ORIGINAL RESEARCH ORİJİNAL ARAŞTIRMA

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Assessing the Intention to Use Beacon Technology Supported Mobile Fitness Instructor Application in Fitness Centers: A Descriptive Research

Beacon Teknolojisi Destekli Mobil Fitness Eğitmen Uygulamasının Fitness Merkezlerinde Kullanılma Niyetinin Değerlendirilmesi: Tanımlayıcı Araştırma

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This study was prepared based on the findings of Özkan Altun's thesis study titled "Factors Contributing to the Intention of Users to Adopt Beacon Technology Supported Mobile Fitness Instructor Application in Fitness Centers" (Ankara: Middle East Technical University; 2018).

ABSTRACT Objective: Sports organizations often seek ways to gain strategic advantage by using new technologies that will allow them to perform better in the sports industry. In pursuit of this strategic advantage, the sports industry often provides environments for the development or implementation of new technologies. This study aims to evaluate university students' intentions to use beacon technology-supported applications using the Mobile Service Acceptance Model (MSAM). For this purpose, the Beacon-Supported Mobile Fitness Instructor Application (BS-MFIA) was developed and this program was tested on university students. **Material and Methods:** To evaluate the developed application, data were collected from university students at a fitness center of a state university in Ankara. The data were collected in a three-stage process. First, exploratory factor analysis was conducted with 178 university students. Second, confirmatory factor analysis was conducted on a different sample of 205 university students to evaluate the determined factor structure of the scale. After the validity and reliability studies were conducted, MSAM was tested using the structural equation modeling method. **Results:** Structural Equation Modeling analysis showed that perceived usefulness, perceived ease of use, trust, and context variables play a significant role in the intention to use BS-MFIA. **Conclusion:** The mobile services acceptance model revealed that perceived ease of use, perceived usefulness, trust, and context factors have a significant and positive effect on the intention to use BS-MFIA. The findings of this research contribute to the fields of technology and sports management by providing deeper insights into the adoption of beacon technology in the sports industry.

Keywords: Beacon; mobile service acceptance model; intention to use; fitness applications

ÖZET Amaç: Spor organizasyonları genellikle spor endüstrisinde daha iyi performans göstermelerine olanak sağlayacak yeni teknolojileri kullanarak stratejik avantaj elde etmenin yollarını ararlar. Bu stratejik avantajın peşinde olan spor endüstrisi sıklıkla yeni teknolojilerin geliştirilmesi veya uygulanması için ortamlar sunar. Bu çalışma, Mobil Hizmet Kabul Modelini [Mobile Service Acceptance Model (MSAM)] kullanarak üniversite öğrencilerinin beacon teknolojisi destekli uygulamaları kullanma niyetlerini değerlendirmeyi amaçlamaktadır. Bu amaçla Beacon Destekli Mobil Fitness Eğitmen Uygulaması [Beacon-Supported Mobile Fitness Instructor Application (BS-MFIA)] geliştirilmiş ve bu program üniversite öğrencileri üzerinde test edilmiştir. **Gereç ve Yöntemler:** Geliştirilen uygulamayı değerlendirmek amacıyla Ankara ilindeki bir devlet üniversitesinin fitness merkezinde üniversite öğrencilerinden veriler toplanmıştır. Veriler üç aşamalı bir süreçte toplanmıştır. İlk olarak 178 üniversite öğrencisiyle açımlayıcı faktör analizi yapılmıştır. İkinci olarak, ölçeğin belirlenen faktör yapısını değerlendirmek amacıyla 205 üniversite öğrencisinden oluşan farklı bir örneklem üzerinde doğrulayıcı faktör analizi yapılmıştır. Geçerlilik ve güvenirlik çalışmaları yapıldıktan sonra MSAM, yapısal eşitlik modellemesi yöntemi kullanılarak test edilmiştir. **Bulgular:** Yapısal Eşitlik Modellemesi analizi, algılanan fayda, algılanan kullanım kolaylığı, güven ve bağlam değişkenlerinin BS-MFIA'yı kullanma niyetinde önemli bir rol oynadığını göstermiştir. **Sonuç:** Mobil hizmetleri kabul modeli, algılanan kullanım kolaylığı, algılanan fayda, güven ve bağlam faktörlerinin BS-MFIA'yı kullanma niyeti üzerinde anlamlı ve olumlu bir etkiye sahip olduğunu ortaya çıkarmıştır. Bu araştırmanın bulguları, spor endüstrisinde beacon teknolojisinin benimsenmesine ilişkin daha derin bilgiler sağlayarak teknoloji ve spor yönetimi alanlarına katkıda bulunmaktadır.

Anahtar Kelimeler: Beacon; mobil hizmet kabul modeli; kullanım niyeti; fitness uygulamaları

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The sports industry, which ranks as one of the top business markets globally, has a significant impact on both the economy and society.[1] The worldwide sports market increased from $486.61 billion in 2022 to $512.14 billion in 2023.[2] One of the major advancements that are transforming the sports industry is widespread digitalization. Cloud technology, beacon technology, and artificial intelligence are examples of digital technologies that have changed many facets of how the sports sector functions and competes.[1] Hence, sport organizations and individuals usually look for ways to obtain a strategic advantage using novel technologies that will allow them to outperform in the sport industry. In pursuit of this strategic advantage, sport industry frequently serves as a motivator for the development or implementation of new technologies and consumers of sports have demonstrated a preference for consuming new technologies.[3]

The use of smartphones which make up the focus of this study considerably alters audiences' perceptions of values and experiences.[4] Thus, actors in the sports industry are offering digital touchpoints for visitors at sporting venues, such as stadium apps or mobile ticketing services which provide new possibilities for engagement and interaction.[4] For instance, the San Francisco 49ers app gives fans the chance to order food and drinks, chat with other fans, access real-time data, view traffic conditions near the stadium, and actively engage in light show.[5]

Bluetooth beacon technology is among the most recent advancements in proximity marketing and location technology.[6] Beacons work only with a smartphone and mobile app. These are tiny wireless devices that communicate with neighboring smartphones using low-energy Bluetooth technology. In simple terms, they link to smart devices and send data, facilitating and improving location-based engagement.[6] What makes these devices different from other portable devices is that the beacon technology can give necessary support at the "right place" and at the "right time", and it could be beneficial to promote self-interested activities. Individually tailored interventions with beacon technology can contribute to the creation of more effective just-in-time intervention methods. Smartphones can be used as personal trainers with the aid of beacon technology and mobile apps can assist to schedule and apply fitness programs more successfully using automated, preconfigured training program recommendations. In this regard, to better comprehend and integrate innovations in the sports industry, there must be more scholarly emphasis on implementing new technology in sport marketing.

The technology acceptance model (TAM) has been extensively used as the theoretical framework for examining users' acceptance of new technology, to investigate sports fans' intention to play fantasy sport, sport website acceptance, or to examine intentions of individuals to use health and fitness apps recent studies used the TAM or integrated TAM as a theoretical background.[7-13] TAM is a simple model and depending on the technology, the intended audience, and the setting, several factors may influence the acceptability of new technologies.[14] Therefore, TAM might not adequately explain users' technology adoption behavior. Researchers have claimed that in order to better explain people's behavior in particular settings, an expansion with the addition of new constructs may be necessary.[11,15] In the frame of this study, we preferred to employ a model explicitly designed to assess the acceptance of mobile services. Therefore, in this study, the mobile services acceptance model (MSAM) which is an extension of TAM, was utilized to evaluate the variables influencing the usage intention.[16] MSAM was developed depending on the fact that the special impacts of mobile technology and usage-context aspects that may affect users' acceptance are not fully reflected in the TAM's main variables. Hence, new variables are required for mobile service acceptance in order to better understand the behavior of the target audience. The difference between these two models is that MSAM consists of three constructs of TAM (perceived ease of use, perceived usefulness, and behavioral intentions), and in addition to these constructs, three new variables were added to the TAM, including context, trust, and personal initiatives and characteristics.

MSAM has not been studied previously in the field of sports and fitness. Comprehensive knowledge of the factors influencing the acceptability of digital technology may be best gained from experimental re-

search. Which features or aspects motivate people to adopt a novel technology? How do the selected variables impact the acceptance of technology? Are very important questions when it comes to the adoption and use of new technology. Addressing users' preferences for mobile services in sport marketing is the foundation for developing effective strategies. Smartphones can function as personal trainers with the aid of beacon technology and mobile apps can help schedule and apply fitness programs more successfully utilizing automated, pre-configured just in time training program recommendations. This could result in labor cost savings for fitness facilities. Additionally, it gives sports marketers the chance to target messages according to the user's location through location-based marketing. In this regard, to understand the acceptance of the latest beacon technology for fitness users, we developed the Beacon Supported-Mobile Fitness Instructor (BS-MFI) system and empirically evaluated it based on the MSAM. Thus, the purpose of this study is to discover the preference of people to use Beacon Supported Mobile Fitness Application (BS-MFIA) BS-MFI. The present research's purpose is mainly two-fold; (1) to adopt selected measurement instruments into the fitness context, (2) to test a theoretical model to understand an individual's intention to use the BS-MFIA. The proposed hypotheses are depicted in Figure 1 below.

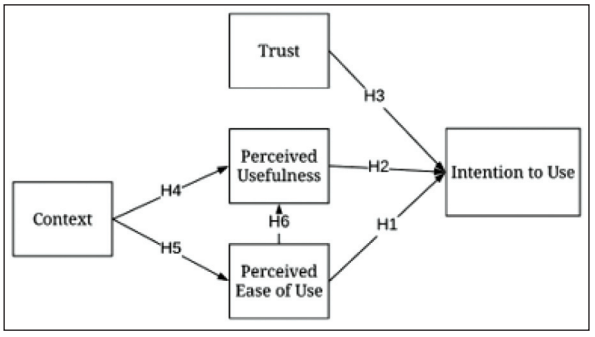

FIGURE 1: Visual representation of the hypotheses tested in the study.

TABLE 1: Descriptive statistics of the study samples.

EFA			
Variables	Category	Number	%
Gender	Female	71	39.9
	Male	107	60.1
CFA			
Variables	Category	Number	%
Gender	Female	72	35.1
	Male	133	64.9
SEM			
Variables	Category	Number	%
Gender	Female	85	41.46
	Male	120	58.54
How many times per week	1 time a week	67	32.68
do you engage in	2 or 3 times a week	108	52.68
fitness activities?	4 or 5 times a week	22	10.73
	6 or 7 times a week	5	2.44
	7 + times a week	3	1.46
Total		205	100

EFA: Exploratory factor analysis; CFA: Confirmatory factor analysis; SEM: Structural equation modeling.

MATERIAL AND METHODS

PARTICIPANTS OF THE STUDY

Students who exercise at university fitness facilities provided the data in this study. We collected the data in a three-phase process. First, the selected instrument had not been applied in a fitness context before. An exploratory factor analysis (EFA) was performed with 178 university students (39.9% female, 60.1% male) to determine if the instrument's dimensional structure differed in this new context and to see the factor structure of the scale in the fitness context. Second, confirmatory factor analysis (CFA) was performed within a different sample of 205 university students (35.1% female, 64.9% male) to evaluate the identified factor structure of the scale. After making validity and reliability studies and necessary adjustments to the scale to fit our empirical context. The selected model was tested with 205 students utilizing the structural equation modeling method. Convenience sampling method was utilized. The main sample group of the study consists of 205 students who utilize fitness center at a university in Ankara. 85 (41.46%) of the participants were female, and 120 (58.54%) of the participants were male (Table 1).

The mean age of the sample used in structural equation modeling is (M=24.83, SD=2.81) for men and (M=22.23, SD=1.15) for women. The mean age of the sample used in CFA is (M=22.41, SD=2.45)

TABLE 2: Age distribution of study samples by gender.

	Age			
	Male		Female	
Sample group	X̄	SD	X̄	SD
EFA	23.32	2.9	22.56	1.69
CFA	22.41	2.45	21.98	1.81
SEM	24.83	2.81	22.23	1.15

SD: Standard deviation; EFA: Exploratory factor analysis;
CFA: Confirmatory factor analysis; SEM: Structural equation modeling.

for men and (M=21.98, SD=1.81) for women. The mean age of the sample used in EFA is (M=23.32, SD=2.09) for men and (M=22.56, SD=1.69) for women. The age distributions of the sample used in EFA, CFA and Structural Equation Modeling (SEM) analyses by gender were presented in the Table 2 below.

For SEM and CFA analyses, criterion of a sample size of more than 200 was deemed sufficient.[17] There are opinions that the number of samples in EFA analysis should be at least five times or ten times the number of scale items.[18,19] The number of sample for EFA in this study meets the requirement of being at least 5 times the number of items. Descriptive statistics of the study samples are presented in Table 2 below.

DATA COLLECTION PROCEDURES

The Declaration of Helsinki was followed in the execution of this study. Before the data collection ethics approval was obtained from Middle East Technical University Human Subjects Ethics Committee with 2017-EGT-038 number. Participants had the option to fill out the questionnaire either online or on paper. All participants gave their informed consent. The process of gathering the data lasted approximately seven months from April 10 to November 27, 2017. It was held with university students at two fitness centers on the main campus of a university in Türkiye.

In the fitness center, two LiveBeacons were placed near the dumbbell and barbell area for fitness exercises, as well as the mat area for stretching. The posters on the fitness center walls illustrated everything there was to know about BS-MFIA. The posters were used in fitness centers as advertisements and information. When the participants agreed to take part in the study, they used their mobile devices to download the LiveBeacon app, which was accessible on both Android and iOS.

BS-MFIA helps participant's workout programs like an online personal trainer. This trainer figures out what people want and/or need by receiving signals from their location. When a person approaches the dumbbell or mat area in the fitness center, BS-MFI can assess the location, and the cell phone can then provide guidance on the dumbbell or flexibility-related exercises. When an individual gets closer to the stretching field, for example, he or she sees Figure 2 on their phone. As can be seen, the BS-MFIA provides several exercise options based on the location and the needs of the user. Following the participant's selection of the preferred alterna-

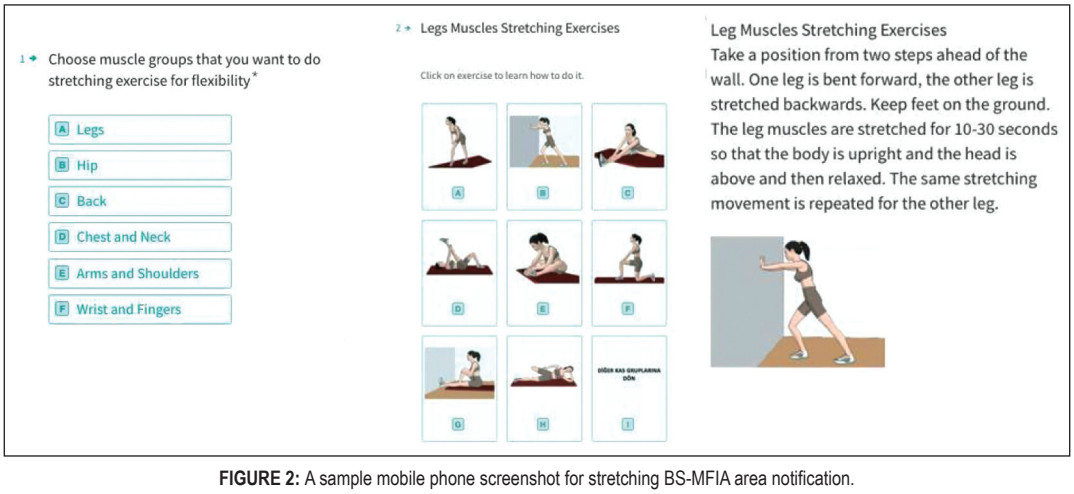

FIGURE 2: A sample mobile phone screenshot for stretching BS-MFIA area notification.

tive, individual exercises are presented again, allowing him/her to choose an exercise that is appropriate for him/her needs and skills. Following the selection of a specific exercise, the participant receives detailed instructions on how to complete the exercise using the mobile application. The software offers illustrations, animations, and guidance on how to perform the exercise correctly. An example from the stretching zone is as follows:

DATA COLLECTION INSTRUMENT

The scale used in this analysis was adapted from the mobile service acceptance model's original measurement scale.[16] Personal initiative and characteristics, trust, perceived usefulness, perceived ease of use, and intention to use are among the six factors on the Likert-type scale. The scale has 33 items. The scale was translated and adapted into the Turkish context in 2014 by Koç and Turan.[20] The Turkish version of the scale was utilized with minor terminology adjustments to suit the fitness and BS-MFIA background. The scale was developed for the mobile information systems. Where appropriate, minor changes were made to better suit this study's objective. Several words of the scale were changed. For example, "Beacon Supported Mobile Fitness Instructor Application (BS-MFIA)" was used where appropriate instead of "mobile information system". The mean and standard deviation scores of the scale subscales obtained from all sample groups were presented Table 3 below.

RESULTS

EXPLORATORY FACTOR ANALYSIS RESULTS

The preferred scale had never been used in a sports or fitness setting before. First, EFA was conducted to find out if the instrument's factorial structure varies in this new setting and to decide on the items' factor structure, chosen to measure mobile services acceptance dimensions. Bartlett's test of sphericity and Kaiser-Meyer-Olkin values were examined before running factor analysis. Bartlett's test of sphericity was statistically significant, $\chi 2(df=253)=3736.6$, ($p<0.05$), supporting the factorability of the correlation matrix. Kaiser-Meyer-Olkin test score (0.91) was found higher than the recommended value of 0.60.[21] After performing EFA with the maximum likelihood and oblique (promax) rotation method, five items regarding "Personal Initiative and Characteristics" were excluded from the scale because some of the items were cross-loaded. Some of the items had lower loading values than 0.32.[21] Due to loadings less than 0.32 and cross-loading, two items from the "Trust" factor and three items from the "Context" factor were omitted from the scale. On the other hand, two items about the "Personal Initiative and Characteristics" factor were loaded under the "Intention to Use" factor. Therefore, the "Intention to Use" factor decided to have four items since the four items have common meanings. Five factors explained the 64% of the variance. The retained items were presented below (Table 3).

CONFIRMATORY FACTOR ANALYSIS RESULTS

Different samples of respondents were used to assess the identified factor structure. The model was the five-factor twenty-three-item model shaped from the EFA results of the scale. CFA results yielded acceptable values as follows; ($\chi^{2=}466.012$, *df*=219, $\chi^2/df=2.13$; Goodness of Fit Index (GFI)=0.91, Normed Fit Index (NFI)=0.90, Comparative Fit Index (CFI)=0.95; Root Mean Square Error of Approxima-

TABLE 3: Means and standard deviations of the subscales.

Subscale	EFA mean	SD	CFA mean	SD	SEM mean	SD
Usefulness	3.86	0.70	3.39	0.65	3.61	0.72
Ease of use	4.04	0.63	3.80	0.59	3.90	0.63
Trust	4.09	0.77	3.53	0.79	3.80	0.84
Context	3.88	0.78	3.47	0.83	3.64	0.83
Intention to use	4.01	0.70	3.52	0.77	3.74	0.78

SD: Standard deviations; EFA: Exploratory factor analysis; CFA: Confirmatory factor analysis; SEM: Structural equation modeling.

tion (RMSEA)=0.052; Trucker-Levis Index (TLI)=0.94; Standardized Root Mean Square Residual (SRMR)=0.43). CFA loadings of the items were presented in Table 4.

For each factor, Cronbach's alpha values were calculated to assess internal consistency. The internal consistency score of the perceived usefulness (PU) factor was found as α=0.83, the alpha level of the Perceived ease of use (PEOU) was found as α=0.79. The alpha level of the trust factor was found as α=0.89. The internal consistency score of the context factor was found as α=0.80 and the internal consistency score of the intention to use factor was found as α= 0.82. The results of the internal consistency analysis revealed that all the factors exceeded the. 70 cut-off point, suggesting that the factors are reliable to measure the intended factors.[19] For Average Variance Extracted (AVE) values, 0.5 is considered sufficient.[22] However, in this study, the AVE value for the "Ease of use" sub-dimension was lower than 0.5. CR is a measure of reliability; values of 0.7 and higher are considered an adequate CR score.[22] In this study, all CR values and Cronbach's α values were found to be acceptable (Table 3).

STRUCTURAL EQUATION MODELLING RESULTS

In the current study frame, the maximum-likelihood estimation approach was utilized to assess the causal model and investigate the proposed relationships. The fit indices were found to be acceptable for this study; (χ^2=679.535, df=224, χ^2/df=3.03; GFI=0.91, NFI=0.90, CFI=0.94; RMSEA=0.053; TLI=0.94;

TABLE 4: Confirmatory Factor Analysis loadings of the scale, Average Variance Extracted, Composite Reliability and Cronbach's Alpha values.

	Factor loadings	AVE	CR	Cronbach's α
Perceived Usefulness		0.51	0.84	0.83
Using the BS-MFIA would increase the efficiency of my daily fitness program.	0.76			
BS-MFIA would allow me to find exercise training areas.	0.68			
BS-MFIA would make it easier to keep track of my weekly fitness tasks.	0.73			
BS-MFIA would allow me to better schedule my time.	0.74			
BS-MFIA would be useful for me as a fitness center participant.	0.65			
Perceived Ease of Use		0.43	0.79	0.79
Learning to operate the BS-MFIA would easy for me.	0.65			
I would easily find the information I am looking for using the BS-MFIA.	0.68			
I find the user interface of the BS-MFIA clear and intuitive.	0.69			
I find the BS-MFIA to be flexible to interact with.	0.67			
I find the BS-MFIA easy to use.	0.60			
Trust (I could use the system …)		0.61	0.89	0.89
If the BS-MFIA protects the privacy of its users	0.74			
If I feel confident that I can keep the system under control.	0.80			
If I feel confident that the data returned by the BS-MFIA is reliable.	0.80			
If I believe it is risk-free to use the BS-MFIA.	0.81			
If it is safe to use the BS-MFIA.	0.76			
Context (I could use the system …)		0.53	0.81	0.80
If most people around me are using the BS-MFIA.	0.54			
If I had nice experience in using mobile services before.	0.74			
If the university encourage to use the BS-MFIA.	0.84			
If the BS-MFIA was easy to obtain and install.	0.74			
Intention to use		0.54	0.82	0.82
Assuming I have access to the BS-MFIA, I intend to use it.	0.80			
Given that I have access to the BS-MFIA. I predict that I would use it.	0.72			
I find it rewarding to use the BS-MFIA	0.69			
Using the BS-MFIA is a good idea	0.71			

AVE: Average variance extracted; CR: Composite reliability; BS-MFIA: Beacon-supported mobile fitness ınstructor application.

SRMR=0.049). According to the study's findings, the model and the data fit each other well in the context of fitness. An illustration of the overall model's results may be found below.

As can be seen in the Figure 3, context has a positive direct effect on PU (β=0.44, p<0.05); context has a positive direct effect on PEOU (β=0.54, p<0.05); PEOU positively affects the PU (β=0.41, p<0.05); trust positively affects the intention to use (β=0.43, p<0.05); PU positively affects the intention to use (β=0.25, p<0.05); PEOU positively affects the intention to use (β=0.25, p<0.05); Perceptions of ease of use and usefulness were explained by the context factor by 29% and 56%, respectively. The structural model explained 39% of the variance in intention to use BS-MFIA when all factors were considered together. The following table represents the results of the hypothesis and path coefficients between the study variables (Table 5).

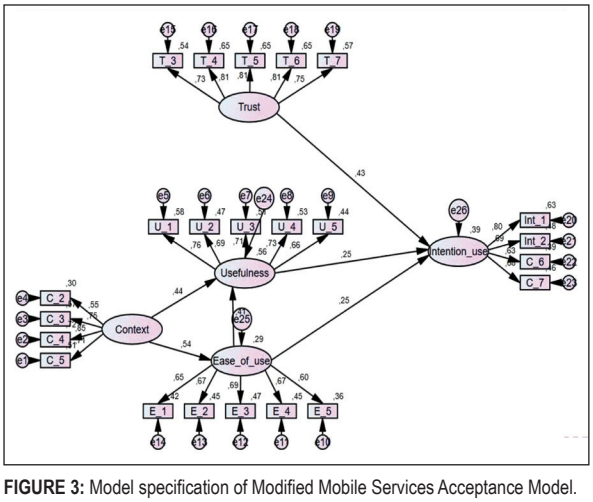

FIGURE 3: Model specification of Modified Mobile Services Acceptance Model.

DISCUSSION

The BS-MFIA was developed and empirically evaluated in the current study to understand fitness participants' intention to use it, and the application was empirically evaluated based on the MSAM. Analysis of the SEM revealed that perceived ease of use, perceived usefulness, trust, and context factors have a significant positive effect on the intention to use the BS-MFIA. According to the findings, first, PEOU which reflects the role of technology in decreasing user effort, was found significant in influencing fitness participants' intention to use the BS-MFI.[7] The positive correlation between PEOU and the intention to use was in line with previous research.[12,23] In a health and fitness setting, Canhoto and Arp have found that simple handling of wearables for health and fitness offers more sustainable usage.[24] On the other hand, Beldad and Hegner reported that people have avoided using fitness apps due to the difficulty of using fitness apps.[10] Therefore, fitness apps should require their users to perform somewhat boring procedures (e.g., data entry) for optimum use.[10] As a result, this research backs up the fact that simple interaction between users and the mobile application will increase participants' willingness to use it.

PU which is about how much technology can improve users' performance, was found significant in influencing the intention to use the BS-MFI.[7] If individuals believe that fitness apps will help them reach their fitness goals, such as losing fat, gaining muscle, or increasing flexibility/balance, they are more eager to use fitness apps. The positive relation between PU and behavioral intention has also been identified by several studies.[12,23]

TABLE 5: Path co-efficient and t-values for the structural model.

Hypotheses	Causality	Path coefficients	t values	Result
H1	Context → Perceived usefulness	0.44	5.95	Confirmed
H2	Context → Perceived ease of use	0.54	6.68	Confirmed
H3	Perceived ease of use → Perceived usefulness	0.41	5.29	Confirmed
H4	Trust → Intention to use	0.43	6.84	Confirmed
H5	Perceived usefulness → Intention to use	0.25	2.84	Confirmed
H6	Perceived ease of use → Intention to use	0.25	2.75	Confirmed

Another finding of this study was that PEOU has a positive direct effect on PU. People find the BS-MFIA useful and tend to use it in fitness centers if the device components are simple to use. If individuals think there is little effort to adopt health and fitness apps, they find apps beneficial, and they are more inclined to use them while doing exercise. This finding is in line with previous studies as well.[10,11,14,23]

Trust was found to have a positive effect on the intention to use the application. Besides, trust was the most critical factor for fitness participants' preference to use the app. First of all, before downloading a fitness app, a person needs to have trust.[10] Along with the several risks related to using mobile health apps (such as those pertaining to information security, privacy, and quality), the influence of trust on the decision to continue the use of apps can be understood.[10] A body of research has also indicated that trust affects individuals' intention to use the technology.[14,25] Users won't use the system if they don't trust it because trust is an essential need and influences decisions.[26]

Finally, the context was found as a significant determinant of PU and PEOU and indirectly fitness participants' intention to use the BS-MFIA. People's habits of using mobile technology have changed; they often carry cell phones in their pockets or bags and use them almost everywhere.[27] The usage environment has become an essential consideration in shaping user adoption of mobile applications. Individuals determine if mobile apps are easy to use or useful depending on the specific context. A match between the context and the mobile application is essential. If presented in a proper context, a person will be more inclined to use a mobile app. On the other hand, if a mobile information system does not match the context of usage, the service may not be assessed favorably by the user. The importance of context on perceived usefulness was highlighted in the literature. Mallat et al. indicated that the user context has an essential association with perceived usefulness, and use context is an important determinant of mobile ticketing service adoption.[27] Besides, context-related attributes have been reported to be powerful determinants of behavioral intention.[28,29] As a result, context is essential for both mobile apps and Beacon's customized notifications such that users can continue following. The use of a mobile service is often context-dependent. Users value mobile services when they are incorporated into appropriate contexts. In understanding technological services, the context has been rarely included in traditional adoption models; thus, we have limited knowledge about its impact on adoption behavior. In this sense, the context element should be integrated into adoption models as a significant variable.

CONCLUSION

Previously, the only point of contact between fitness and technology was the workout equipment itself. Smartphones have made it possible to incorporate technology into every aspect of the exercise experience in a variety of ways. Individually tailored interventions with beacon technology can contribute to the creation of more effective just-in-time intervention methods in fitness centers. Smartphones can be used as personal trainers with the aid of beacon technology, and mobile apps can assist in scheduling and applying fitness programs more successfully using automated, training program recommendations. This might help gyms and fitness centers save money on labor. Fitness centers can use beacon technology to monitor their members via their smartphones, which can help them understand if they follow a regular and appropriate schedule. Moreover, fitness centers will be able to detect which portions of the facility are the most commonly used, as well as how often customers use the equipment. Fitness centers can decide their financial and business plans based on this information since they can arrange purchases and maintenance plans accordingly. Furthermore, data on membership behaviors can provide insight into the needs of fitness facilities in a variety of areas. For example, fitness centers may experience overcrowding at particular times, causing personnel to have difficulty reaching every single member of the facility at the same time. Furthermore, there are no, or insufficient fitness coaches employed at university fitness centers. The Beacon fitness program is expected to result in significant workload reductions, particularly in university fitness centers. Personalized and customizable messaging, automated check-in, and proximity marketing are other benefits of beacon

technology in fitness facilities. One example of proximity marketing is a juice bar that advertises to individuals as they pass by. Anybody who works out at the gym could be a potential customer of the juice since beacons turn mobile phones into billboards that advertise to potential customers. Customized and personalized messaging is another potential use. For example, if a user regularly attends such group exercise classes, they may be notified of upcoming classes of the same kind. Beacon technology can be used to provide customized meal plans, group workout invites, and personalized coaching. Another, but not final, Beacon application is automatic check-in. The technology allows customers to sign into the fitness center without having to make any other effort. In the field of exercise and fitness, beacon technology can be useful for a variety of samples. For example, Beacon and mobile applications might invite sedentary people to fitness centers. While passing by the fitness center, they might receive healthy living invitations and helpful recommendations.

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Conflict of Interest

No conflicts of interest between the authors and / or family members of the scientific and medical committee members or members of the potential conflicts of interest, counseling, expertise, working conditions, share holding and similar situations in any firm.

Authorship Contributions

Idea/Concept: *Özkan Altun;* ***Design:*** *Özkan Altun, Settar Koçak;* ***Control/Supervision:*** *Özkan Altun;* ***Data Collection and/or Processing:*** *Özkan Altun;* ***Analysis and/or Interpretation:*** *Özkan Altun, Tuba Yazıcı;* ***Literature Review:*** *Özkan Altun;* ***Writing the Article:*** *Özkan Altun;* ***Critical Review:*** *Özkan Altun, Tuba Yazıcı, Settar Koçak;* ***References and Fundings:*** *Özkan Altun, Tuba Yazıcı, Settar Koçak;* ***Materials:*** *Özkan Altun.*

REFERENCES

1. Gruttner A. What we know and what we do not know about digital technologies in the sports industry. Twenty-fifth Americas Conference on Information Systems; August 2019; Cancún, Mexico. [Link]
2. Business Research [Internet]. TBRC The Business Research Private Ltd. © 2023 [Cited: January 20, 2023]. Sports Global Market Report. Available from: [Link]
3. Goebert C, Greenhalgh GP. A new reality: Fan perceptions of augmented reality readiness in sport marketing. Computers in Human Behavior. 2020;106:106231. [Crossref]
4. Horbel C, Buck C, Diel S, Reith R, Walter Y. Stadium visitors' smartphone usage and digital resource integration. Sport, Business and Management: An International Journal. 2021;11(1):10-27. [Crossref]
5. Stegmann P, Nagel S, Ströbel T. The digital transformation of value co-creation: a scoping review towards an agenda for sport marketing research. European Sport Management Quarterly. 2021;23(4):1221-48. [Crossref]
6. Wordstream [Internet]. WordStream ©2022 [Cited: July 22, 2022]. 5 Things You Need to Know About Beacon Technology 5 Things You Need to Know About Beacon Technology Available from: [Link]
7. Davis FD. Perceived usefulness, perceived ease of use, and user acceptance of information technology. MIS Quarterly. 1989;13(3):319-40. [Crossref]
8. Kwak DH, McDaniel SR. Using an extended technology acceptance model in exploring antecedents to adopting fantasy sports league websites. Int J of Sports Marketing and Sponsorship. 2011;12(3):43-56. [Crossref]
9. Hur Y, Ko YJ, Claussen CL. Determinants of using sports web portals: an empirical examination of the sport website acceptance model. Int Journal of Sports Marketing and Sponsorship. 2012;13(3):169-88. [Crossref]
10. Beldad AD, Hegner SM. Expanding the technology acceptance model with the inclusion of trust, social influence, and health valuation to determine the predictors of German users' willingness to continue using a fitness app: A structural equation modeling approach. Int J of Human-Computer Interaction. 2017;34(9):882-93. [Crossref]
11. Byun H, Chiu W, Bae JS. Exploring the adoption of sports brand apps: An application of the modified technology acceptance model. Int J of Asian Business and Information Management. 2018;9(1):52-65. [Crossref]
12. Cho H, Chi C, Chiu W. Understanding sustained usage of health and fitness apps: incorporating the technology acceptance model with the investment model. Technology in Society. 2020;63:101429:1-10. [Crossref]
13. Dam L, Roy D, Atkin DJ, Rogers D. Applying an integrative technology adoption paradigm to health app adoption and use. Journal of Broadcasting and Electronic Media. 2018;62(4):654-72. [Crossref]
14. Suh B, Han I. Effect of trust on customer acceptance of internet banking. Electronic Commerce Research and Applications. 2002;1(3-4):247-63. [Crossref]
15. Perugini M, Bagozzi RP. The role of desires and anticipated emotions in goal-directed behaviours: broadening and deepening the theory of planned behaviour. Br J Soc Psychol. 2001;40(Pt 1):79-98. [Crossref] [PubMed]

16. Gao S, Krogstie J, Siau K. Developing an instrument to measure the adoption of mobile services. Mobile Information Systems. 2011;7(1):45-67. [Crossref]

17. Şencan H, Fidan Y. Likert verilerinin kullanıldığı keşfedici faktör analizlerinde normallik varsayımı ve faktör çıkarma üzerindeki etkisinin spss, factor ve prelis yazılımlarıyla sınanması [Normality assumption in the exploratory factor analysis with likert scale data and testing its effect on factor extraction]. BMIJ. 2020;8(1):640-87 doi: [Crossref]

18. Bryman A, Cramer D. Quantitative data analysis with SPSS release 10 for Windows: A guide for social scientists. 1st ed. London: Routledge; 2001. [Crossref]

19. Nunnally J. Psychometric Theory. 2nd ed. New York: McGraw-Hill; 1978.

20. Koç T, Turan AH. Mobil sabis kabul ve kullanımı: Sakarya Üniversitesi'nde ampirik bir değerlendirme [Mobile sabis acceptance and use: an ampirical assessment at Sakarya University]. Bilgi Ekonomisi ve Yönetimi Dergisi. 2014;9(2):163-75. [Link]

21. Tabachnick BG, Fidell LS. Using Multivariate Statistics. 6th ed. Boston: Pearson; 2013.

22. Fornell C, Larcker DF. Structural equation models with unobservable variables and measurement error: algebra and statistics. Journal of Marketing Research. 1981;18:382-8. [Crossref]

23. Teo T, Noyes J. An assessment of the influence of perceived enjoyment and attitude on the intention to use technology among pre-service teachers: a structural equation modeling approach. Computers & Education. 2011;57(2):1645-53. [Crossref]

24. Canhoto AI, Arp S. Exploring the factors that support adoption and sustained use of health and fitness wearables. Journal of Marketing Management. 2017;33(1-2):32-60. [Crossref]

25. Wu CC, Huang Y, Hsu CL. Benevolence trust: a key determinant of user continuance use of online social networks. Information Systems and e-Business Management. 2014;12(2):189-211. [Crossref]

26. Gefen D, Karahanna E, Straub DW. Trust and TAM in online shopping: An integrated model. MIS Quarterly. 2003;27(1):51-90. [Crossref]

27. Mallat N, Rossi M, Tuunainen VK, Öörni A. The impact of use context on mobile services acceptance: the case of mobile ticketing. Information&Management. 2009;46(3):190-5. [Crossref]

28. Bouwman H, van de Wijngaert L, de Vos H. Context-sensitive mobile services for police officers: A re-assessment of TAM. Proceedings of the 2008 7th International Conference on Mobile Business (ICMB '08); Jul 7-8, 2008; Barcelona, Spain. Washington, DC: IEEE Computer Society; 2008. p.191-200. [Crossref]

29. Van de Wijngaert L, Bouwman H. Would you share? Predicting the potential use of a new technology. Telematics and Informatics. 2009;26(1):85-102. [Crossref]