

Explaining Chinese citizens' intention to use fitness applications under a national fitness policy: a technology acceptance model perspective

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Abstract. Fitness technology is becoming increasingly popular as a means of measuring and encouraging physical activity. It's vital to understand and research the factors that influence people's willingness to use fitness applications. This study considers intrinsic and extrinsic factors to explain Chinese citizens' intention to use fitness applications by extending the Technology Acceptance Model. Data from 224 Chinese questionnaires was used to empirically test the model. The findings suggest that the technological acceptance model is a good fit for this study, and all of the hypotheses are validated. The suggested model can account for 64% of the variation in fitness applications intentions and 52% of fitness applications use. Based on the findings, policymakers may be able to create more effective interventions from a new perspective, resulting in improved health. We also talk about fresh ideas and directions for the national fitness program's following promotion.

Keywords: national fitness policy; behaviour intention; technology acceptance model; fitness applications; fitness behaviour.

1. Introduction

Outdoor activities may be especially beneficial for reducing stress during epidemic management [1]. As a result of the pandemic, there is a growing need for people to keep physically active, and the necessity of healthy living is increasingly being recognized. Various fitness programs have progressively promoted physical exercise in recent years, and their user base is quickly expanding [2]. Anyone may track their geographic data and post it to internet platforms such as social networking or fitness applications using a smartphone or other GPS device. Digital technologies for healthy living are increasingly being employed, such as sports games and health-related smartphone applications [3]. The viability of these devices and applications to encourage healthy behaviours in terms of physical activity and body image perception is at the heart of this digital technology [4]. In international policy, there is a lot of support for using digital technology to encourage healthy living habits [5]. The lack of national exercise, on the other hand, has been a much-needed societal concern. In the 1960s, one of the most important social problems in the United States was a national health crisis caused by a lack of exercise [6]; in the Third Korean National Health and Nutrition Examination Survey, around 20% of residents were in poor health [7].

In response, the National Fitness Plan was published on July 18, 2021. The strategy strives to increase the popularity of sports while also recognizing the strategic significance of fitness culture in the areas of health, culture, education, and recreation, as evidenced by economic and cultural claims of value. The rise in basic quality, along with an increase in public health and safety issues, has prompted the Chinese government and the general public to place a greater emphasis on physical fitness. With the rise in smartphone ownership, many people are actively looking for health-related applications for their phones. The main objective of this research is to investigate the intent of Chinese residents to use fitness applications. The investigation aims to look into a theoretical model of technology adoption that is based on usage intentions and to investigate if regulations influence this model.

1.1 Problem statement

The popularity and ubiquity of fitness applications are undeniable, as indicated by the findings of a global study of fitness trends, which show that smart fitness is becoming more mainstream [8], and fitness applications play a key part in this. Fitness applications' availability and accessibility should be regarded as a blessing to fitness-conscious consumers, particularly in economically developed nations where being healthy are fast becoming the standard, as indicated by the growth of the fitness market in many countries [9].

Currently, fitness application research is studied from two perspectives: the application's perspective and the perspective of the users themselves. Many academics have argued for the intervention or promotion impact of fitness applications on health behaviours from the standpoint of application software [10,11,12]. Fitness applications not only fulfil people's exercise and workout demands, but they also give scientific workout techniques and exercise programs, as well as aid in the development of an interest in exercise. These cutting-edge exercise goods defy the traditional output paradigm of public sports services, opening up significant prospects for resource integration in the national fitness market sector. Fitness applications may successfully integrate numerous paths to increase physical fitness and have a good influence on the development of healthy lives as a new online media that is fast gaining momentum in the exercise community. The argument is mostly based on the user's willingness to use and enjoyment [13,14]. When users use a mobile fitness application, they will give it better ratings if they find it simple to use and if it assists them in developing healthy exercise habits and improving their health [15]. The increased awareness and desire for healthy exercise have resulted from the faster pace of life and greater stress. Exercise and fitness are progressively becoming one of the new lifestyles that people are adopting as their quality of life and health awareness improves. Sports and fitness software is fast-growing, not only changing people's lives but also affecting their passion for fitness participation, thanks to national policies that encourage and advocate the use of technological products for national fitness services. Sports and fitness software, as a tool-based software, has the features of social connection and ease, which enhances the tedious exercise process and is preferred by the majority of users.

1.2 Research purpose and research question

TAM has been employed in established research in a variety of domains [16]. TAM was used by Scherer to explain teachers' use of digital technologies in education [17]. Through a modification and expansion of the technology acceptance model, Sepasgozar established a new model called the urban services technology acceptance model, which accurately predicted technology adoption in smart city deployments [18]. Cheung used survey data from 136 students participating in full-time degree programs to experimentally test the upgraded model, finding that the determinants of the technology acceptance model were the most important factors impacting users' adoption of collaborative technologies [19]. Although the preceding experiments show TAM's capacity to forecast human adoption of technology, few researchers have looked at national policy as an external influence. Individuals' behaviour in an organizational context is influenced by the external environment. As a result, we added a fitness strategy to the model to make it more appropriate for the research environment of this work. As a result, the following questions led to this investigation.

Question 1: How well can TAM explain individuals' intentions to use fitness applications as part of a fitness policy?

Question 2: Will the fitness policy have an impact on citizens' willingness to use fitness applications? If that's the case, how is it affected?

2. Literature Review

2.1 Technology Acceptance Model (TAM)

Technology Acceptance Model is an outgrowth of the Theory of Reasoned Action [20], and it was made with the intention of describing the aspects that impact computer adoption in the mainstream. TAM is a metric that assesses people's ability to absorb new technology [21]. The model's two essential parts are perceived usefulness and perceived ease of use, which are used to assess people's attitudes regarding technology and their acceptance of it [22]. The subjective good or negative sensations that an individual user experiences when utilizing technology are referred to as attitudes to use. Attitude to use refers to the subjective feelings of individual users when using technology. TAM's six correlations were directly incorporated into the study's initial six hypotheses.

H1: Perceived ease of use boosts perceived usefulness significantly.

H2: Perceived usefulness significantly influences attitude to use.

H3: Perceived ease of use improves attitude to use in a considerable way.

H4: A positive attitude to use affects behavioural intentions substantially.

H5: Perceived usefulness has a major effect on behavioural intentions.

H6: Behavioural intention dramatically increases technology use.

2.2 Extending the TAM

Despite TAM's broad application, it may still be tweaked by adding external inputs and theoretically sound features to improve the model's predictive potential [23]. We choose fitness policy as an external element in this analysis. It has been established that policies may influence people's opinions [24,25]. Although there is no evidence that fitness-related legislation influences people's views regarding fitness applications, we propose that the two are linked substantially. So we propose the following hypotheses.

H7: Fitness policy significantly increases perceived ease of use.

H8: Fitness policy improve perceived usefulness in a considerable way.

3. Method

3.1 Procedure

The data was collected between November 2021 and February 2022. Participants had various levels of exercise foundation since this study focused on people's maintained fitness behaviour under a fitness policy. The contestants came from China's 25 provincial administrative areas. We notify participants of the following at the start of the questionnaire. (a) It is voluntary for them to participate. (b) They should fill out the questionnaire as accurately as feasible based on their situation. (c) Their entries are solely for the aim of scientific study. In addition, we affirm unequivocally that we are committed to data confidentiality and anonymity. After completing the questionnaire, participants were given a modest amount of money or a voucher for a certain amount of money to promote participation. There were 232 surveys gathered.

3.2 Instruments

To verify the validity, the study's structure was measured using well-established scales from the literature. The fitness policy was created in response to Zhong's research [26]. Regarding the Davis et al. and Taylor and Todd investigations, question items on perceived usefulness, perceived ease of use, and attitudes were established [21,27]. Bhattacharjee's scale design was used as the basis for employment [28]. We did not use scales from the literature as a reference for the use of technology, instead opting for the most basic aspect of the health application that comes with the phone: data statistics. This is since there is a greater variety of fitness software accessible, and the major characteristics of each software may affect users' intentions to use it to some level, yet most studies

pick particular software when investigating fitness software, resulting in some mistakes. After the program has tallied exercise data, users voluntarily upload this data to the web for recording or comparison [29], and this data is well suited as a measure of whether we use fitness applications. For all items in the questionnaire, a Likert scale was employed, which asks the respondent to indicate how much he agrees or disagrees with each attitude-related statement and is the most extensively used scale in survey research today.

Table 1 Construct convergent validity (n = 224)

		Standardised loading	AVE	CR	Cronbach's alpha
Fitness Policy	FP1	0.828	0.6282	0.8350	0.833
	FP2	0.753			
	FP3	0.794			
Perceived Usefulness	PU1	0.905	0.7701	0.9095	0.889
	PU2	0.866			
	PU3	0.861			
Perceived Ease of Use	PEOU1	0.856	0.7719	0.9103	0.909
	PEOU2	0.898			
	PEOU3	0.882			
Attitude	A1	0.895	0.7030	0.8756	0.874
	A2	0.883			
	A3	0.731			
Intention	I1	0.82	0.6583	0.8516	0.834
	I2	0.828			
	I3	0.839			
Technology Use	TU1	0.724	0.6147	0.8269	0.820
	TU2	0.861			
	TU3	0.738			

3.3 Data analysis

The reliability of the questionnaire in this study was determined using Cronbach's alpha coefficient. The KMO test was used to determine whether the variables were eligible for factor analysis by examining their correlation and bias correlation. Structural equation model was used to examine the data. Because the measure was constructed based on an a priori theory that explains how items are associated with each target variable, confirmatory factor analysis was used as a first step to assess its reliability and validity. CFA is a type of limited factor analysis that defines which items are loaded on each factor [30], implying that items cannot freely load on non-target variables. The suggested model's postulated links were then examined using route analysis to determine their relevance and strength. Numerous and associated dependencies between possible structures with multiple indications can be estimated using SEM [31]. The structural equation model was built with AMOS 24 software, and the path coefficients of the structural equation were then analyzed with the great likelihood estimation method to get standardised path coefficients.

4. Results

As a preliminary step in evaluating the measurement model, the correlation and regression of the questionnaire were tested. All of the retrieved values for Composite Reliability, Cronbach's alpha,

and Average Variance Extracted, indicating high measurement quality: CR>0.60 [31], Cronbach's alpha>0.70, and AVE>0.50 [32] (see Table 1). The KMO value of 0.917, which is greater than 0.7, was obtained from the test results. This shows that the variables have a strong correlation and a modest bias correlation, making it ideal for component analysis. Bartlett's spherical test yielded a p-value of less than 0.05, indicating that the requirements were met, the data were spherically distributed, and the variables were fairly independent of one another.

With a p-value less than 0.05, the cardinality value of the model in this study is 287.673; however, because the cardinality value is sensitive to the sample size, other overall model fit indices must also be considered when deciding whether to accept the model. CFI, TLI, IFI, SRMR, CMIN/DF, and RMSEA were used to estimate the model's fitness from the model fit findings. The results show that CFI=0.944, TLI=0.932, IFI=0.944, SRMR=0.0562, CMIN/DF=2.265 and RMSEA=0.075. The overall model fit was judged to be in the good range according to Hu and Bentler's recommended thresholds [34]. In addition, with the current data set confirming all assumptions, the model explained 68% of the variance in attitudes, 64% of intentions, and 52% of use. Figure 1 depicts the completed model.

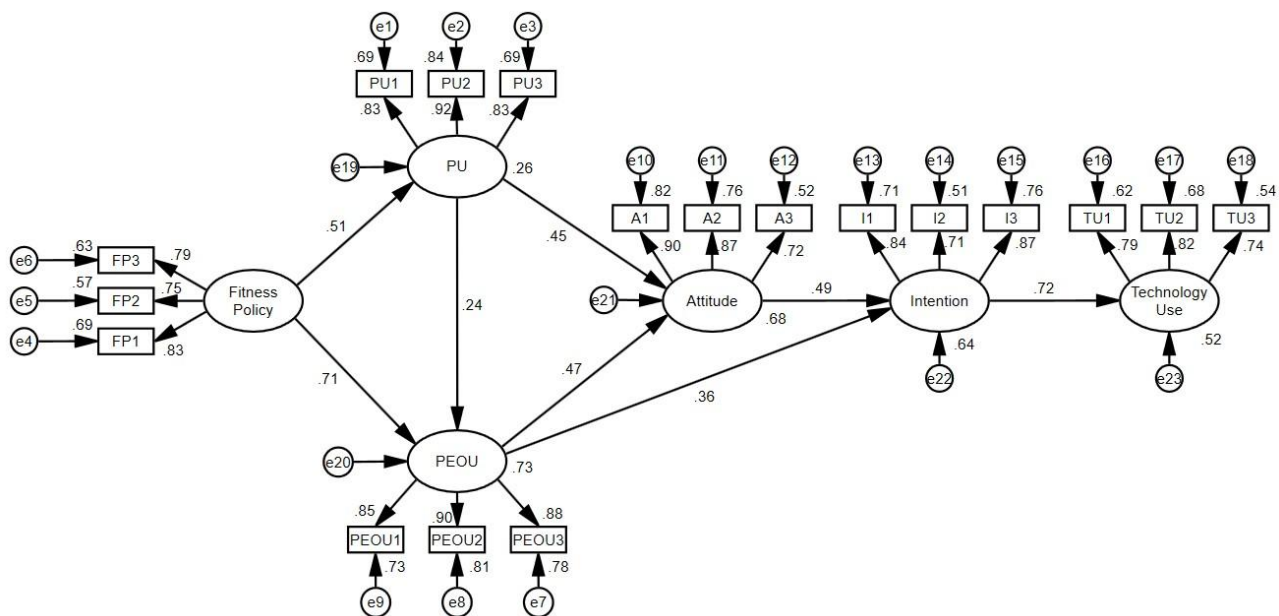


Fig. 1 Extended technique acceptance model results

Table 2 Test of hypotheses in the refined model

No.	Hypothetical relationships	Standardisation factor	P	Test results
H ₁	Perceived usefulness→Perceived ease of use	0.241	***	Supported
H ₂	Perceived usefulness→Attitude to use	0.454	***	Supported
H ₃	Perceived ease of use→Attitude to use	0.468	***	Supported
H ₄	Attitude to use→Behavioural intention	0.495	***	Supported
H ₅	Perceived usefulness→Behavioural intention	0.364	***	Supported
H ₆	Behavioural Intentions→Use of Technology	0.721	***	Supported
H ₇	Fitness policy→Perceived ease of use	0.709	***	Supported
H ₈	Fitness policy→Perceived usefulness	0.508	***	Supported

5. Summary

This study confirmed the importance of technology acceptance models in the study of Chinese persons' willingness to use fitness applications by collecting questionnaire data and including fitness policies into the research framework to examine their role in perceived usefulness and ease of use. Five avenues for the national fitness program to affect people's inclination to use fitness applications were discovered after a literature study, questionnaire research, and data analysis.

The first pathway is fitness policy → perceived usefulness → perceived ease of use → behavioural intention → technology use. Perceived usefulness influences behavioural intention in a good way [34]. While the Internet age has made knowledge abundant, it has also sparked a craving for effective content. Because exercisers cannot be supervised during online fitness, unlike traditional fitness, usefulness is the most effective driver.

The second pathway is fitness policy → perceived usefulness → attitude to use → behavioural intention → technology use. When Huang et al. investigated the views of middle-aged and older persons about the usage of health applications, they discovered that users who believed that using health software was useful to their physical health had a good image of the program [35]. Those who thought the program was really useful were more likely to have good thoughts about it.

The third pathway is fitness policy → perceived ease of use → attitude towards use → behavioural intention → technology use. In today's fast-evolving technological environment, where the Internet and people's lives are inextricably linked, technical concerns seldom have a negative influence on attitudes about use. Overly intricate processes, on the other hand, might lead consumers to lose patience and abandon their use. Ease of use works in tandem with usefulness, and only by not wasting too much time on system operation can user stickiness be increased. A clean and straightforward design, user-friendly features, and clever reminders may all help make a fitness app easier to use.

The fourth pathway is fitness policy → perceived ease of use → behavioural intention → technology use. It has been demonstrated that perceived ease of use has a major impact on behaviour intention [36]. The better the software's simplicity of use, the more likely users will acquire a proclivity to use and rely on it out of a desire to save time and reduce workload.

The fifth pathway is fitness policy → perceived usefulness → perceived ease of use → attitude towards use → behavioural intention → technology use. This pathway emphasizes the importance of users' perceived ease of use, indicating that users are concerned about how easy it is to get started with fitness applications.

Returning to the original question, TAM explains 64% of the variation in the intention to use fitness applications among Chinese citizens under a national fitness policy, and 52% of the variation in the fitness applications use among Chinese citizens under a national fitness policy. Citizens' intentions to use fitness applications are influenced by fitness rules that influence their perceived usefulness and ease of use.

The study's findings might be useful in determining individuals' intentions to adopt fitness software as part of a national fitness initiative. The National Fitness Programme, in particular, was created to improve the nation's general physical fitness and health. Based on a technological explanatory model, this study highlights the major characteristics that impact people's adoption of fitness software. The findings of these important determinants, as well as their internal hierarchical relationships, can assist policymakers in thinking beyond the traditional sporting perspective, providing them with theoretical perspectives and empirical evidence to design effective interventions to motivate the nation to adopt a healthy lifestyle and thus promote better health.

5.1 Recommendations

This study is based on the National Fitness Program, as well as the more popular online fitness and smart fitness programs of today, and aims to provide new ideas and directions for the National

Fitness Program's subsequent promotion through a survey of Chinese citizens' intentions to use fitness applications. To that aim, we provide the following policy recommendations.

Firstly, the government should guide the public to establish the concept of lifelong sports and encourage innovation in the technology and fitness exercise methods of the fitness industry. Plan innovation with an international perspective, strengthen international exchange and cooperation, actively introduce and absorb advanced international technology, and comprehensively enhance the pattern and status of China's fitness industry in opening up to the outside world. Increase the impact of the sports industry, promote industrialization and marketization in the fitness sector, and strengthen related policies for overall coordination and methodical planning. Regular lectures on the sport will be given to popularize the knowledge and practices of everyday and required sport, and various types of sporting activities will be organized to encourage the demand for the sport. To offer fundamental support for the development of fitness for all through strengthening infrastructure and public services, such as daily workout equipment for inhabitants.

Secondly, the government should effectively prioritize education as a strategic development priority, continue to increase education investment, accelerate higher education restructuring and optimization, train talents based on market demand, and provide intellectual support to promote green development. Increase assistance for the growth of education in economically disadvantaged communities, as well as the problem of unequal regional educational development. The fitness business in China is still in its infancy, but there is plenty of possibility for growth. We need to continue to encourage high-quality fitness for all people. Strengthen the introduction of high-quality talent, encourage conventional fitness to break the attitude, and aggressively innovate to give the fitness sector a new lease on life. Improve the governance structure to create circumstances for the effective and orderly promotion of fitness for all, relying on the new generation of internet technology to develop new industries, new business models, and new modes for the fitness sector.

Finally, in the context of the "Internet+" and the post-epidemic period, we are actively investigating new models for the growth of the fitness business to promote fitness for all. On the one hand, we should strive to build a new model of talent training in the dual context and develop a new model of exercise services based on the Internet to better promote the development of the fitness industry; on the other hand, we should strive to promote the need for daily exercise on the Internet, promote the daily practice of fitness, and call on all citizens to get moving.

5.2 Limitations

Given human behavioural actions are often dynamic and may be impacted by time and relevant elements such as socio-economic and current events in the sample area, the model developed in this study is temporal and region-specific. Furthermore, owing to time and resource restrictions, this study focused solely on the influence of fitness rules on citizens' intentions to use fitness applications and did not investigate the impact of other variables or software features on respondents' intentions to use them. Continuous dynamic monitoring of changes in the public's intention to use fitness applications will continue to be an effective way to identify constraints on the public's fitness behaviour and to promote fitness for all in the future, as the new policy develops, while the factors influencing the intention to use fitness applications will be enriched and refined.

Acknowledgements

This work is supported by the National innovation and entrepreneurship training program for college students (S202110497002) and the Ministry of Education of Humanities and Social Science Project of China (21YJC630104).

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