

Article

An Extended Theory of Planned Behavior Approach to Fitness Facility Use Intention in Korea: The Moderating Role of Social Sustainability

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Abstract

Based on an extended Theory of Planned Behavior (ETPB), this study investigated how perceived social sustainability shaped individuals' intentions to use fitness facilities. Specifically, it examined the moderating role of social sustainability in the relationships between key TPB determinants and fitness facility use intention. Survey data were collected from 195 adults living in metropolitan areas and were analyzed using partial least squares structural equation modeling (PLS-SEM). The results revealed that perceived social sustainability exerted a dual moderating influence on intention formation by strengthening the effect of subjective norm while attenuating the effect of perceived behavioral control on use intention. Higher levels of perceived social sustainability (SS) strengthened the relationship between subjective norm (SN) and fitness facility use intention with a medium effect size, while attenuating the relationship between perceived behavioral control (PBC) and use intention with a small effect size. In contrast, no significant moderating effect was observed in the relationship between attitude and use intention. These findings suggest that value-oriented considerations related to social responsibility and community well-being enhanced socially driven motivations while reducing the relative influence of control-based factors. By demonstrating the conditional effects of perceived social sustainability within the TPB framework, this study extended existing research on health-related behavioral intentions. The findings further highlight the importance of incorporating community-oriented and socially responsible practices into fitness facility management to foster sustainable user engagement.



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Keywords: extended theory of planned behavior (ETPB); fitness facility use intention; social sustainability; subjective norm; perceived behavioral control; PLS-SEM

1. Introduction

In recent years, sustainability has gained increasing attention in both academic and professional discussions of the fitness industry in Korea. In this context, sustainability extends beyond short-term managerial concerns such as operational efficiency, membership growth, or cost reduction. Instead, it reflects a long-term developmental strategy grounded

in the Triple Bottom Line framework, which emphasizes the balanced integration of social, environmental, and economic dimensions [1–3]. When applied to the fitness industry, sustainability may therefore be conceptualized as the simultaneous pursuit of high-quality exercise services and the public value creation through the promotion of community health and social well-being.

Despite this conceptual shift, the Korean fitness industry remains within a highly competitive market structure that encourages short-term, profit-oriented strategies. Intense competition and market saturation have compelled many fitness facilities to prioritize immediate financial survival over long-term sustainability. As reported by Kim [4] in a news article titled “Proliferation of Health Clubs and Closures Due to Cutthroat Competition” (16 April 2016), these structural pressures have resulted in frequent facility closures and limited the integration of sustainability-driven initiatives into core management strategies. Consequently, the pursuit of sustainability tends to be relegated to secondary priority or excluded from core management strategies.

Within this context, examining prospective users’ intentions to use sustainability-oriented fitness facilities is of both theoretical and practical importance. Given prospective consumers make facility choices based on sustainability-related information and value judgments in the absence of prior usage experience, their initial intentions are critical for understanding demand structures at the market entry stage. Moreover, fitness facility use intention is a key determinant of management outcomes, including long-term viability and service continuity, and initial use intentions, in particular, function as antecedent variables influencing new customer acquisition and the feasibility of sustainable management. Therefore, a systematic analysis of intention formation can provide empirical evidence supporting the strategic relevance of sustainability-based management. Such an approach also enables the assessment of whether sustainability-oriented practices are perceived as legitimate and meaningful by users, including prospective consumers, thereby providing practical implications for fitness facility operators.

The Theory of Planned Behavior (TPB) provides a well-established framework for analyzing behavioral intention and decision-making processes. TPB, originally proposed by Ajzen [5], posits that behavioral intention is determined by three core components: attitude toward the behavior, subjective norm, and perceived behavioral control [5–8]. Attitude reflects an individual’s overall evaluation of a behavior, subjective norm refers to perceived social expectations or pressures, and perceived behavioral control refers to the perceived ease or difficulty of performing the behavior. Due to its conceptual simplicity and strong predictive validity, TPB has been extensively applied across diverse research domains, including health, consumer behavior, and physical activity [8,9].

In Korea, TPB has been applied to explain human behavior across a wide range of settings, and recent studies have increasingly adopted extended TPB approaches to more accurately capture complex interrelationships among variables [10–20]. In particular, extensions of the original TPB model that incorporate additional exogenous or moderating variables have been regarded as both theoretically and practically valuable, as they allow for a more nuanced understanding of human behavior. In this regard, an extended TPB framework is particularly appropriate for examining fitness facility use intention from a sustainability perspective.

However, given the unique characteristics of the Korean fitness industry, operating on a small-scale, privately operated structure within an intensely competitive market, the implementation of environmental and economic sustainability practices is likely to face structural constraints. Specifically, environmental sustainability is constrained by high initial investment costs, weak links to short-term financial returns, and limited institutional support, whereas economic sustainability is constrained by its overemphasis in a profit-

driven competitive structure, which intensifies price competition, reduces service quality, and reduces sustainability to a short-term survival strategy.

Given the structural constraints of the Korean fitness industry, social sustainability is considered the most feasible and theoretically meaningful dimension. In the fitness industry, social sustainability can be understood as the capacity of sports activities and facilities to generate social value on a continuous basis and public benefits through interactions with the local community.

Moreover, social sustainability mitigates structural limitations more effectively than environmental and economic sustainability, due to its relatively low implementation costs and high feasibility, and directly shapes users' perceptions and behavioral intentions. Accordingly, it is expected to provide valuable insights for establishing the need for and direction of sustainable management strategies that reflect the structural characteristics of the Korean fitness industry.

Although directly relevant empirical studies remain limited, prior research adopting extended TPB frameworks with sustainability-related moderating effects provides indirect support for the validity of this approach [11,21,22]. Moreover, broader sustainability-related studies also suggest that specifying conditional relationships involving sustainability-oriented variables is theoretically and methodologically plausible [23,24]. In addition, previous studies indicating that social value-oriented dimensions of sport participation may function as important antecedents of individual intention further support the theoretical validity of the present study [25,26].

Accordingly, this study aims to examine fitness facility use intention within an extended Theory of Planned Behavior framework by incorporating perceived social sustainability as a moderating variable. Specifically, it investigates how the relationships between the core TPB constructs and use intention vary depending on individuals' perceptions of the social responsibility practices of fitness facilities, including contributions to local communities and the promotion of public health. By addressing a notable gap in the existing literature, this study contributes to a more nuanced understanding of intention formation in the Korean fitness industry and offers strategic insights into the role of social sustainability in long-term, community-oriented fitness facility management.

2. Research Hypotheses

TPB conceptualizes behavior as the outcome of intention formation, which is influenced by three psychological determinants: attitude, subjective norm, and perceived behavioral control. Attitude reflects an individual's overall evaluative judgment of a behavior, subjective norm represents perceived social expectations and normative pressures, and perceived behavioral control refers to the perceived capacity and control over behavior performance, including assessments of ease or difficulty [5,6,8].

Due to its parsimony and explanatory strength, TPB has served as a foundational framework for behavioral research across multiple disciplines [8,9]. More recently, scholars have sought to extend the original TPB by integrating additional contextual, antecedent, or moderating variables, thereby enabling a more refined understanding of behavioral decision-making. These extended TPB models have demonstrated both theoretical and practical value by the elucidating conditional mechanisms underlying complex behaviors [10–22,27].

Applying an extended TPB framework is theoretically relevant given the structural characteristics of the Korean fitness industry. In particular, as environmental and economic sustainability are likely to face structural constraints by the industry's small-scale, privately operated structure and intensified price competition, social sustainability can function as a key variable that directly shapes users' perceptions and behavioral intentions, due to

its relatively low implementation costs and high feasibility. Accordingly, research on an extended TPB framework incorporating social sustainability is expected to provide both practical implications for developing sustainable management strategies and a theoretical basis for explaining fitness facility use intention [11,21,22].

Building on this rationale, this study investigates whether the effects of attitude, subjective norm, and perceived behavioral control on fitness facility use intention vary depending on individuals' levels of perceived social sustainability (Figure 1). By testing these moderating effects, the study seeks to clarify the functional role of social sustainability in intention formation and to provide empirically grounded insights into sustainability-oriented management strategies within the Korean fitness industry [5,11,22].

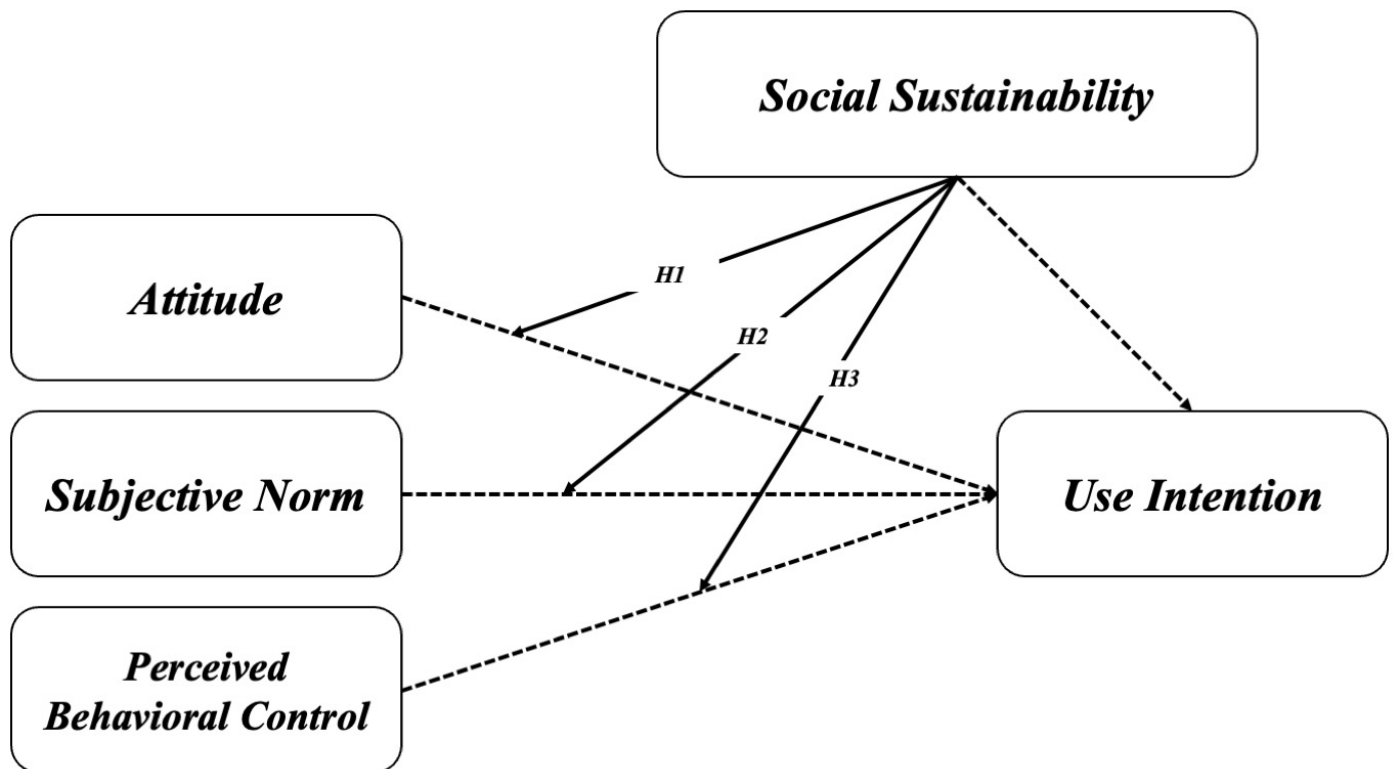


Figure 1. Research Model.

However, prior research directly examining the moderating role of perceived social sustainability in this context remains limited. Accordingly, the present study approaches these potential interaction effects from a predictive perspective and, based on the preceding theoretical discussion, proposes the following non-directional hypotheses.

H1. *Perceived social sustainability moderates the relationship between attitude and fitness facility use intention.*

H2. *Perceived social sustainability moderates the relationship between subjective norm and fitness facility use intention.*

H3. *Perceived social sustainability moderates the relationship between perceived behavioral control and fitness facility use intention.*

3. Methods

3.1. Research Sampling

The target population comprised men and women aged 19 years and older residing in the Seoul metropolitan area, encompassing Seoul, Gyeonggi-do, and Incheon. The sampling frame was restricted to prospective fitness facility users who were not actively using fitness facilities or engaging in regular exercise at the time of the survey but reported a clear intention to begin exercise activities, including fitness facility use, within the subsequent three months.

Convenience sampling was adopted. The minimum required sample size was estimated using G*Power 3.1 (Heinrich Heine University Düsseldorf, Düsseldorf, Germany), based on an a priori power analysis with an effect size of $f^2 = 0.15$, significance level of $\alpha = 0.05$, statistical power of 0.95, and seven predictor variables. The analysis indicated a minimum sample size of 153 participants. Anticipating an attrition rate of approximately 30% due to low-quality or inattentive responses (e.g., uniform response patterns or failure on attention-check items), 200 questionnaires were distributed through Google Forms (Google LLC, Mountain View, CA, USA), all of which were completed.

3.2. Participants

Following data screening, five responses were excluded due to insufficient data quality, resulting in a final analytical sample of 195 participants. Among these, 84 participants (43.1%) were male and 111 (56.9%) were female. With respect to age, participants in their twenties constituted the majority of the sample ($n = 155$, 79.5%), followed by those in their thirties ($n = 32$, 16.4%) and forties ($n = 8$, 4.1%). The predominance of younger adults should be considered when interpreting the findings, as it may limit the generalizability of the results to older populations.

3.3. Measurement Instruments

The sources and composition of the measurement instruments used in this study were as follows:

First, items measuring the core constructs of the TPB—attitude, subjective norm, perceived behavioral control, and use intention—were developed based on instruments employed in prior studies [28–35]. The measurement instrument was reviewed by three experts—including a Ph.D. in sport science and a fitness center operator—and refined through one round of expert feedback. Subsequently, the items were revised and reconstructed to fit the research context, resulting in measures of attitude (4 items), subjective norm (4 items), perceived behavioral control (4 items), and use intention (5 items), all assessed using a 7-point Likert scale.

Second, perceived social sustainability was measured as a single-factor construct based on the theoretical foundations of Maignan and Ferrell [36] and Sen et al. [37]. Items previously used in studies reflecting the Korean cultural context [38,39] were adopted and also reviewed by the expert panel and refined through one round of feedback to ensure suitability for the study population. Consequently, perceived social sustainability was operationalized as a unidimensional construct comprising four items, measured on a 7-point Likert scale.

Given that all constructs were measured using the same self-report instrument, the potential for common method bias was considered. To mitigate this issue, procedural remedies were applied by assuring respondent anonymity and reducing evaluation apprehension.

3.4. Data Analysis

Data analysis was conducted using Partial Least Squares Structural Equation Modeling (PLS-SEM) with SmartPLS 4.1.1.2 (SmartPLS GmbH, Oststeinbek, Germany). Unlike covariance-based structural equation modeling (CB-SEM), PLS-SEM is a variance-based, non-parametric estimation approach that emphasizes explanatory power and predictive accuracy rather than strict theory testing and requires fewer assumptions regarding sample size and data normality, making it particularly suitable for research contexts such as the present study, which are characterized by relatively small samples and limited directly relevant prior evidence [40–42].

The assessment of the measurement model and the structural model, which constitute the core analytical procedures in PLS-SEM, was conducted in accordance with methodological guidelines proposed in prior studies [40–42]. Specifically, the measurement model evaluation focused on indicator reliability (outer loadings and indicator reliability), internal consistency reliability (Cronbach's alpha, ρ_a , and ρ_c), convergent validity (average variance extracted; AVE), and discriminant validity (heterotrait–monotrait ratio; HTMT). Subsequently, the structural model was assessed based on multicollinearity (variance inflation factor; VIF), explanatory power (adjusted R^2), effect size (f^2), predictive relevance (Q^2), and the statistical significance of path coefficients.

4. Results

4.1. Measurement Model Assessment

The measurement model was evaluated in terms of indicator reliability (outer loadings and indicator reliability), internal consistency reliability (Cronbach's alpha, ρ_a , and ρ_c), convergent validity (AVE), and discriminant validity (HTMT) (Tables 1 and 2). Indicator reliability was supported, as all items exhibited standardized outer loadings (λ) exceeding the recommended threshold of 0.70 (range: 0.779–0.974) and indicator reliability values (λ^2) exceeding 0.50 (range: 0.607–0.949). Internal consistency reliability was confirmed, with Cronbach's alpha values ranging from 0.944 to 0.972, ρ_a values from 0.947 to 0.972, and ρ_c values from 0.960 to 0.979, all surpassing the recommended minimum criterion of 0.70. Convergent validity was established, as the AVE for all constructs exceeded 0.50 (range: 0.855–0.922). Discriminant validity was verified through HTMT analysis, as none of the confidence intervals included the value of 1, indicating adequate discriminant validity among the latent constructs.

Table 1. Assessment Results of the Measurement Model.

Latent Variable	Measurement Variable	λ	λ^2	α	ρ_a	ρ_c	AVE	Discriminant Validity
		>0.70	>0.50	>0.70	>0.70	>0.70	>0.50	CI Includes 1
Attitude (ATT)	ATT 1	0.944	0.891	0.944	0.947	0.960	0.856	No
	ATT 2	0.948	0.899					
	ATT 3	0.884	0.781					
	ATT 4	0.923	0.852					
Subjective Norm (SN)	SN 1	0.955	0.912	0.972	0.972	0.979	0.922	No
	SN 2	0.966	0.933					
	SN 3	0.974	0.949					
	SN 4	0.946	0.895					
Perceived Behavioral Control (PBC)	PBC 1	0.933	0.870	0.953	0.954	0.966	0.876	No
	PBC 2	0.928	0.861					
	PBC 3	0.961	0.924					
	PBC 4	0.921	0.848					

Table 1. Cont.

Latent Variable	Measurement Variable	λ	λ^2	α	ρ_a	ρ_c	AVE	Discriminant Validity
		>0.70	>0.50	>0.70	>0.70	>0.70	>0.50	CI Includes 1
Social Sustainability (SS)	SS 1	0.923	0.852	0.965	0.966	0.974	0.905	No
	SS 2	0.966	0.933					
	SS 3	0.969	0.939					
	SS 4	0.947	0.897					
Use Intention (UI)	UI 1	0.941	0.885	0.956	0.961	0.967	0.855	No
	UI 2	0.959	0.920					
	UI 3	0.968	0.937					
	UI 4	0.961	0.924					
	UI 5	0.779	0.607					

Table 2. Confidence Interval Estimates for HTMT Ratios.

Latent Variable Pairs	O	M	95% PC	
			2.5%	97.5%
SN ↔ ATT	0.586	0.585	0.440	0.713
PBC ↔ ATT	0.633	0.631	0.514	0.731
PBC ↔ SN	0.535	0.535	0.405	0.652
SS ↔ ATT	0.470	0.469	0.299	0.625
SS ↔ SN	0.344	0.346	0.185	0.504
SS ↔ PBC	0.752	0.752	0.665	0.826
UI ↔ ATT	0.676	0.676	0.525	0.798
UI ↔ SN	0.575	0.574	0.417	0.714
UI ↔ PBC	0.695	0.695	0.553	0.804
UI ↔ SS	0.607	0.608	0.492	0.719

Note: ATT = Attitude, SN = Subjective Norm, PBC = Perceived Behavioral Control, SS = Social Sustainability, UI = Use Intention, O = Original sample, M = Sample mean.

4.2. Structural Model Assessment

In this study, the adequacy of the structural model was evaluated based on multicollinearity (VIF), explanatory power (adjusted R^2), effect size (f^2), and predictive relevance (Q^2) (Table 3). Multicollinearity was not a concern, as all VIF values were below the recommended threshold of 5 (range: 1.616–2.912). The adjusted coefficient of determination for the endogenous construct, use intention, was 0.642, indicating a moderate level of predictive power. Based on established guidelines for effect size interpretation [42–44], the effect sizes of most exogenous constructs on use intention were classified as small, with the exception of the interaction term between subjective norm and perceived social sustainability, which exhibited a medium effect size. Finally, the predictive relevance of the model was confirmed, as all endogenous constructs produced Q^2 values greater than zero, demonstrating adequate predictive capability of the exogenous variables.

In addition, the VIF values remained below the more conservative threshold of 3.3, suggesting that common method bias was unlikely to pose a serious threat to the interpretation of the findings.

Table 3. Assessment Results of the Structural Model.

		VIF	f ²	adj R ² (R ²)	Q ²
ATT	→ UI	2.012	0.064	0.642 (0.655)	0.594
SN		1.616	0.098		
PBC		2.797	0.055		
SS		2.912	0.097		
ATT × SS		2.308	0.009		
SN × SS		1.702	0.123		
PBC × SS		2.486	0.074		

Note: ATT = Attitude, SN = Subjective Norm, PBC = Perceived Behavioral Control, SS = Social Sustainability, UI = Use Intention.

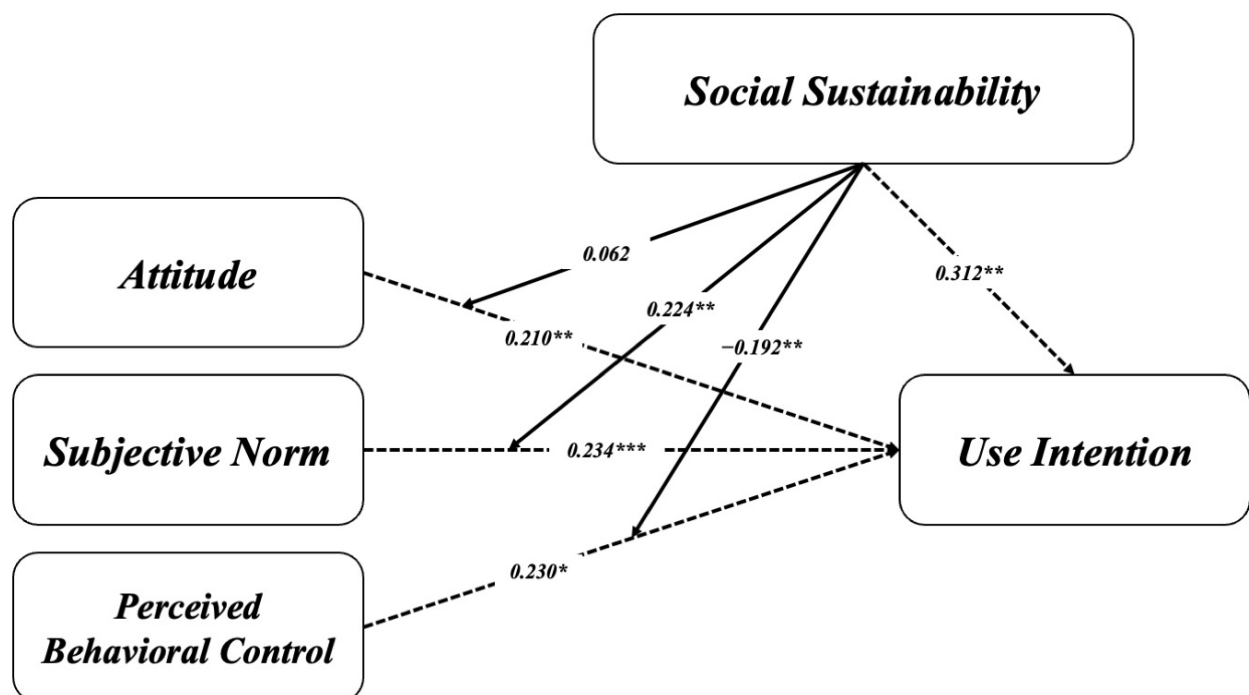
4.3. Hypothesis Testing

Hypotheses were tested by examining the statistical significance and direction of the path coefficients (Table 4 and Figure 2), and effect sizes (f^2) were additionally assessed to evaluate the magnitude of the moderating effects.

Table 4. Results of Hypothesis Testing.

H	Path	β	SD	t	95% PC		p
					Lower	Upper	
	ATT → UI	0.210	0.072	2.909	0.073	0.360	0.004
	SN → UI	0.234	0.066	3.563	0.090	0.346	0.000
	PBC → UI	0.230	0.113	2.040	0.007	0.439	0.041
	SS → UI	0.312	0.111	2.819	0.092	0.521	0.005
H1	ATT × SS → UI	0.062	0.080	0.770	−0.062	0.246	0.441
H2	SN × SS → UI	0.224	0.074	3.026	0.046	0.331	0.002
H3	PBC × SS → UI	−0.192	0.060	3.202	−0.313	−0.073	0.001

Note: ATT = Attitude, SN = Subjective Norm, PBC = Perceived Behavioral Control, SS = Social Sustainability, UI = Use Intention.

**Figure 2.** Results of Hypothesis Testing. Note: * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

Prior to testing the interaction effects, the direct effects of attitude ($\beta = 0.210$, $p = 0.004$, 95% CI [0.073, 0.360]), subjective norm ($\beta = 0.234$, $p < 0.001$, 95% CI [0.090, 0.346]), perceived behavioral control ($\beta = 0.230$, $p = 0.041$, 95% CI [0.007, 0.439]), and perceived social sustainability ($\beta = 0.312$, $p = 0.005$, 95% CI [0.092, 0.521]) on use intention were all found to be positive and statistically significant.

With regard to the moderating effects, perceived social sustainability did not significantly moderate the relationship between attitude and use intention ($\beta = 0.062$, $p = 0.441$, 95% CI [−0.062, 0.246]), and the corresponding effect size was negligible ($f^2 = 0.009$). Therefore, Hypothesis 1 was not supported.

In contrast, perceived social sustainability significantly and positively moderated the relationship between subjective norm and use intention ($\beta = 0.224$, $p = 0.002$, 95% CI [0.046, 0.331]), with an effect size that approached the medium range ($f^2 = 0.123$), thereby supporting Hypothesis 2.

Additionally, perceived social sustainability exerted a significant negative moderating effect on the relationship between perceived behavioral control and use intention ($\beta = -0.192$, $p = 0.001$, 95% CI [−0.313, −0.073]), with a small effect size ($f^2 = 0.074$), thus supporting Hypothesis 3.

To facilitate interpretation of the significant interaction effects, simple slope plots were generated. As shown in Figures 3 and 4, the positive relationship between subjective norm and use intention became stronger as perceived social sustainability increased, whereas the positive relationship between perceived behavioral control and use intention became weaker at higher levels of perceived social sustainability.

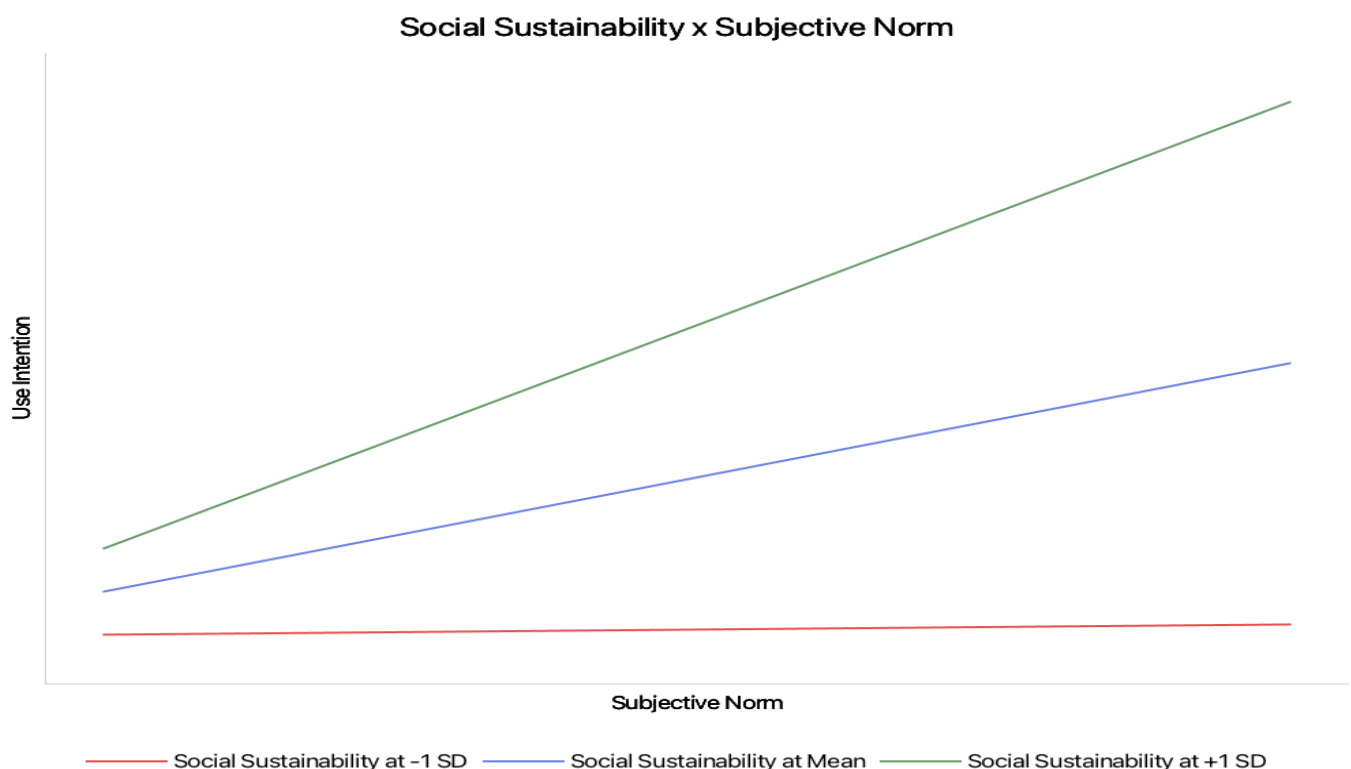


Figure 3. Moderating effect of perceived social sustainability on subjective norm.

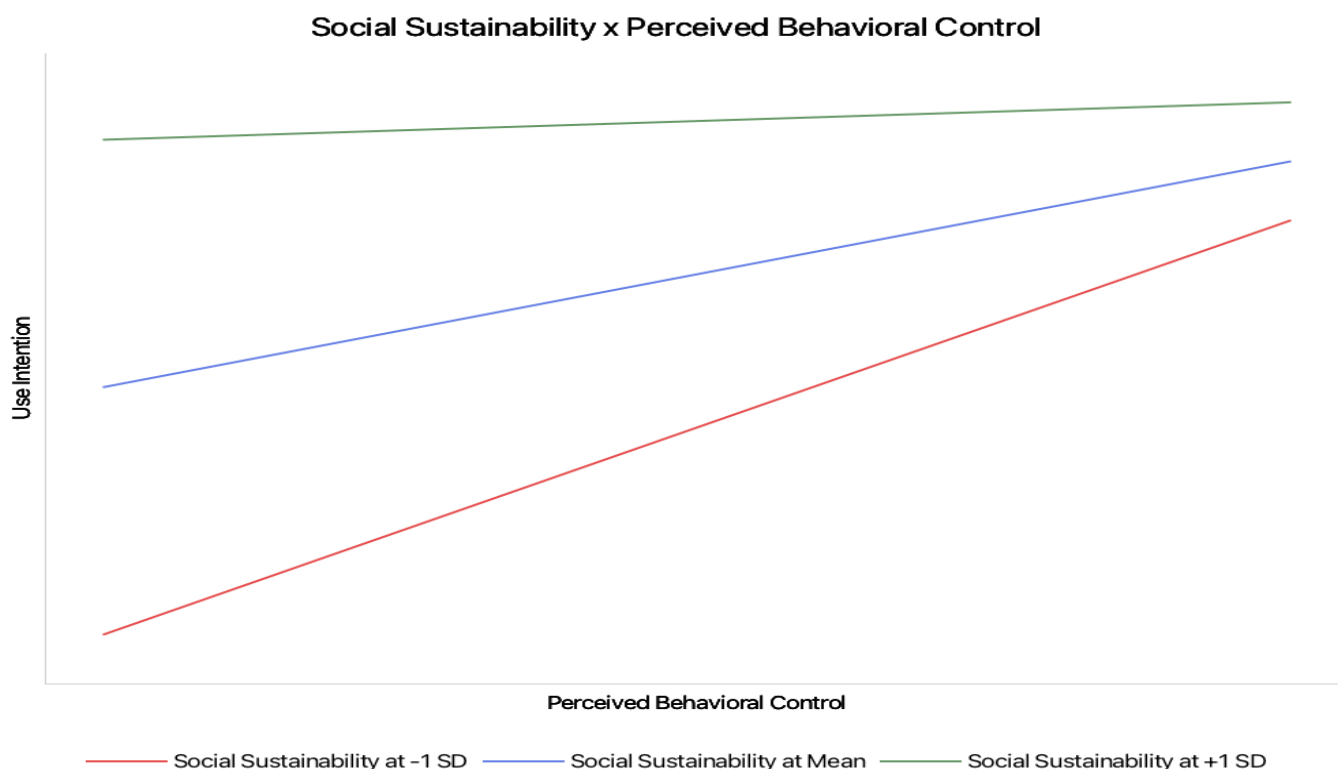


Figure 4. Moderating effect of perceived social sustainability on perceived behavioral control.

5. Discussion

This study examined fitness facility use intention within an extended TPB framework by incorporating perceived social sustainability, thereby clarifying the need for and strategic orientation of sustainable management practices that reflect the structural characteristics of the Korean fitness industry. To address this objective, PLS-SEM was applied to test whether perceived social sustainability moderates the relationships between attitude, subjective norm, perceived behavioral control, and use intention. Based on the empirical evidence obtained, the following discussion is provided.

The findings indicate that perceived social sustainability performed distinct functions depending on the specific TPB component, suggesting that it operates as a contextual condition that shaped intention-formation pathways rather than as a peripheral add-on. In other words, social sustainability perceptions may recalibrate the relative salience of conventional predictors in translating intention into behaviors. Importantly, the central contribution of this study lies not merely in identifying a moderating effect of perceived social sustainability but in demonstrating that such moderation operates in systematically different directions across TPB components. Taken together, the findings suggest that perceived social sustainability tends to reinforce socially and value-driven pathways of intention formation while weakening pathways grounded in feasibility and personal control.

Consistent with this interpretation, the interaction between attitude and perceived social sustainability was not statistically significant in predicting use intention. This pattern is understandable, given that attitudes toward fitness facilities are typically grounded in individuals' relatively stable beliefs and evaluative appraisals, encompassing both cognitive judgments and affective reactions. As such, these pre-existing attitudinal evaluations may be less susceptible to modification by contextual value-oriented perceptions at the social level.

In contrast, perceived social sustainability significantly strengthened the subjective norm–use intention relationship. Notably, this interaction demonstrated a medium ef-

fect size, indicating a practically meaningful level of influence. This finding implies that when prospective users hold stronger perceptions that a facility engages in socially sustainable activities, normative influence—stemming from significant others' expectations and perceived social pressure—becomes more consequential in shaping use intention. Put differently, social sustainability perceptions may confer social and moral legitimacy on normative cues, thereby encouraging individuals to internalize others' expectations as personally meaningful and worthwhile behavioral choices.

A contrasting pattern emerged in the perceived behavioral control–use intention relationship, in which perceived social sustainability exerted an attenuating moderating effect. Although this interaction was statistically significant, the effect size was relatively small, suggesting a limited magnitude of practical influence. Nevertheless, its negative direction offers important theoretical insight. Specifically, as social sustainability perceptions increased, the predictive salience of feasibility-related considerations (e.g., time, cost, accessibility, and convenience) declined. This suggests that individuals with stronger value-oriented dispositions may place greater emphasis on the facility's social meaning and public value than on considerations of personal efficiency or controllability when forming use intention.

The observed moderation patterns were consistent with the broader logic underpinning extended TPB research. Prior work has repeatedly argued that the original TPB components—attitude, subjective norm, and perceived behavioral control—may be insufficient to account for the complexity of human behavior, thereby motivating calls to incorporate additional explanatory factors [5,18,45]. Additionally, studies in the Korean sport context have reported that social and value-oriented variables can play consequential roles in intention formation [10,12–14,16–19].

Against this theoretical backdrop, this study contributes by demonstrating that the translation of TPB components into use intention can vary as a function of individuals' value-related orientations, operationalized here as perceived social sustainability. More specifically, this study's key contribution is to show that perceived social sustainability does not simply enhance intention formation overall but rather selectively reshapes it by reinforcing normative influence while weakening control-based influence. This finding extends the explanatory scope of the TPB framework by revealing that sustainability-related value orientations may reconfigure the relative salience of intention pathways rather than uniformly amplifying all predictors.

At the same time, growing societal attention to sustainability has been accompanied by increasing interest in sustainability—particularly its social dimension—within the Korean fitness sector. This trend suggests that fitness facilities may evolve beyond their conventional role as exercise spaces, potentially functioning as social platforms that support healthy living, facilitate social connectedness, and strengthen community ties. Nevertheless, many facilities continue to prioritize short-term financial performance, and social sustainability is often not adopted as a long-term management strategy.

From a practical perspective, the findings suggest that sustainability-oriented management should be regarded not only as an ethical imperative but also as a strategic lever that can substantively influence use intention. Notably, the core predictors of use intention—attitude, subjective norm, and perceived behavioral control—were found to operate in a distinct manner depending on prospective users' awareness of a facility's social sustainability initiatives. This implies that, alongside conventional promotional tactics (e.g., flyers and social media marketing), socially sustainable practices—such as community-based engagement programs, partnerships with local welfare organizations, and free or low-cost exercise programs for socially vulnerable groups (e.g., low-income

populations, older adults, and youth)—may function as effective strategic instruments for strengthening use intention.

In conclusion, this study demonstrates that perceived social sustainability plays a pivotal and multidimensional role in moderating the effects of TPB determinants on fitness facility use intention. More importantly, it shows that perceived social sustainability functions as a dual moderating mechanism, simultaneously amplifying socially driven motivation and attenuating control-based decision pathways. By highlighting the conditional influence of social sustainability, the findings underscore the potential of long-term, community-oriented strategies as viable and competitive approaches to sustainable management in the Korean fitness industry.

6. Conclusions and Implications

This study provides empirical evidence supporting sustainability-oriented management in Korean fitness facilities by applying an extended TPB framework that incorporates perceived social sustainability. Using PLS-SEM, the study examined how social sustainability perceptions condition the relationships between core TPB determinants and fitness facility use intention.

The findings demonstrate that the effects of attitude, subjective norm, and perceived behavioral control on use intention vary according to individuals' levels of perceived social sustainability. Specifically, perceived social sustainability strengthened the influence of subjective norm on use intention while attenuating the influence of perceived behavioral control. This pattern represents a key contribution of the present study, as it demonstrates that perceived social sustainability functions not merely as a positive contextual factor but as a dual moderating mechanism that selectively reshapes intention formation pathways. These findings indicate that value-oriented perceptions related to social responsibility and community contribution play a meaningful moderating role in intention formation within an extended TPB framework.

From a theoretical perspective, this study contributes to the TPB literature by illustrating that intention formation is shaped not only by the direct effects of TPB components but also by context-specific value orientations that differentially modify their functional roles. More specifically, the findings suggest that sustainability-related perceptions do not uniformly strengthen all determinants of intention; rather, they selectively reinforce socially driven influences while weakening control-based decision pathways. In this respect, the study extends the explanatory scope of the TPB framework by demonstrating that sustainability-related values may reconfigure the relative salience of intention pathways in health and fitness contexts.

From a practical perspective, the findings suggest that sustainability-oriented management should be regarded not only as an ethical imperative but also as a strategic lever capable of influencing prospective users' behavioral intention. In particular, the results imply that fitness facilities may strengthen use intention not only through conventional promotional strategies but also by implementing socially sustainable initiatives such as community health promotion programs, partnerships with local welfare organizations, and free or low-cost exercise services for socially vulnerable groups. Such practices may enhance the perceived social value of the facility and contribute to sustainable user engagement.

Given the limited number of studies that have applied an extended TPB framework to the Korean fitness facility context, this study holds intrinsic scholarly value. Accordingly, additional empirical investigations are warranted to further validate and extend the findings and theoretical interpretations derived from this study. Based on the identified limitations, several directions for future research are proposed.

Firstly, to facilitate the design of more effective social sustainability initiatives, future studies should move beyond general exploration and formulate more specific and testable research questions. In particular, rather than broadly examining social sustainability activities, future research could investigate which types and contextual forms of such initiatives—such as community health programs, charitable donations, or inclusive fitness services—are more strongly preferred and positively evaluated by prospective users, and which exert greater influence on use intention. Such an approach would enable a more nuanced understanding of the relative effectiveness of different sustainability practices and provide practical implications for the development of evidence-based sustainability programs.

Secondly, acknowledging the methodological constraint that demographic characteristics were minimized during data collection to comply with institutional review board (IRB) requirements, future research should incorporate additional facility-related variables—such as geographic proximity, equipment availability, and program diversity—that may exert meaningful influences on use intention. Such efforts would enhance the practical relevance and explanatory depth of subsequent findings.

Thirdly, this study is limited by its conceptualization and analysis of social sustainability as a unidimensional construct. Accordingly, future research should adopt more nuanced approaches that reflect the multidimensional characteristics and contextual diversity of social sustainability, thereby contributing to a more refined understanding of the relationships among relevant variables and offering more meaningful theoretical and practical implications.

Fourthly, given that this study employed a cross-sectional research design based on self-reported quantitative survey data, future research should adopt longitudinal designs and qualitative methodologies—such as in-depth interviews or focus group discussions—to more thoroughly capture dynamic and process-oriented relationships among the study variables.

Finally, given that the sample was limited to the Korean metropolitan region and that the data were concentrated within a specific age group, caution is warranted when generalizing the findings to broader populations. In addition, due to the limitations of self-reported responses and the use of a non-probability sampling method, the possibility of social desirability bias and the overrepresentation of certain groups cannot be ruled out, requiring additional caution in interpreting the generalizability of the results. Furthermore, the present study focused on perceived social sustainability rather than objectively verified sustainability practices. Therefore, respondents' evaluations may not necessarily reflect the actual level or quality of social sustainability initiatives implemented by fitness facilities. Future research should employ more diverse samples, incorporate more objective indicators of sustainability practices, and extend the analytical framework to a wider range of geographic regions and cultural contexts, thereby contributing to the theoretical refinement and cross-contextual validation of the extended TPB model.

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Abbreviations

The following abbreviations are used in this manuscript:

TPB	Theory of Planned Behavior
ETPB	Extended Theory of Planned Behavior
PLS-SEM	Partial Least Squares Structural Equation Modeling
SEM	Structural Equation Modeling
ATT	Attitude
SN	Subjective Norm
PBC	Perceived Behavioral Control
UI	Use Intention
AVE	Average Variance Extracted
HTMT	Heterotrait–Monotrait Ratio
VIF	Variance Inflation Factor
f ²	Effect Size
Q ²	Predictive Relevance
R ²	Coefficient of Determination
IRB	Institutional Review Board

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