21	1.27	0.204	Not supported
H2	Customer feedback → Self-efficacy	0.73	12.14	0.000	Supported
H3	Self-efficacy → Innovation behavior	0.63	9.42	0.000	Supported

H1 (Customer feedback → Innovation behavior): The direct path was positive but not statistically significant ($\beta = 0.21$, $t = 1.27$, $p > 0.05$). Thus, H1 was not supported.

H2 (Customer feedback → Self-efficacy): The path was positive and significant ($\beta = 0.73$, $t = 12.14$, $p < 0.001$), supporting H2.

H3 (Self-efficacy → Innovation behavior): The path was positive and significant ($\beta = 0.63$, $t = 9.42$, $p < 0.001$), supporting H3.

These findings indicate that while customer feedback does not directly enhance innovation behavior, it significantly boosts self-efficacy, which in turn promotes innovation.

5.4. Mediation and Moderation Analyses

5.4.1. Mediation Analysis

To test H4, the mediating role of self-efficacy in the relationship between customer feedback and innovation behavior was examined using the bootstrapping method. The indirect effect of customer feedback on innovation behavior through self-efficacy was significant ($\beta = 0.46$, 95% CI [0.32, 0.61], $p < 0.001$). The variance accounted for (VAF) value was 0.31, indicating partial mediation. This finding supports H4 and highlights self-efficacy as a crucial mechanism linking customer feedback and innovation behavior.

5.4.2. Moderation Analyses

H5a (Interpersonal sensitivity as a moderator): The interaction effect between customer feedback and interpersonal sensitivity on self-efficacy was significant ($\beta = 0.18$, $t = 2.97$, $p < 0.01$). The relationship between customer feedback and self-efficacy was stronger when employees exhibited higher interpersonal sensitivity. This supports H5a.

H5b (Work autonomy as a moderator): The interaction effect between self-efficacy and work autonomy on innovation behavior was significant ($\beta = 0.21$, $t = 3.41$, $p < 0.001$). Simple slope analysis revealed that the positive impact of self-efficacy on innovation behavior was amplified under conditions of high work autonomy. This supports H5b.

To better visualize the moderating effects, Figures 3a and 3b display the simple slope analyses. The relationship between customer feedback and self-efficacy is stronger under high interpersonal sensitivity, while the effect of self-efficacy on innovation behavior is amplified by higher work autonomy.

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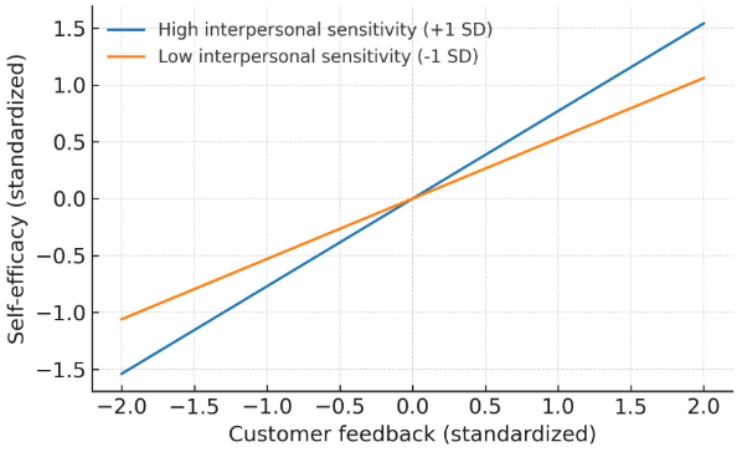

Figure 3a.
Interaction: Interpersonal sensitivity on CF → SE.

Figure 3b.
Interaction: Work autonomy on SE → EIB.

Bootstrapping results confirmed the mediating role of self-efficacy and the moderating roles of interpersonal sensitivity and work autonomy. Table 4 summarizes these results.

Table 4.
Mediation and moderation effects.

Hypothesis	Path/Interaction	β	95% CI	t-value	p-value	Result
H4	Customer feedback → Self-efficacy → Innovation behavior	0.46	[0.32, 0.61]	6.83	0.000	Supported
H5a	Customer feedback × Interpersonal sensitivity → Self-efficacy	0.18	[0.07, 0.29]	2.97	0.003	Supported
H5b	Self-efficacy × Work autonomy → Innovation behavior	0.21	[0.10, 0.32]	3.41	0.001	Supported

Together, these findings confirm both the mediating role of self-efficacy and the moderating roles of interpersonal sensitivity and work autonomy in the proposed FEI (Feedback–Efficacy–Innovation) model.

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5.5. Qualitative Findings

The qualitative phase provided additional insights to contextualize the quantitative results. Content and thematic analysis of 18 in-depth interviews revealed three major themes:

1) Customer feedback as a developmental resource.

Employees consistently described customer feedback as a critical source of learning. Positive feedback boosted their confidence and motivation, while constructive criticism provided direction for improvement. This aligns with the quantitative finding that feedback significantly enhanced self-efficacy.

2) The role of self-efficacy in overcoming challenges.

Interviewees emphasized that self-efficacy was the psychological resource that enabled them to translate customer input into innovative solutions. Employees with high self-efficacy reported being more willing to experiment with new service approaches and recover from setbacks, supporting the mediating role of self-efficacy.

3) The conditions of sensitivity and autonomy.

Consistent with the moderation analyses, employees highlighted the importance of individual and contextual factors. Those with high interpersonal sensitivity reported being more responsive to customer cues and therefore better able to integrate feedback into their self-assessment. Similarly, employees who perceived higher levels of work autonomy expressed greater freedom to implement innovative ideas, strengthening the link between self-efficacy and innovation behavior.

Table 5 provides representative interview quotes that illustrate how employees perceive customer feedback, self-efficacy, and contextual factors.

Table 5.
Representative interview quotes (Qualitative phase).

Theme	Representative Quote	Interpretation
Customer feedback as a resource	"When customers point out service gaps, it motivates me to think of new solutions."	Feedback strengthens self-efficacy.
Self-efficacy in innovation	"I feel more confident trying new methods after receiving positive feedback."	Confidence drives innovative behavior.
Boundary conditions (sensitivity & autonomy)	"Because I care about how customers see me, I pay close attention to their comments."	Interpersonal sensitivity amplifies feedback effects.
	"My manager allows me to adjust the service process on my own."	Work autonomy enhances innovation outcomes.

The integration of qualitative and quantitative findings offers a richer understanding of the mechanisms at play, underscoring the value of the mixed-methods design.

5.6. Summary of Findings

The results demonstrate that customer feedback influences innovation behavior primarily through self-efficacy, rather than directly. Self-efficacy partially mediates the relationship, while interpersonal sensitivity and work autonomy act as boundary conditions that strengthen these effects. The combination of survey and interview data provides both statistical rigor and contextual depth, lending strong support to the proposed model.

6. Discussion

6.1. Overview of Findings

This study set out to investigate how customer feedback shapes employees' innovative behavior through the mediating role of self-efficacy and under the moderating influences of interpersonal sensitivity and work autonomy, within the broader context of competitiveness in tourism. The empirical analysis, employing PLS-SEM and complemented by qualitative interviews, produced several noteworthy findings.

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First, customer feedback demonstrated a significant positive effect on self-efficacy, and through this pathway, indirectly influenced innovative behavior. The direct effect of customer feedback on innovative behavior was not significant in this sample, suggesting that the impact of customer feedback is primarily transmitted via employees' self-efficacy [6, 26]. Second, self-efficacy emerged as a robust mediator, accounting for a substantial portion of the variance in innovative behavior, consistent with social cognitive theory emphasizing the role of internal beliefs in shaping creative performance [7, 9, 27]. Third, the moderating effects revealed distinct dynamics: interpersonal sensitivity amplified the conversion of customer feedback into enhanced self-efficacy, while work autonomy reinforced the pathway from self-efficacy to innovative behavior. These findings align with prior research that highlights the interaction between contextual support and psychological resources in fostering employee innovation [8, 18, 29]. Finally, the qualitative evidence supported the statistical findings, offering rich examples of how tourism employees interpret customer feedback, reframe challenges, and devise creative solutions—particularly when supported by adequate autonomy and attunement to interpersonal cues [24, 33].

Taken together, these findings emphasize that customer feedback, self-efficacy, and contextual moderators are not only individual-level mechanisms but also critical levers for strengthening innovation as a factor of competitiveness in the tourism sector [1, 3].

6.2. Comparison with Prior Literature

This study aligns with social cognitive theory Bandura [9] confirming that self-efficacy is a key driver of innovative behavior. Consistent with earlier findings [27, 34] employees with stronger self-beliefs are more likely to innovate. The contribution here lies in the tourism context, where frequent customer interactions and immediate feedback make innovation central to competitiveness. Unlike prior research treating feedback mainly as a managerial tool [35] this study highlights customer feedback as a direct external stimulus for employee innovation.

The moderation results also extend existing knowledge. Work autonomy, previously seen as a direct motivator of creativity [31, 36] is shown here to strengthen the link between self-efficacy and innovation. Interpersonal sensitivity, often framed as a liability [37] emerges as a potential asset, enabling employees to convert customer input into self-efficacy gains that foster innovative behavior. These insights enrich prior literature by emphasizing how social–emotional traits and workplace conditions jointly enhance innovation as a factor of tourism competitiveness.

6.3. Theoretical Contributions

This study offers several theoretical contributions to innovation and competitiveness in tourism. First, it advances understanding of the micro-foundations of innovation in service contexts by empirically linking customer feedback with employee innovative behavior. In doing so, it connects external market signals with internal psychological processes that drive competitiveness in tourism organizations. Second, it enriches self-efficacy theory by demonstrating its mediating role: self-efficacy not only predicts performance but also gains strength from customer interaction, particularly when supported by contextual moderators. Third, the study broadens innovation theory by incorporating underexplored moderators. Interpersonal sensitivity, often framed negatively, is shown here as a constructive trait that facilitates the translation of feedback into innovation. Similarly, the contingent role of autonomy refines self-determination theory, illustrating how structural job design can amplify psychological mechanisms to foster innovation.

Methodologically, the integration of PLS-SEM and qualitative interviews also contributes to tourism research. This mixed-methods approach strengthens validity and provides a replicable framework for exploring complex cognitive and organizational mechanisms underpinning innovation as a factor of competitiveness in tourism.

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6.4. Practical Implications

This study generates several actionable implications for managers and organizations in the tourism and service industries. First, establishing systematic mechanisms for collecting and communicating customer feedback is essential. Employees should not only receive feedback but also be guided to interpret it as constructive input that strengthens their competence and problem-solving orientation. Structured feedback channels, coaching, and recognition systems can help frame customer input as developmental rather than purely evaluative, thereby stimulating innovation.

Second, strengthening employees' self-efficacy should be a managerial priority. Training programs, mentoring, and opportunities for mastery experiences can enhance employees' confidence in their innovative capabilities. By reinforcing positive self-beliefs, organizations can maximize the transformation of external market cues into proactive innovative behavior.

Third, job design should emphasize work autonomy. Providing employees with discretion in decision-making creates conditions where self-efficacy can translate into innovative action. For example, frontline staff with flexibility in addressing customer requests are more likely to generate novel solutions, which directly improve service quality and contribute to organizational competitiveness.

Fourth, managers should recognize the strategic value of interpersonal sensitivity. Rather than viewing it as a weakness, organizations can foster training that enables employees to channel sensitivity into empathetic listening and adaptive learning. In high-contact tourism contexts, such sensitivity helps staff interpret subtle customer needs and convert them into innovative service practices.

Finally, the findings suggest broader policy-level implications. For tourism and service sectors seeking sustainable competitive advantage, building a culture of feedback-driven innovation enhances resilience in rapidly changing markets. This approach benefits not only individual firms but also regional clusters of tourism organizations striving to raise service quality standards and strengthen overall industry competitiveness.

6.5. Limitations and Future Research

Despite its contributions, the study has limitations. First, the data were collected within specific organizational contexts in China's tourism sector, which may constrain generalizability. Future research should examine whether the observed mechanisms hold across industries and cultural contexts. Second, the cross-sectional survey design limits causal inference. Longitudinal or experimental studies could validate the temporal ordering of constructs. Third, although PLS-SEM effectively modeled complex relationships, the reliance on self-report measures raises concerns of common method bias. Future studies may integrate objective performance metrics or supervisor ratings to complement employee perspectives.

In addition, the moderation constructs warrant further exploration. Interpersonal sensitivity, while beneficial here, may operate differently in cultures with lower power distance or in industries with less customer interaction. Work autonomy may also display non-linear effects, where excessive autonomy leads to role ambiguity and reduced innovation. These contingencies should be tested in future research.

Finally, qualitative evidence, though supportive, was limited in scope. Expanding the qualitative component to include focus groups or longitudinal ethnographies could enrich understanding of how employees make sense of feedback over time. Integrating advanced analytical approaches such as multi-level modeling could also capture organizational-level influences on individual processes.

7. Conclusion

This study sets out to examine the mechanisms through which customer feedback influences employees' innovative behavior, with a focus on the mediating role of self-efficacy and the moderating influences of interpersonal sensitivity and work autonomy. Grounded in social cognitive theory and self-determination theory, we employed a mixed-methods design combining PLS-SEM analysis with qualitative interviews to develop a holistic understanding of these relationships. The findings highlight customer feedback as a critical external driver that fuels employees' psychological resources and

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innovative outcomes, while underscoring the importance of individual traits and job design in shaping these processes.

First, customer feedback directly enhances employees' self-efficacy, which in turn promotes innovative behavior. However, the direct link between customer feedback and innovative behavior did not reach significance, indicating that the effect operates mainly through the mediating role of self-efficacy. Second, self-efficacy functions as a robust mediator, serving as the psychological bridge between feedback and innovation. Third, the moderating effects of interpersonal sensitivity and work autonomy illustrate that these contextual and personal factors determine the strength of the observed relationships. Specifically, interpersonal sensitivity enhanced the conversion of customer feedback into self-efficacy, whereas work autonomy amplified the impact of self-efficacy on innovative behavior. Complementary qualitative evidence further validated these patterns, showing that employees who are attentive to customers and empowered with autonomy are more likely to transform feedback into meaningful innovations.

Theoretically, this study advances research on the micro-foundations of innovation in tourism and service industries. By linking customer feedback to innovative behavior through self-efficacy, it integrates external market signals with individual-level psychological mechanisms, enriching existing models of innovation in tourism. It further refines self-efficacy theory by demonstrating that feedback from customers—not only supervisors or peers—can serve as a crucial antecedent of innovative action. In addition, it extends self-determination theory by showing that work autonomy functions as a contextual amplifier of efficacy-driven innovation, while reframing interpersonal sensitivity as a positive social–emotional resource rather than a liability.

From a practical standpoint, the findings offer important implications for organizations in tourism and service industries where customer interaction is frequent and innovation is vital for competitiveness. Managers should establish structured systems for collecting and framing customer feedback so that employees perceive it as developmental rather than evaluative. Training and development programs that build self-efficacy—through mastery experiences, mentoring, and recognition—can enhance employees' confidence to act innovatively. Job design should emphasize sufficient autonomy, enabling employees to translate their efficacy beliefs into creative service solutions. Moreover, rather than undervaluing interpersonal sensitivity, organizations can cultivate it as a strategic capability that allows staff to interpret nuanced customer needs and develop adaptive innovations.

Nevertheless, several limitations must be acknowledged. The study was conducted in Chinese tourism organizations, which may restrict generalizability to other contexts. Its cross-sectional design also limits causal inference, suggesting the need for longitudinal or experimental research. Furthermore, although qualitative interviews enriched interpretation, expanding qualitative evidence—such as through case studies or focus groups—would provide deeper insights into the dynamics of feedback-driven innovation.

Despite these limitations, this study offers a valuable framework for understanding how customer feedback can be harnessed to drive innovative behavior in tourism. By integrating external stimuli, psychological mechanisms, and contextual moderators, it contributes to both academic theory and managerial practice. Ultimately, the research underscores that customer feedback is not merely an evaluative tool but a vital source of learning and empowerment that strengthens competitiveness in the tourism industry, particularly in dynamic markets where innovation is indispensable for sustainable advantage.

Transparency:

The authors confirm that the manuscript is an honest, accurate, and transparent account of the study; that no vital features of the study have been omitted; and that any discrepancies from the study as planned have been explained. This study followed all ethical practices during writing.

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