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A Study of User Continuance Intention on Online Fitness Platforms: A Perspective from TAM Theories

Xudong Rui[1] and Ren Xu[2]
Panyapiwat Institute of Management, Nonthaburi, Bangkok, Thailand
E-mail: vance11166516@gmail.com, ORCID ID: https://orcid.org/0009-0009-5393-3377
E-mail: 510716549@qq.com, ORCID ID: https://orcid.org/0000-0002-8656-141X
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Abstract

Background and Aims: In light of the rapid emergence of the online fitness industry as an alternative to traditional fitness methods, particularly accentuated by the COVID-19 pandemic, this study delves into the motivations and continuous usage behavior of users within online fitness platforms. Grounded in the context of health issues stemming from insufficient physical activity, the research aims to address challenges such as low user continuance rates and loyalty within the online fitness domain. To this end, the study constructs a comprehensive research framework drawing from theories including flow theory, technology acceptance model (TAM), and health belief model (HBM), thus exploring the intricate interplay of various factors influencing users' intention to persist with online fitness platforms.

Methodology: With a diverse sample comprising 606 valid questionnaires collected from a wide array of online fitness participants, the study employs purposive sampling to ensure representation across different demographics and user profiles. Through the utilization of structured questionnaires and statistical analyses including difference analysis, regression analysis, and path analysis using SPSS and AMOS software, the research reveals significant insights into the dynamics of user behavior within the online fitness realm. Specifically, findings confirm the positive impact of factors such as content quality, platform incentives, and subjective norms on users' perceived usefulness and flow experience, which in turn significantly influence their intention to continue using online fitness platforms.

Results: The study's conclusions not only contribute to a deeper understanding of online fitness user behavior but also offer practical implications for the operation and enhancement of fitness platforms. By elucidating the mediating and moderating effects of variables such as exercise self-efficacy and health awareness, the research provides valuable guidance for improving service quality, enhancing user stickiness, and ultimately promoting the sustained and healthy development of online fitness platform enterprises.

Conclusion: Through its interdisciplinary approach and empirical analysis, the study enriches the theoretical framework of the fitness industry while advancing initiatives for public health and well-being in the digital age.

Keywords: Online Fitness; Flow Experience; Self-efficacy; Continuance Intention

Introduction

The proliferation of technology alongside the growing emphasis on health consciousness has propelled online fitness platforms into the forefront of contemporary society. These platforms offer users convenient and flexible fitness solutions through digital channels, enabling individuals to partake in physical activities at their convenience. Despite the burgeoning availability of online fitness platforms, the persistent engagement of user's post-registration remains a pressing concern. Sustained user intention on these platforms encompasses various factors, including technology acceptance, individual health beliefs, and satisfaction with platform features and content. This study aims to delve into the sustained intention of users on online fitness platforms, grounded in the Technology Acceptance Model (TAM), to unravel the pivotal factors influencing their continuous participation.

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TAM, renowned for elucidating individuals' adoption and utilization of information technology, serves as a fitting model for exploring users' acceptance of new technology and its impact on sustained usage within the context of online fitness platforms. Additionally, incorporating users' health beliefs will provide a deeper understanding of the interplay between attitudes and behaviors in fitness activities. Through an exhaustive examination of this subject matter, our objective is to offer insights into user-sustained engagement on online fitness platforms, thereby furnishing practical recommendations for platform enhancement, heightened user satisfaction, and the formulation of health promotion policies. By integrating TAM and the Health Belief Model, this study endeavors to comprehensively analyze the sustained intention of users on online fitness platforms, to make significant contributions to both academic discourse and practical application.

In this research endeavor, we aim to scrutinize the psychological processes of online fitness platform users, with the aspiration of laying down new theoretical and empirical foundations for the advancement of both technology and health domains.

Objectives

To address the practical challenge of maintaining the continued usage of original users on online fitness platforms and bridge the gaps in theoretical research, this study amalgamates flow theory and the technology acceptance model (TAM) alongside other pertinent theories. By comprehensively, deeply, and systematically exploring the impact and mechanisms of emotional experiences and other factors on users' continued usage intentions, we seek to provide robust, sustainable, and effective solutions for online fitness platform companies. The specific research objectives of this study are as follows:

Literature Review

Unveil the intrinsic mechanism of continued usage on online fitness platforms by integrating the Health Belief Theory (HBM) and Technology Acceptance Model (TAM) to construct a model of continued usage among online fitness platform users, thereby gaining profound insights into their continued usage behavior.

1. Technical acceptance model (TAM)

As the acceptance model of information technology is an important research model for the use and adoption of information systems, it was originally the theory of rational behavior (Theory of Reasoned Action, TRA) based on the field of psychological research by Davis (1989), which is one of the theoretical models widely used in the field of user behavior research of information systems. The model believes that the adoption and use of the new information system depends on the user's behavioral intention, The user's behavior intention (Behavioral Intention) will be influenced by the user's attitude (Attitude) and perceived usefulness (Perceived Usefulness), In addition, the user attitude in the model is determined by perceived usefulness and perceived ease of use (Perceived Ease of Use), The initial technical acceptance model was constructed (Technology Acceptance Model, TAM) as shown in the initial TAM model, Perceived usefulness and perceived ease of use are key direct factors that directly influence use attitudes, And can indirectly influence the user's behavior intention through the attitude. External variables, such as system characteristics, task characteristics, and user characteristics (External Variables), as precursor variables, have a positive impact on the perceived usefulness and perceived ease of use and indirectly affect the users' attitude toward using the information system through these two variables. The user's final system use behavior is directly determined by the user's use behavior intention, and is indirectly affected by the use attitude.

After the initial technical acceptance model was proposed, it was widely used in the acceptance behavior of information system users. With the deepening of relevant research, Davis et al. (1992) continuously improved the initial TAM in order to enhance the explanatory power of the technical acceptance model. Venkatesh (2000) that the use attitude variable only reflects the user's emotional preferences, cannot effectively and completely convey the direct influence of perceived usefulness and ease of use on the user behavior will, thus delete the use attitude variable in the initial TAM, modify the initial TAM, and proposed the revised TAM model, see Figure 2.2. This study takes one of the improved TAM theories as the basic model to build the model of continuous willingness to use users, which can help us to better understand user behavior.

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2. Health Belief Model (HBM)

In the early 1850s, the Public Health Service of the United States focused on epidemic prevention, and preventive measures were usually provided to the public for free or at a very low cost. However, preventive measures and asymptomatic disease screening tests (such as cervical cancer, testing and prevention of dental diseases, rheumatic fever, myelopoliomyelitis, and influenza tests) are generally not accepted by the public. In this context, it is important to understand why the public does not adopt preventive health behaviors, so social psychologists Hochbaum, Rosenstock, and Kegels in the US Department of Public Health developed the HBM to explain the processes by which individuals perceive, assess, respond, and change behavior to health threats (Janz & Becker, 1984). In 1974, Health Education Monographs introduced HBM through a full-issue series of papers, summarizing the findings of studies applying HBM to explain individual involvement or nonparticipation in multiple health-related behaviors and demonstrating the validity of HBM. Over time, HBM has become the most prominent model of social behavior, and the theory can effectively explain and predict health behaviors, thus avoiding a range of health risks.

Early HBM models suggested that health behavior decisions were generated by the combination of two cognitive concepts, risk perception and behavioral evaluation (Janz & Becker, 1984; Rosenstock et al., 1988). Among them, risk perception includes two subsets: perceived severity and perceived susceptibility; behavioral evaluation consists of two subsets: perceived disorder and perceived benefit. Later, based on this model, scholars introduced self-efficacy to further improve the interpretation strength of the model (Becker et al., 1977; Rosenstock et al., 1988; Vassallo et al., 2009). Perceptual susceptibility refers to the subjective perception of the probability of a disease; perceived severity is the judgment of the severity of the adverse consequences; perceived benefits emphasize the positive results of successful health behaviors, and perceived barriers emphasize the possible negative effects of specific health behaviors (Janz & Becker, 1984; Tajeri et al., 2020). Moreover, self-efficacy is the difficulty an individual needs to perform a behavior, while health awareness focuses on the individual's concerns about health issues (Becker et al., 1977). These concepts are widely used in the field of health behavior to help practitioners understand and predict people's willingness to change their health behavior. The health belief model states that if individuals believe that negative health outcomes are serious (perceived severity), consider themselves vulnerable (perceived susceptibility), consider the benefits of reducing such outcomes high (perceived benefit), and consider that barriers to taking these behaviors are low (perceived impairment), these individual behaviors are likely to occur (health behavior).

3. Flow theory (Flow Theory)

The heart flow theory (Flow Theory) was first proposed by psychologist Csikszentmihalyi (1975), who defines heart flow (Flow) as a feeling that puts an individual spirit on a certain activity, with a high degree of positive emotions such as excitement and fulfillment, also known as "optimal experience" (Optimal Experience). Flow theory includes nine characteristics: clear goals (Clear Galson Task, CGT), Instant feedback (Immediate Feedback on Tasks, IFT), individual skills matching to the task challenge (Balance between Challenges and Skills of the Task, BCST), the fusion of action and perception (Merging of Action and Awareness, MAA), focus on what you do (Concentration on the Task at Hand, CTH), a potential sense of control (Sense of Control, SOC), loss of self-awareness (Loss of Self-Consciousness, LSC), time experience distortion (Time Distortion, TD), a purposeful experience (An Experience that Becomes Autotelic, A EBA) (Csikszentmihalyi, 1997).

The heart circulation model (The Model of The Flow State) is closely related to flow theory. The model believes that the balance between skills and challenges is the core of the flow state. Csikszentmihalyi Initially, skills and challenges are taken as horizontal and vertical coordinates. According to the different matching degrees of the two, three areas are divided on the coordinate map. When the challenges and skills reach balance, they can enter the flow state. These areas are called channels (see Figure 2.4). However, the follow-up study found that when skills and challenges are at a low level, even if the two are in balance, it is difficult to stimulate the flow state, so the follow-up research further proposed the eight-channel model (see figure 2.5), the horizontal axis represents personal skill level, the vertical axis represents task challenge difficulty, personal skill level and task challenge difficulty is two important factors affecting the flow. According to the combination of "skill" and "challenge", you can get awakening, heart flow, mastery, relaxation, boredom, indifference, worry, and anxiety. The heart flow state is only generated when the individual skill level matches the challenge difficulty. The heart channel model has been used to determine

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flow in a large number of empirical studies, and several researchers have developed scales to measure flow (Karelina, 2015; Sun et al., 2017）.

4. Health and behavior change study

Kasl and Cobb (1966) first proposed the concept of health behavior (Health Behavior). They believed that health behavior is the behavior taken by individuals to prevent disease or to detect it early in the disease and that these individuals considered their bodies healthy. Then Phillip & Pugh (2000) further extended to individuals to prevent disease, and maintain their health behavior, including changing health risk behaviors (such as smoking, drinking, bad diet, etc.), taking positive health behaviors (such as regular exercise, regular physical examination, etc.), and follow the doctor, therefore, fitness behavior in this study is considered to be a kind of health behavior.

Early studies on health behaviors mainly focused on status quo investigation and practical application, and lacked theoretical guidance. Since the theory of Health Faith (Health Belief Theory) was proposed in the 1950s, the relevant theoretical models of health behavior have been continuously improved and developed, providing theoretical support and a framework for the study of health behavior change. Currently, the research on health behavior change mainly focuses on the theoretical research of health behavior change and the prodefendant variables.

(1) Theoretical research on health and behavior change

In the study of health behavior change, it is found that the intervention of health behavior has a better theoretical model of health behavior change from a psychological perspective (Kaljee et al, 2004）. Since the introduction of the health belief model (Health Belief Model, HBM), several representative theoretical models in the field of health behavior change have been used by many scholars, including planning behavior theory, health belief theory, protective motivation theory, and cross-theoretical model. (2) Research on the influencing factors of health behavior change

The change in health behavior is related to demographic factors, sociological factors, psychological factors, social situations, and other factors. In previous studies, many scholars have discussed the factors affecting health behavior, mainly involving the following variables:

Gender and age: Pascucci et al (2012) study shows that with the gradual increase of age, the deepening of experience, and accumulated more relevant medical and healthcare knowledge. The more attention older adults attach to their own health, the more awareness of acquiring medical knowledge, and the higher scores for health behaviors compared with younger adults. Other studies showed that the elderly score better than the youth in the nutrition and healthcare dimension, and the younger workers score better than the older workers in the exercise dimension. Wen Ye et al. pointed out that men are different from women in terms of health behavior, because they have the habit of smoking and drinking, work relatively more times, and bear greater pressure (Wen et al, 2011). Studies of Macao community 119 elderly patients with hypertension in the form of convenient sampling, the results found that in bad health behavior change female patients are better than male patients, because women in the family are good at taking care of themselves and family health, assume the role of caregivers, they choose and buy, cook healthy food (Wen et al, 2011). However, some studies have shown that there is no difference in health behavior levels between older men and women (Johnson & Johnson 2005).

Education level: Gokyildiz S et al. showed that education level is related to health behavior change. The higher the education level, the more attention they pay to quality of life, and the more likely they are to accept and understand health knowledge, so they can follow the doctor's advice and change bad health behavior (Gokyildiz & Alan, 2014). The health behavior is influenced by education level. In terms of health knowledge, the higher the accuracy; the higher the education level, and the higher the demand for consultation forms and on-site discussion.

Social support: Social support is an important part of health promotion. It not only plays a supporting role in meeting individual emotional and physiological needs but also can buffer stressful events that have an impact on the quality of life. Research by Ievers-Landis et al. (2003) showed that parents' behavior can have a sustained impact on the health behavior of children in early youth. Liu Yan et al. pointed out that the formation and continuity of health behavior can be affected by social support, and the higher the level of social support, the higher the level of health behavior (Liu et al, 2012). A study of survivors of older cancer patients showed that self-efficacy and social support have the most significant effects on health behavior change factors.

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Stress and other psychological factors: Kang (2012) in 195 Korean patients with hypertension, diabetes, and dyslipidemia showed that adult depression was inversely associated with health behavior and that patients with depression were higher than adults without depression. Stark et al (2007) showed that stress is negatively associated with health behavior, and the greater the stress, the lower the health behavior.

Knowledge literacy: In the health education mode of "knowledge-letter-action", "knowledge" refers to the foundation of knowledge learning, "faith" means that attitude and belief are the motivation, and "action" refers to the goal of behavior change. Individuals who only know that healthy behaviors can bring physical benefits and have the knowledge to adopt healthy behaviors can motivate them to actively adopt healthy behaviors. When studying the health behavior of stroke patients and its influencing factors, Wang Lihong believes that the health behavior level of stroke patients is related to the ability of daily living activities and education level. The lower the ability and education level of daily living activities, the lower the level of health knowledge (Wan et al., 2010). Li Shuxia et al. (2012) pointed out that the more hypertension patients know about the prevention and treatment of cerebrovascular diseases during the treatment process, the higher the compliance behavior will be.

Self-efficacy: Self-efficacy is considered to be the most important factor in behavioral decision-making, that is, the individual's confidence in performing a certain behavior and achieving the expected result, which can determine people's choice of behavior and their adherence to and effort of the behavior (Guo & Jiang, 2008). Foreign scholars point out that health beliefs are positively correlated with health behaviors, and with the enhancement of health beliefs, the scores of health behaviors are higher (Sullivan & Waugh, 2007). The Peker (2011) study noted that the strongest predictor of all factors affecting health behavior was self-efficacy. Von Ah et al. (2004) conducted a study of 161 college students and found that self-efficacy can significantly predict smoking and drinking behaviors, physical activity, and safety and protective behaviors. There is a significant negative correlation between college students, that is, the higher the individual self-efficacy, the lower the frequency of psychological problems, and vice versa.

External environment: Environmental factors are one of the important influencing factors of health behavior change, but they are relatively few explored. Context refers to the environment which is closely related to people's current behavior, and refers to the social environment which is directly connected with individuals, and the individual can be aware of and have a direct impact on the individual psychology. Without contact with the environment and others, human motivation is difficult to achieve in behavior. At present, with the continuous development of network information technology, the influence of situational factors such as network information and media publicity on health behavior is also getting more and more attention. For example, the influence of information framework (Information framework) on people's behavior and decision-making has become one of the hot topics of attention of scholars in recent years (Yang et al., 2020).

Other factors: In recent years, With the development of multidisciplinary integration and further research on health behavior, Many scholars have expanded the scope of their research, Main factors of concern + physiological and genetic factors: some motivation comes from genes, Physiological and biological factors such as metabolic rate, hormone levels, and physical conditions will inevitably affect individual health behavior; External reward and punishment: Various reward and punishment mechanisms can influence an individual to adopt some behavior, For example, by giving points, punching in, and other ways to increase the persistence of a specific behavior; Experiences: Positive emotional experience helps individuals enhance self-efficacy and develop a strong desire to change their behavior; Platform factors: including product design, function Settings, social interaction, and incentive mechanism. In technology-based health applications, these factors may involve product categories, forms of operations, MOOC platforms, predictive assessment systems, and more.

Based on previous studies and combined with the current information background, this study selects the user behavior of users of self-efficacy, platform incentive, flow experience, and other variables, which can better explain the online fitness behavior of users in the information society.

Conceptual Framework

Based on the S-O-R (stimulus-body-reflection) model analysis framework, the continuous use of willingness as the research variable, external motivation (platform incentive, content quality, subjective specification) as independent variables, internal motivation (flow experience, perceived usefulness) as

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intermediary variables, and individual traits (exercise self-efficacy, health awareness) as regulatory variables. This paper draws on the research results of predecessors, at the same time combining online fitness research situations, building the platform incentive, content quality, subjective norms, perceived usefulness, flow experience, exercise self-efficacy, health consciousness, and continuous use will contain eight core variables of online fitness platform continuous use will model, see figure below.

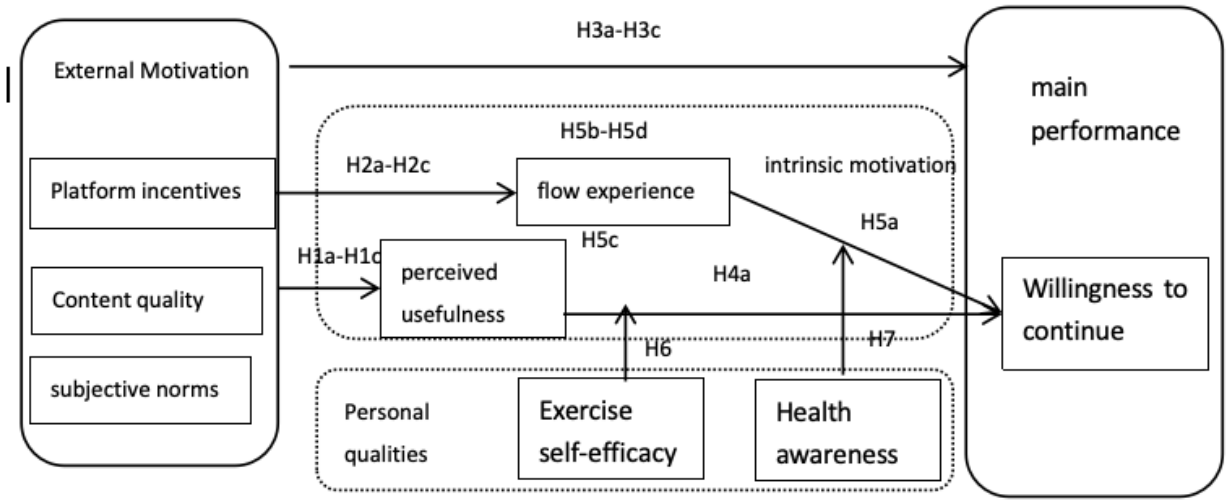

Figure 1 Conceptual Framework

Methodology

The Structural Equation Model (SEM) is a statistical method crucial for analyzing the relationships between variables, especially in fields like psychology, sociology, and management where certain constructs are challenging to measure directly, known as latent variables. Traditional statistical methods struggle with these latent variables, but SEM allows for their simultaneous consideration alongside observable indicators. In practical application, researchers construct theoretical models, design questionnaires, collect sample data, and utilize SEM analysis tools like LISREL or AMOS to test model fit and validity. By scrutinizing path relationships, researchers verify the model's validity, contributing to a deeper understanding of underlying mechanisms. Wu (2010) provides a comprehensive SEM analysis framework, serving as a guide for researchers. In this study, SEM was employed to analyze the structural model path, aiming to validate the model fit and assumed relationships within. Through this analysis, the study seeks to confirm the validity of the proposed theoretical model and contribute to the field's knowledge base.

The assumption model of online fitness platform users contains 19 hypotheses, including 9 hypotheses involving external incentives (H 1a, H 1b, H 1c, H 1 c, H 2a, H 2b, H 2c, H 3a, H 3b, H 3c), 8 hypotheses involving intrinsic motivation (H 4a, H 4b, H4c, H4d, H 5a, H5b, H5c, H5d), and 2 hypotheses involving individual traits (H 6, H7). The hypotheses are summarized in the table below.

Dimension	Number	Suppose the relationship	Suppose the direction
External drive	H 1a	Content quality of online fitness platforms positively affects users' perceived usefulness	+
	H 1b	The platform incentive of the online fitness platform positively affects the users' perceived usefulness	+

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Dimension	Number	Suppose the relationship	Suppose the direction
	H 1c	Subjective norms positively affect the perceived usefulness of online fitness platform users	+
	H 2a	The content quality of the online fitness platform positively affects users' heart flow experience	+
	H 2b	The platform incentive of the online fitness platform positively affects the users' heart flow experience	+
	H 2c	Subjective norms positively affect the heart flow experience of online fitness platform users	+
	H 3a	The content quality of online fitness platforms positively affects users' willingness to use it	+
	H 3b	The platform incentive of online fitness platform positively affects users' willingness to use it	+
	H 3c	Subjective norms positively affect the continuous use willingness of users of online fitness platforms	+
internal motivation	H 4a	The perceived usefulness of online fitness platforms positively affects users' willingness to use it	+
	H 4b	The perceived usefulness of online fitness platforms mediates content quality and users' willingness to use it	intermediary
	H4c	The perceived usefulness of the online fitness platform users plays a mediating role between the platform incentive and the users' willingness to use it continuously	intermediary
	H4d	The perceived usefulness of online fitness platforms plays a mediating role between subjective norms and users' willingness to use them	intermediary
	H 5a	The heart flow experience of online fitness platform users positively affects users' willingness to continuously use it	+
	H5b	User flow experience of online fitness platforms plays an intermediary role between content quality and users' willingness to continuously use it	intermediary
	H5c	User flow experience of online fitness platform plays an intermediary role between platform incentive and users' willingness to continuously use it	intermediary
	H5d	User flow experience of online fitness platforms plays an intermediary role between subjective norms and users' willingness to use it continuously	intermediary
Individual characteristics	H 6	The exercise self-efficacy of users on online fitness platforms positively regulates the relationship between users 'perceived usefulness and users' willingness to continuously use	+ regulate
	H7	The health awareness of online fitness platform users positively regulates the relationship between users' heart flow experience and continuous willingness to use it	+ regulate

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Results

Descriptive analysis of the survey sample

Table1 Descriptive Statistics (N =606)

Statistical items	Class	Frequency	Percentage
sex	man	309	51.0
	woman	297	49.0
	amount to	606	100.0
record of formal schooling	Junior high school and below	46	7.6
	High school / technical secondary school	62	10.2
	junior college	174	28.7
	undergraduate course	232	38.3
	Graduate student or above	92	15.2
	amount to	606	100.0
age group	18~26	180	29.7
	26~34	182	30.03
	34~42	136	22.4
	42~50	65	10.7
	50 And above	43	7.1
	amount to	606	100.0

Reliability analysis

Table 2Analysis of reliability and validity

Sub active variables	Code	Factor loading	AVE	CR	Cronbach's α
Platform incentive (Platform Incentives)	PI1	0.772	0.5858	0.8760	0.876
	PI2	0.783			
	PI3	0.749			
	PI4	0.776			
	PI5	0.746			
Content quality (Content Quality)	CQ1	0.700	0.5617	0.7932	0.793
	CQ2	0.772			
	CQ3	0.774			
Subjective norms (Subjective Norm)	SN1	0.765	0.5653	0.8387	0.839
	SN2	0.741			
	SN3	0.737			
	SN4	0.764			
Perceived usefulness (Perceived Usefulness)	PU1	0.744	0.5522	0.8314	0.832
	PU2	0.733			
	PU3	0.762			
	PU4	0.733			
Flow experience (Flow Experience)	FE1	0.753	0.5838	0.8487	0.848
	FE2	0.776			
	FE3	0.764			
	FE4	0.763			

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Sub active variables	Code	Factor loading	AVE	CR	Cronbach's α
Exercise self-efficacy (Exercise Self-Efficacy)	ES1	0.759	0.5856	0.9339	0.934
	ES2	0.801			
	ES3	0.755			
	ES4	0.754			
	ES5	0.778			
	ES6	0.755			
	ES7	0.758			
	ES8	0.762			
	ES9	0.752			
	ES10	0.777			
health consciousness (Health Consciousness)	HC1	0.773	0.588	0.8771	0.877
	HC2	0.770			
	HC3	0.773			
	HC4	0.763			
	HC5	0.755			
Continued willingness to use (Continuance Intention)	CI1	0.754	0.5551	0.7892	0.789
	CI2	0.750			
	CI3	0.731			

analysis of validity

Table 3 Overall Fitting Coefficient Table (Structural Validity)

Fitting the index	X^2/df	RMSEA	RMR	GFI	AGFI	CFI	IFI
price	1.063	0.010	0.071	0.945	0.936	0.997	0.997
Fits	fine	fine	good	good	good	good	good

Table 4Differentiation validity

	Platform incentive	Content quality	Subjective norms	Perceived usefulness	Flow experience	Exercise self-efficacy	health consciousness	Continued willingness to use
Platform incentive	**0.765**							
Content quality	0.412***	**0.749**						
Subjective norms	0.409***	0.505***	**0.752**					
Perceived usefulness	0.419***	0.464***	0.462***	**0.743**				
Flow experience	0.439***	0.444***	0.405***	0.408***	**0.764**			
Exercise self-efficacy	0.368***	0.330***	0.371***	0.338***	0.381***	**0.765**		
health consciousness	0.376***	0.403***	0.399***	0.385***	0.365***	0.424***	**0.767**	
Continued willingness to use	0.542***	0.574***	0.607***	0.566***	0.498***	0.390***	0.421***	**0.745**

(1) Direct effect test

When using A MOS software for path analysis, the online fitness platform was drawn based on the original hypothesis and then used the path analysis function to analyze 606 data in the study. Firstly, the

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direct effect path coefficient of the model was estimated and significance tested, and the relevant parameter estimates and results are shown in Table 5.12.

Table 5 Results of the model direct effect pathway analysis

Latent variable path relationship			Estimate	S.E.	C.R.	p	Standardization coefficient	significance test
Platform incentive	→	Perceived usefulness	0.218	0.046	4.707	0.000	0.232	notable
Platform incentive	→	Flow experience	0.203	0.032	6.381	0.000	0.250	notable
Platform incentive	→	Continued willingness to use	0.193	0.044	4.396	0.000	0.207	notable
Content quality	→	Perceived usefulness	0.276	0.059	4.654	0.000	0.264	notable
Content quality	→	Flow experience	0.274	0.053	5.195	0.000	0.209	notable
Content quality	→	Continued willingness to use	0.206	0.056	3.679	0.000	0.199	notable
Subjective norms	→	Perceived usefulness	0.236	0.051	4.648	0.000	0.254	notable
Subjective norms	→	Flow experience	0.175	0.041	4.226	0.000	0.170	notable
Subjective norms	→	Continued willingness to use	0.257	0.049	5.269	0.000	0.279	notable
Perceived usefulness	→	Continued willingness to use	0.206	0.058	3.561	0.000	0.208	notable
Flow experience	→	Continued willingness to use	0.125	0.042	3.014	0.003	0.137	notable

(2) Mediation effect test

Table 6Results of the mediation effect analysis

Way	Effect	Boot SE	Boot LLCI	Boot ULCI
Platform motivating perceived usefulness and continued willingness to use	0.021	0.010	0.018	0.057
The platform encourages the flow experience	0.016	0.009	0.012	0.046
Content quality, perceived usefulness, and continued willingness to use	0.034	0.010	0.018	0.058
Content quality heart flow experience continuous use willingness	0.022	0.009	0.008	0.044
Subjective norms perceived usefulness sustained use willingness	0.027	0.011	0.017	0.060
Subjective specification of heart flow experience and continuous use of willingness	0.013	0.007	0.005	0.033

The analysis revealed that two parallel mediation effects were included in the model. According to the indirect effect criterion: if the 95% interval (Boot CI) of the indirect effect value includes the number 0, it has no mediation effect; if the 95% interval (Boot CI) of the indirect effect value does not include the number 0, it has a mediation effect.

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Table 7 Model test of mediation effects

	Perceived usefulness	Flow experience	Continued willingness to use	Continued willingness to use
constant	6.677***(5.447)	4.493**(3.414)	2.013*(2.379)	0.587(0.694)
sex	0.623(1.638)	0.131(0.327)	-0.019(-0.073)	-0.125(-0.492)
age	-0.209(-1.154)	0.193(1.019)	-0.167(-1.341)	-0.154(-1.273)
record of formal schooling	0.283(1.408)	0.120(0.569)	0.257(1.853)	0.203(1.511)
Platform incentive	0.157***(5.154)	0.175***(5.358)	0.155**(7.389)	0.115***(5.424)
Content quality	0.248***(4.891)	0.236***(4.351)	0.214**(6.127)	0.155***(4.423)
Subjective norms	0.201***(4.997)	0.137**(3.191)	0.222**(8.014)	0.179***(6.491)
Perceived usefulness		0.152***(3.553)		0.136***(4.950)
Flow experience				0.093***(3.584)
sample capacity	606	606	606	606
R^2	0.253	0.247	0.387	0.429
After the adjustment of R^2	0.246	0.238	0.381	0.421
F price	F =33.889***	F =27.989**	F =63.057***	F =55.976***

* p <0.05, * * p <0.01, * * * p <0.001, t value in parentheses

Discussion

This study deepens the understanding of user acceptance and continuous use of new technology application systems by deeply analyzing the continuous use willingness of users of online fitness platforms. The research combines the technical acceptance model (TAM), the health belief model (HBM), and the heart flow theory to form a comprehensive research framework. The framework covers platform incentives, content quality, subjective norms (independent variables), perceived usefulness, flow experience (mediation variables), exercise self-efficacy, health awareness (regulatory variables), and users' willingness to continuously use it (dependent variables). The results show that platform motivation, content quality, and subjective norms have a significant positive impact on perceived usefulness, flow experience, and willingness to use continuously, and perceived usefulness and flow experience play a mediating role between external incentive-related variables and willingness to use continuously. Moreover, exercise self-efficacy and health awareness had a positive modulation of the relationship between users' perceived usefulness and flow experience on willingness to continue use, respectively, further improving willingness to continue use. The following analysis of each pathway of analyzed follows:

1）Content quality, platform motivation, and subjective norms have significant positive effects on users' perceived usefulness, flow experience, and willingness to continue continuously, and these variables play important positions in the process of user acceptance and use of online fitness platforms. These factors may improve their perceived experience and influence their willingness to continue it by improving their cognitive evaluation of the platform. This provides a strategic basis for the platform to improve users' willingness to use, that is, by improving the quality of content, improving the incentive mechanism, and creating a subjective normative atmosphere, the perceived usefulness and continuous use willingness of online fitness platform users can be effectively improved.

2）Perceived usefulness and flow experience have an important impact on users' willingness to continue to use, while perceived usefulness and flow experience play a partial mediating role between external incentive factors (content quality, platform incentive, and subjective norms) and the willingness to use continuously, respectively. According to Davis (TAM)'s technology acceptance model (1989), users are more likely to accept and continue using new technology if they feel useful to them, while perceived usefulness partially mediates external incentives (content quality, platform incentives, and subjective norms), which are supported by the results of this study. Flow experience also plays a partial mediating role between external incentive factors (content quality, platform incentives, and subjective norms) and users' willingness to continuously use them.

3）Exercise self-efficacy has a positive regulatory effect on the relationship between users 'perceived usefulness and willingness to continue use, and health awareness also has a positive regulatory effect on the relationship between users' heart flow experience and willingness to continue use. In this study, the

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connotation of exercise self-efficacy was consistent with the self-efficacy in the Health Belief Model (HBM), which refers to the confidence that users should be able to exercise effectively and achieve their expected fitness effects through an online fitness platform.

Conclusion

In today's digital age, the rapid development of health technology is constantly changing people's lifestyles and health management habits. Online fitness platforms are widely used as an important tool to promote healthy lifestyles, and to realize their full potential, it is essential to understand the motivation and behavior of users' continuous use of these platforms. Based on the technology acceptance model (TAM) and the Health Belief Model (HBM), this study explores the key factors that affect the continuous willingness of users of online fitness platforms. Through the analysis of 606 validated questionnaires, this study not only verified a series of hypotheses, but also made important theoretical contributions in the following three aspects.

(1) It responds to the impact of external influences such as the platform and society on users' perception and continuous use intention. This study expands the application scope of the technical acceptance model (TAM) and the health belief model (HBM) through the in-depth analysis of the continuous use willingness of online fitness platform users. In traditional TAM models, where user technology acceptance is mainly influenced by perceived usefulness and perceived ease of use, this study introduced platform incentives, content quality, and subjective norms as leading variables, which are particularly important in the specific context of health-like technology platforms. By validating the significant impact of these external incentives on user-perceived usefulness, this study not only enriches the theoretical connotation of the TAM model but also provides a new perspective for understanding and predicting users' acceptance of online health-related technologies. Furthermore, this study highlights the important role of social influences (e.g., subjective norms) in the technology acceptance process of online fitness platforms. In the health belief model, an individual's health behaviors are influenced by their health beliefs, and this study revealed the influence of the social environment and others' attitudes on individual health behavior decisions by incorporating subjective norms into the analytical framework. This finding not only responds to the research needs of user behavior from the perspective of management psychology but also provides important practical guidance for the design and promotion of online health promotion platforms.

(2) Explore the path model of irrational instinctive motivation of online fitness platform users, such as heart flow experience. By integrating the heart flow experience into the research framework of user behavior of online fitness platforms, this study provides a new perspective for understanding the psychological experience of users during the use of online fitness platform technology. Flow experience as a deep, immersive mental state is often associated with a high degree of concentration and enjoyment. In this study, flow experience was not only confirmed to directly affect users' willingness to continue it, but also acted as a mediator between content quality, platform incentives, and subjective norms, and willingness to continuously use it. This finding shows that the user experience design of an online fitness platform should not only focus on the transmission of information and the realization of functions but also pay more attention to the psychological feelings and emotional experiences of users. Moreover, this study systematically explored and verified the role of flow experience in user behavior models, providing empirical support for the application of flow theory in such technical fields. This theoretical contribution not only enriches relevant research on the development of flow experience but also provides a rationale for the design of more attractive and effective health promotion interventions.

(3) It reveals the boundary role of individual factors such as exercise self-efficacy and health awareness on online fitness behavior research. In this study, the introduction of exercise self-efficacy and health awareness as regulatory variables provides new perspectives into understanding how individual trait differences influence health technology acceptance and use. The high and low levels of exercise self-efficacy were shown to modulate the relationship between perceived usefulness and willingness to continue to use, suggesting that the level of confidence in their abilities is an important factor affecting the sustainability of their health behaviors. This finding not only provides new empirical evidence for the application of self-efficacy theory in the field of health behavior but also suggests the need to focus on improving individual self-efficacy in health promotion practice. As another regulatory variable, health

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awareness's regulatory effect on the relationship between flow experience and willingness to continue to use reveals the importance of individual health concerns in the acceptance and use of health technology. This finding not only enriches the application scope of related theories but also provides a theoretical basis for designing personalized health promotion strategies for users with different levels of health awareness.

Recommendation

1. Suggestions for applying research results:

(1) Content Enhancement: Elevate content quality by offering diverse and engaging workout routines tailored to user preferences. Introduce multimedia elements and personalized plans to enrich user experience and maintain interest. (2） Incentive Programs: Implement rewards and challenges to incentivize consistent platform engagement. Offer exclusive perks or recognition to motivate users and foster a sense of achievement. (3） User-Friendly Design: Prioritize user experience by optimizing platform navigation and interface design. Seamless integration with fitness devices enhances usability, ensuring a positive and intuitive experience for users. And (4） Community Engagement: Foster a supportive community atmosphere by encouraging interaction among users. Utilize forums or social features to facilitate discussions, share success stories, and enhance user engagement.

2. Suggestions for future research:

(1) Longitudinal Studies: Conduct longitudinal studies to track user engagement patterns over time, providing insights into the long-term factors influencing sustained participation on online fitness platforms. (2). Cultural Variations: Investigate cultural differences in user behavior and preferences to tailor platform features and content to diverse user demographics effectively. (3). Emerging Technologies: Explore the integration of emerging technologies, such as virtual reality or artificial intelligence, to enhance user engagement and personalized fitness experiences on online platforms. (4). Behavioral Interventions: Evaluate the efficacy of behavioral interventions, such as gamification or habit-forming techniques, in promoting sustained engagement and adherence to fitness goals on online platforms.

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