



INVESTIGATING THE ROLE OF UTAUT2 IN THE USER SATISFACTION AND CONTINUED USAGE OF MOBILE FITNESS APPS: EVIDENCES FROM INDIA

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ABSTRACT

This study examines mobile fitness app (MFA) adoption and use using the Unified Theory of Acceptance and Use of Technology 2 (UTAUT2). CB-SEM analysis of 445 respondents through IBM-AMOS was conducted. UTAUT2 constructs were examined including, consumer satisfaction, e-loyalty, and mobile fitness app reuse. Also, the roles of socio-demographic factors as control variables were examined. The results indicated that UTAUT2 significantly influenced user perception of MFAs. UTAUT2 constructs increased user satisfaction. User satisfaction positively and significantly influenced e-loyalty and app reuse. The study also suggests future research on UTAUT2's role on MFAs. The study highlights UTAUT2 by revealing the constructs that influence MFA adoption, and selected consequences.

Keywords: Mobile fitness apps, technology adoption, UTAUT2, user satisfaction, customer loyalty, continued intention to use.

1. Introduction

MFAs have grown in popularity. COVID-19 and people's interest in health and wellness may explain this. This trend has resulted in 359 million global users and \$16.6 billion in revenue in 2022 (Basuroy, 2022). These numbers demonstrate how important mobile fitness apps are to consumers, especially home exercisers. Indian mobile app development is booming. India has surpassed China in app downloads and monthly users, but both countries have the most users and money (Basuroy, 2022). As the mobile app market grows, fitness apps are one of the most popular subcategories (Al-Saedi, 2020). Smartphones have helped this growth (Yang & Koenigstorfer, 2021). Indians are tech-savvy and health-conscious. India downloaded over 245 million health and fitness apps in 2021 (Basuroy, 2022).

Mobile apps are now ubiquitous. The Play Store and Apple Store offer mobile apps for specific needs (Baber et al., 2024). Understanding mobile app user satisfaction and retention is crucial. To retain customers, mobile app developers must prioritize customer satisfaction (Kalinic et al., 2019).

Ferreira Barbosa et al. (2021) examined consumer intention to use mobile fitness apps (MFA) in fitness centers using UTAUT 2 to investigate new technology. Mobile app and fitness center customer satisfaction were measured. This study examines how mobile fitness app users can have a good experience. The study examines MFA users' satisfaction. Thus, this research aims to fill gaps in previous studies by creating a reliable model that measures user satisfaction with fitness mobile apps and its impact on customer loyalty and continued usage intentions. This study is unique because it applies the UTAUT2 model to MFA user satisfaction, customer e-loyalty, and continued use. This study aims to:

1. To analyze the influence of UTAUT2 on user satisfaction
2. To examine influence of user satisfaction on consumer loyalty and continued intention to use.
3. To examining role of control variables like age, gender, income group on consumer loyalty and continued intention to use.

2. Literature Review

Mobile application technology has impacted healthcare and fitness in recent years. Mobile fitness apps (MFAs) have exploded since 2014. In 2019, 203.45 million people used free fitness apps; by 2021, 359,553 million will. Revenue earned by Fitness Apps was \$16.6 billion in 2022. MFAs go beyond workout trackers. Health applications often use MFAs due to their close relationship. Thus, a fitness app can track blood pressure and heart rate during running, walking, and diet. These apps also track fat loss. These apps monitor health, fitness, and well-being by assessing age, height, weight, and gender. These apps can track daily health and fitness changes, which can help users improve their fitness over time.

AI, VR, and AR are increasingly used in fitness. Innovative technologies are being developed for many applications. Novel mobile apps get downloaded. Such features should be considered when developing fitness apps because they can replace personal trainers. Voice-activated fitness assistants are the future of fitness. Gamification in VR/AR smartphone apps makes physical training more fun and effective (Faqih, 2022).

Several theoretical models have been examined to determine the continued intention to use and actual use of new innovative technology (Beh et al., 2019). This study used the TAM model (Technology

Adoption Model; Davis et al., 1989), UTAUT (Venkatesh et al., 2003), and UTAUT2 (Venkatesh et al., 2012) to explain the model. The latest models, UTAUT and UTAUT2, have better customer prognosis than TAM (Venkatesh et al., 2012). TAM predicts customer adoption of new technologies. The TAM may not be enough to predict new technology adoption because it ignores real-world factors like social impact (Beh et al., 2019). Thus, several scholars have tried to expand the TAM to better understand how people react to new technology. This paradigm has been studied in fitness apps (Beldad & Hegner, 2017; Gómez-Ruiz et al., 2022).

Table 1 shows that UTAUT constructs positively affect fitness app use (Dhiman et al., 2019; Vinnikova et al., 2020). Scholars have criticized the UTAUT model for its limited inclusion of relevant elements when predicting organizational employees' behavioral intention to adopt new technology. Venkatesh et al. (2012) added customers' perspectives to UTAUT2 to address this issue. Figure 1 shows the UTAUT2 model, which adds three constructs—habit, price value, and hedonic motivation—to the four original UTAUT constructs (Venkatesh et al., 2012). Consumer technology adoption and use require these additional constructs (Beh et al., 2019).

Table 1: Definitions of constructs

Constructs	Definitions
Performance Expectancy (PE)	Venkatesh et al., (2012) defined as "The degree to which an individual believes that using a system will allow him or her to achieve a profit in performance". Alalwan et al., 2020 explained performance expectancy means "that the new system and application should make it easier and faster for customers to get what they need and want (Venkatesh et al., 2003)."
Effort Expectancy (EE)	Venkatesh et al. (2003), "EE is meant for the degree to which a system is simple and easy to operate." Alalwan et al. (2017) stated that "Customers have consistently been observed to pay particular attention to the extent to which using a new system is easy and requires less effort."
Social Influence (SI)	Venkatesh et al. (2003), defined SI as "the degree to which an individual feels that others (such as peers and faculty members) believe he or she should employ a modern system or a novel technique in learning," (p. 450).

Constructs	Definitions
Facilitating Conditions (FC)	Moorthy et al. (2019) defined FC as "the learner's insights into the existence of technological and organizational infrastructure and equipment to support the operation of a system." FC answers "how much people use modern apps and how happy they are with them depends a lot on how much technical infrastructure and human support are available when customers need them." (Venkatesh et al., 2003).
Price Value (PV)	Chao (2019) described as "the learners' knowledge of a trade-off between the perceived benefits of the system and the monetary cost paid for the adoption of the system." Venkatesh et al. (2012) defined PC as "the price value of new items and systems is related to the financial elements of their utilization. Customers are more likely to weigh the advantages of a new technology against its price tag."
Habit (HT)	According to Limayen et al. (2017), "the habit could be defined as the customer's tendency to act on their own because they have learned to do so over time. People are getting more and more attached to their smartphones, and they use the apps on them automatically. Venkatesh et al. 2012 stated that this construct originates from individual personal experiences."
Hedonic Motivation (HM)	The concept of HM is referred to as "the pleasure that the user derives from using a system"(Chao, 2019). Researchers have found that HM is a significant indicator of future e-learning and mobile-learning adoption (Moorthy et al., 2019; Nguyen et al., 2014).
Customer e-satisfaction	The concept of customer e-satisfaction is defined as "the contentment of the customer with respect to his or her prior purchasing experience with a given electronic commerce firm," which was outlined by Anderson and Srinivasan (2003, pp. 125).
e-loyalty	Cyr, et. al. (2008) defined e-loyalty/online loyalty, "as the perceived intention of visiting/revisiting, using, and purchasing websites. E-loyalty is simply an extension of the old concept of brand loyalty (Cyr, 2004) and is a result of online purchase behavior (Strauss & Frost, 2001)."
Continued intention to reuse	Rezaei et al. (2014) and Alalwan (2020) defined reuse intention as "the customers will continue to use a product or service from the same company."

Source: Compiled by author

The UTAUT2 model has been extensively studied in banking, retail, and restaurant apps (Alalwan, 2020; Cardozo et al., 2020; Chopdar, 2018). The model has been used in studies on fitness wearable technology and smartphone fitness apps (Beh et al., 2019; Hew, 2015; Jakowski, 2022; Yuan, 2015). This client-focused model was chosen for these investigations. It has also been used in fitness app and wearable technology studies (Beh et al., 2019; Hew, 2015; Yuan, 2015). These investigations focused on client experience, so this methodology was used.

2.1 Conceptual Model Development

Mobile app satisfaction has received less research than how people use them (Kalinic et al., 2019). Technology acceptance has several

important theories and models. These include the Theory of Planned Behavior (TPB) (Ajzen, 1991), Diffusion of Innovation (DOI) (Rogers, 1995), Goal Setting Theory (Locke and Latham, 1990), Technology Acceptance Model (TAM) (Davis, 1989), and UTAUT (Venkatesh et al., 2003). UTAUT is the most comprehensive framework for understanding technology acceptance and use, even though it was developed for corporate settings (Hew et al., 2015). Venkatesh et al. (2012) added three variables to their UTAUT model to explain how customers adopt new technology (Macedo, 2017).

TAM, UTAUT, UTAUT 2, and the elaboration likelihood model (ELM) were used in consumer satisfaction research on mobile

fitness apps. Table 2 summarizes prior studies on mobile fitness apps' dependent and

independent variables in the context of mobile technology and smartphone adoptions.

Table 2: Recent Studies on Mobile Fitness Apps

No.	Study	Methodology & Data collection tools	Factors Examined	Theory Used	Context
1	Barbosa et al. (2021)	Questionnaire	<p>IV- Performance Expectancy; Effort Expectancy; Facilitating Conditions; Habit; Social Influence; Hedonic Motivation.”</p> <p>DV- Behavioural Intention; User Intention; Overall Customer Satisfaction.”</p> <p>MV- Age; Gender; Experience”</p>	UTAUT2	Portugal: Fitness Centers and Mobile Fitness Apps
2	Yuan et al. (2015)	Online Questionnaire	<p>IV- Performance Expectancy; Effort Expectancy; Facilitating Conditions; Habit; Price Value; Social Influence; Hedonic Motivation.”</p> <p>DV- Intention of continued Usage”</p> <p>MV- Age; Gender; Experience”</p>	UTAUT2	US: Health and Fitness Mobile Apps
3	Katherine & Kim (2016)	Pre & post-test design on focus group	<p>IV- Attitude; Subjective Norm; Perceived Behavioural Control”</p> <p>DV- Behavioural Intention”</p>	Theory of Planned Behaviour; Functional Triad	Mobile Fitness Apps
4	Stragier & Merchant (2013)	Application Programme Interface; Survey data and API data	<p>IV- Altruism; Reputation Building; Community Identification; Social Norms; Feedback; Information Sharing”</p> <p>DV- Attitude; Sharing Behaviour”</p>	Theory of Planned Behaviour	Social Media Platforms (Twitter): Mobile Fitness Apps
5	Yin et al. (2021)	Dataset obtained from the MFA platform	<p>IV- Self-monitoring; Social Support; Platform Rewards”</p> <p>DV- Users’ Physical Activity”</p> <p>MV- Gender”</p>	Self-determination Theory	China: Mobile Fitness Apps
6	Yoganathan & Kajanan (2014)	Field Survey	<p>IV- Performance Expectancy; Effort Expectancy; Facilitating Conditions; Social Influence”</p> <p>DV- Intention to use the fitness app”</p> <p>MV- Intrinsic Motivation for PA; Credibility of Information”</p>	UTAUT; Elaboration Likelihood Model	Singapore: Mobile Fitness Apps
7	Aldossari et al. (2022)	Online Survey	<p>IV- System Quality; Information Quality”</p> <p>DV- MFA Goal Setting/Tracking Use; Goal Achievement; Behavioural Change”</p>	Goal Setting Theory and IS models	US: Mobile Fitness App Users

No.	Study	Methodology & Data collection tools	Factors Examined	Theory Used	Context
8	Wang & Collins, (2021)	Questionnaire	<p>“DV-attitudes toward each of the five clusters of mobile fitness apps”</p> <p>“IV-Demographic Variables, mHealth Variables, and App Features”</p>	the Integrative Model of Behavioral Prediction (IMBP), Theory of Reasoned Action (TRA), and the Theory of Planned Behavior (TPB, Ajzen, 1991)	iPhone app store and Amazon Mechanical Turk (MTurk) Workers
9	Wei et al., (2020)	Questionnaire	<p>“IV- Perceived Benefit, P Barriers, P Threats, Self-efficacy”</p> <p>“DV- Behavioral Intention, Use Behaviour”</p> <p>“MV- Risk Perception, Performance Expectancy, Weight loss intention”</p>	UTAUT	App Store in China

Empirical Studies on Mobile Fitness Apps (From 2011-2022)

*IV-Independent Variables; DV- Dependent Variables; MV- Moderating Variables

2.1.1 Performance Expectancy and customer e-satisfaction

Advanced technology helps people achieve their goals faster and improve their performance, according to Venkatesh et al. (2012). The internet and mobile devices allow consumers to satisfy their curiosity anytime, anywhere (Tan et al., 2018). According to Jeyaraj et al. (2006), performance expectancy drives customer satisfaction. Siyal et al. (2021) found that new technology improves performance and retains customer loyalty. Alalwan et al. (2020) found that innovative mobile apps with high utilitarian value make customers happier. If mobile apps are useful and satisfying, consumers will use them (Ferreira Barbosa et al., 2021). This study hypothesizes that:

H₁: Performance expectancy positively and significantly influences customer e-satisfaction

2.1.2 Effort Expectancy and customer e-satisfaction

Consumers prefer easy-to-use technology (Wong et al., 2015). Customers' time and effort may reflect mobile app complexity and convenience (Siyal et al., 2021; Wang et al., 2018). Thus, if such apps are easy to use, customers will be satisfied (Alalwan et al., 2020). Kaewkitipong et al. (2016) found that effort expectancies significantly affected student satisfaction with online learning. Rahi

et al. (2019) found a significant relationship between mobile websites, effort expectancy, and customer satisfaction. Similar to mobile food ordering apps (Alalwan, 2020), mobile shopping apps (Alalwan et al., 2020), tourism mobile apps (Chang et al., 2022; Tan et al., 2017), mobile banking (Ali, 2022), and mobile taxi booking apps (Siyal, 2021). This study hypothesizes that:

H₂: Effort expectancy positively and significantly influences customer e-satisfaction

2.1.3 Social Influence and customer e-satisfaction

Social pressure or encouragement to adopt a new technology is social influence (Venkatesh et al., 2012; Mishra, 2023). Smartphone users are part of any social group that discusses technology and encourages adoption (Kasilingam, 2020; Olasina, 2019). Customers are more satisfied with mobile apps if they feel socially accepted for using them, which increases social values (Alalwan, 2020; Jeyaraj, 2006; McLean, 2021). Wang and Collins (2021) found that social influence significantly impacts user satisfaction with mobile social apps. Siyal et al. (2019) found that social influence significantly affects customer satisfaction. This study hypothesizes that:

H₃: Social influence positively and significantly influences customer e-satisfaction

2.1.4 Facilitating Conditions and customer e-satisfaction

Venkatesh et al. (2003) stated that the availability of technological infrastructure and human support when customers need it will greatly impact the use of modern applications and user satisfaction. Facilitating conditions can boost customer satisfaction, especially if customer support services are compatible with other systems (Alalwan et al., 2017). In e-government, Chan et al. (2010) found that facilitating conditions increase customer satisfaction. E-learning, e-banking, MFOAs, and MTB apps have investigated facilitating conditions. This study examines how facilitating conditions drive customer satisfaction. Mobile fitness app research will help retain customers. This study hypothesizes that:

H₄: *Facilitating conditions positively and significantly influences customer e-satisfaction*

2.1.5 Price Value and customer e-satisfaction

Venkatesh et al. (2012), Price value was a financial advantage. Customers compare the cost of innovative new technologies with their utilitarian benefits (Alalwan et al., 2017; Dhiman et al., 2019). The price value extended UTAUT and made the UTAUT2 model more consumer-friendly. More expensive technology would increase adoption. Liu et al. (2022) investigated whether health app users are satisfied if the perceived benefits outweigh the cost. The price value is the trade-off between customer satisfaction and mobile app adoption cost (Alalwan et al., 2020; Dhiman, 2019). This study hypothesizes that:

H₅: *Price value positively and significantly influences customer e-satisfaction*

2.1.6 Hedonic Motivation and customer e-satisfaction

In addition to extrinsic motivations, intrinsic motivation drives customer satisfaction when adopting innovative technologies (Alalwan et al., 2020; Banerjee & Sreejesh, 2021; Chen, 2010; Venkatesh, 2012). Hedonic motivation is the positive feelings that come from using new products, services, and apps (Alalwan, 2020; Tamilmani et al., 2019). Mobile apps are becoming increasingly important to people worldwide (Mehra et al., 2020; Szymkowiak et al., 2021). Mobile app features allow users to co-create value and find satisfaction by writing reviews and giving feedback (Ju et al., 2021; Zhang et al., 2017). Hedonic motivation

also predicts customer satisfaction with mobile apps (Alalwan, 2020; Chen et al., 2010; Salimon et al., 2017; Siyal et al., 2021) and increases consumer satisfaction and adoption of new technologies.

H₆: *Hedonic motivation positively and significantly influences customer e-satisfaction*

2.1.7 Habit and customer e-satisfaction

Venkatesh et al. (2012) define habit as how much a person automatically reverts to a learned behavior. After repeated practice, such behavior can become habitual or automatic (Chang et al., 2022; Singh et al., 2020; Tamilmani, 2021). Venkatesh et al. (2012) added the habit as a final construct to the UTAUT2 model to better characterize customers' use of innovative systems and technologies. Habit formation is important in mobile commerce and app adoption (Alalwan, 2020; Amoroso & Lim, 2017; Chang et al., 2022; Alalwan, 2017; Sun & Chi, 2017; Yan, 2021). Siyal et al. (2021) found that mobile app repetition increases customer satisfaction. This study hypothesizes that:

H₇: *Habit positively and significantly influences customer e-satisfaction*

2.1.8 Customer e-satisfaction to e-loyalty

Loyalty motivates shopping (Rokonuzzaman et al., 2020). Reusing an application is also known as using, repurchasing, or using continuously (Malhotra et al., 2017). Online purchases are successful when customers want to reuse (Duarte et al., 2018). Studies suggest that e-commerce companies should give customers a great experience to keep them coming back (Malhotra et al., 2017; Mofokeng, 2021). In many e-commerce scenarios, mobile application users' loyalty and continuous intention to reuse are positively correlated (Abou-Shouk & Khalifa, 2016; Chan et al., 2010; Malhotra, 2017). User-friendly mobile apps increase app reuse (Choi, 2020; Fong et al., 2017). Satisfied customers are more likely to buy again (Aung, 2020). Malhotra et al. (2017) examined how e-loyalty affects online retailers' reuse. The study found that only loyal online shoppers reuse. Several studies on loyalty and continuous intent to reuse of e-tailing websites suggested examining mobile apps as well (Vinnikova et al., 2020; Kaya et al., 2019; McLean et al., 2020). Review suggests:

H₈: *Customer e-satisfaction positively and significantly influences customer e-loyalty*

2.1.9 Customer e-satisfaction to continued intention to reuse

Various studies have demonstrated a significant relationship between customer e-satisfaction and continued intention to reuse (e.g Al Amin et al., 2021; Hanif & Lallie, 2021; Yeo et al., 2021). E-satisfaction has also been found to have a significant impact on CI to reuse MFOAs. Alalwan (2020) also found a significant influence of e-satisfaction on customers' intention to reuse MFOAs. Studies also indicate that app quality along with user satisfaction results in CI to reuse (Cho et al., 2019; Natarajan et al., 2018). Wang, et al. (2019)

in their study reported that customer satisfaction positively influences intention to reuse on mobile applications.

H₉: Customer e-satisfaction positively and significantly influences continued intention to reuse

Based on the proposed hypotheses, we present a conceptual model in which we examine the influence of the Unified Theory of Acceptance and Use of Technology 2 (UTAUT2) on user satisfaction, consumer loyalty, and continued intention to reuse (refer Figure 1).

3.2 Instrument and Measurement

Table 3: Construct & Item source

Construct	Source	Items
Performance Expectancy	Venkatesh et al. (2003)	<ol style="list-style-type: none"> 1. This Fitness app is of use to me in everyday life 2. The usage of this Fitness app increases the chances to achieve things that are very important to me 3. The usage of this Fitness app helps me quickly realize my health goals. 4. The usage of this Fitness app improves my lifestyle.
Effort Expectancy	Venkatesh et al. (2003)	<ol style="list-style-type: none"> 1. It is easy to learn how this Fitness app is used 2. The usage of this Fitness app is clear and understandable 3. This Fitness app is easy to use 4. Skills regarding the usage of this Fitness app are easily required
Social influence	Venkatesh et al., (2012)	<ol style="list-style-type: none"> 1. People I consider important in my life think that I should use this Fitness app 2. People who have influence on me and my actions think that I should use this Fitness app 3. People whose opinions I respect think that I should use this Fitness app
Facilitating Conditions	Venkatesh et al. (2003)	<ol style="list-style-type: none"> 1. I have the resources needed for using this Fitness app 2. I have the knowledge needed for using this Fitness app 3. The usage of this Fitness app is compatible with other technologies I use
Price Value	Venkatesh et al. (2012)	<ol style="list-style-type: none"> 1. The price of using this Fitness app is reasonable 2. This Fitness app offers good value for invested money 3. At its current price, this Fitness app offers good value
Hedonic Motivation	Venkatesh et al. (2012)	<ol style="list-style-type: none"> 1. I enjoy while using this Fitness app 2. Using this Fitness app is interesting 3. This fitness app expresses myself
Habit	Venkatesh et al. (2012)	<ol style="list-style-type: none"> 1. The usage of this Fitness app has become a habit to me 2. I am loyal to the usage of this Fitness app 3. I must use this Fitness app
User Satisfaction	Roca et al. (2006)	<ol style="list-style-type: none"> 1. My choice to use this this Fitness app is a wise one 2. This this Fitness app never make me disappointed. 3. Overall, my feeling to this Fitness app is satisfactory.
Customer e-Loyalty	Ribbink et al., (2004)	<ol style="list-style-type: none"> 1. I will recommend this Fitness app to other people 2. I would recommend this Fitness app to others 3. I intend to continue using this Fitness app 4. I prefer this Fitness app above others
Continued Intention to Reuse	Alawan (2020)	<ol style="list-style-type: none"> 1. I intend to continue using this Fitness app in the future. 2. I will always try to use this Fitness app in my daily life. 3. I plan to continue to use this Fitness app frequently.

Insert Figure 1 About Here

3. Research Methodology

3.1 Development of Instrument

Table 3 lists study construct sources. Venkatesh et al. (2003) provided Performance, Effort, and Facilitating Conditions. Venkatesh et al. (2012) used social influence. Hansen et al. (2013) determined price. Lin and Lu (2015) scaled hedonic motivation. Venkatesh et al. (2012) provided Habit, and Li and Fang (2019) provided User Satisfaction. Ribbink et al. (2004) introduced customer e-loyalty. Adapted from Alalwan (2020).

Our research focused on MFA user satisfaction and retention. This study's population and sample were Indian MFA users to meet our goal. Quantitative non-probability judgmental sampling was used. Indian MFA users were

surveyed on Facebook, WhatsApp, Telegram, and LinkedIn. Due to the difficulty of estimating the target population's size, Suo (2022) used Cochran's (1977) formula to calculate the quantitative analysis sample size. At 95% reliability, 385 is the sample size (Cochran, 1977). MFA users from across India received 500 questionnaires. After eliminating invalid (non-experienced) and incomplete questionnaires, 445 valid questionnaires were received in 5 weeks with a 92% response rate. Wang and Collins (2021) said high response rate leads to perfection.

3.3 Profile of the Respondents

In this research study demographics variables like age, gender, education and income employed as a control variable (Larson, 2018). Prior research studies have shown that there is a robust association between consumer behavior and demography of consumers (Chakraborty & Paul, 2023). Refer to Table 4 for demographic information.

3.4 Data Normality

Before analysis, data normality must be determined. In this research study, no responses were missing or unengaged. According to prior studies, the skewness and kurtosis values were well within the acceptable tolerance levels of +3 to 3 (Table 5). Table 5 presents construct descriptive statistics. We performed a multicollinearity test to ensure that all findings were below the three-point cut-off. The data were sufficient for the study because no anomalies were found. The survey's 445 respondents tested the study paradigm.

Table 4: Demographic Profile

Measures		Frequency	Percentage
Gender	Male	240	53.9
	Female	205	46.1
Age	Less than 25 years	191	42.9
	26 years - 45 years	170	38.2
	46 years and above	84	18.9
Level of Education	High School	179	40.2
	Graduate	152	34.2
	Post Graduate	114	25.6
Annual income	Less than Rs. 5 lacs per annum	171	38.4
	Rs. 5 lacs to Rs. 10 lacs per annum	167	37.5
	Rs. 10 lacs and above	107	24.0
<i>n</i> = 445			
Source: Calculated using IBM SPSS 28.0			

Table 5: Mean, Standard Deviation & Correlation among variables

	\bar{x}	σ	Gender	Age	Edu	AI	PE	EE	SI	FC	PV	HM	HA	US	CU	CIR
Gender	1.46	0.499	1													
Age	1.75	0.753	-0.041	1												
Edu	1.85	0.799	-0.113	0.092	1											
AI	1.86	0.778	-0.121	0.037	-0.052	1										
PE	4.09	1.4	-0.062	-0.002	-0.049	0.0414	1									
EE	3.37	1.15	-0.079	0.015	-0.078	0.0100	0.787	1								
SI	3.22	1.51	-0.075	0.035	0.039	0.0502	0.875	0.619	1							
FC	3.61	1.32	-0.69	0.016	0.055	0.0430	0.82	0.716	0.642	1						
PV	3.46	1.46	-0.044	0.061	0.025	0.0434	0.755	0.724	0.816	0.705	1					
HM	3.65	1.3	-0.016	0.031	0.031	0.0502	0.838	0.66	0.839	0.823	0.31	1				
HA	3.42	1.35	-0.021	0.042	-0.006	0.0348	0.251	0.722	0.695	0.847	0.27	0.706	1			
US	3.53	1.28	-0.089	-0.034	0.074	0.0422	0.809	0.199	0.831	0.764	0.285	0.882	0.817	1		
CU	3.49	1.22	-0.099	0.411	0.028	0.0685	0.835	0.743	0.183	0.893	0.352	0.892	0.78	0.684	1	
CIR	3.74	1.16	-0.078	-0.070	0.062	0.0377	0.773	0.762	0.816	0.353	0.323	0.787	0.761	0.834	0.756	1

Calculated using IBM SPSS 28.0

3.5 Common method bias (CMB)

In single-method research studies, common method bias (CMB) may cause spurious correlations between variables. Harman's single-factor test is used to detect mono-method variance. This test examines whether a single factor explains a large proportion of the variance (<50%) by factoring all study measures. This suggests no common method variance. Researchers used CFA marker and common latent factor techniques to ensure

rigor (Podsakoff et al., 2012). Given the study's complicated mediation effect analysis, these methods were used to reduce common method bias. Respondents were less likely to make causal assumptions, reducing CMB risk.

3.6 Factor loadings, reliability and validity analysis

Confirmatory Factor Analysis (CFA) assessed reliability, validity, and fit indices. Table 6 shows Cronbach's alpha values and factor

Table 6: Measurement of variables

Construct	Items	Cronbach Alpha	EFA	CFA	SEM
PE	PE2	0.820	0.841	0.674	0.674
	PE1		0.837	0.806	0.806
	PE4		0.800	0.800	0.800
	PE3	PE3	0.785	0.695	0.695
EE	EE2	0.880	0.923	0.914	0.914
	EE1		0.902	0.874	0.874
	EE4		0.895	0.662	0.662
	EE3	EE3	0.770	0.864	0.864
SI	SI2	0.879	0.926	0.923	0.923
	SI1		0.912	0.861	0.861
	SI3	SI3	0.860	0.696	0.696
FC	FC1	0.930	0.951	0.855	0.855
	FC3		0.948	0.931	0.931
	FC2	FC2	0.920	0.941	0.941
PV	PV2	0.934	0.951	0.942	0.942
	PV3		0.940	0.988	0.988
	PV1	PV1	0.929	0.871	0.871
HM	HM1	0.702	0.843	0.843	0.843
	HM2		0.840	0.840	0.840
	HM3	HM3	0.851	0.829	0.829
HA	HA2	0.745	0.914	0.931	0.931
	HA1		0.909	0.910	0.910
	HA3	HA3	0.901	0.855	0.855
USAT	US2	0.951	0.959	0.944	0.944
	US1		0.958	0.907	0.907
	US3	US3	0.946	0.940	0.940
CUL	CUL3	0.872	0.935	0.675	0.675
	CUL1		0.919	0.889	0.889
	CUL3	CUL2	0.824	0.951	0.951
CIR	CIR1	0.905	0.900	0.839	0.839
	CIR4		0.899	0.864	0.864
	CIR3		0.883	0.888	0.888

loadings above 0.7 for all items. All constructs had composite reliability above 0.70 using CFA (Table 7).

AVE and CR were above 0.50, proving convergent and discriminant validity (Fornell & Larcker, 1981). The square roots of the AVEs were greater than the correlation coefficients among the constructs, and the heterotrait-monotrait (HTMT) technique showed that the HTMT values were lower than the 0.85 threshold (Table 8) (Fornell & Larcker, 1981; Henseler et al., 2014).

Positive correlations between study measures were found, but not at the required 0.80 (Kline, 2015). Finally, goodness of fit metrics ($\chi^2/df= 2.122$, CFI = 0.943, TLI = 0.951, RMSEA = 0.036) were within the suggested range (Hair et al., 2013).

3.7 Hypothesis Testing

To test our hypotheses, we performed a structural model analysis and found good model fit indices ($\chi^2/df= 2.122$, CFI, 0.943, TLI, 0.951, RMSEA = 0.036). Table 9 shows that performance expectancy (H1: $\beta= 0.164$, $p=0.001$), effort expectancy (H2: $\beta= 0.146$,

Table 7: Construct and Discriminant validity

	CR	AVE	PE	EE	SI	FC	PV	HM	HA	US	CUL	CIR
PE	0.766	0.525	0.623									
EE	0.725	0.554	0.490	0.654								
SI	0.739	0.623	0.204	0.449	0.811							
FC	0.728	0.646	0.322	0.404	0.448	0.804						
PV	0.749	0.541	0.277	0.524	0.459	0.633	0.791					
HM	0.757	0.579	0.293	0.502	0.486	0.512	0.563	0.616				
HA	0.772	0.588	0.204	0.420	0.375	0.557	0.567	0.433	0.584			
US	0.759	0.626	0.285	0.562	0.519	0.521	0.618	0.532	0.466	0.726		
CUL	0.744	0.658	0.523	0.652	0.372	0.403	0.420	0.442	0.393	0.428	0.652	
CIR	0.755	0.527	0.462	0.462	0.411	0.351	0.310	0.345	0.213	0.293	0.462	0.744

Table 8: Hetrotrait and MonoTrait (HTMT) Ratio

	PE	EE	SI	FC	PV	HM	HA	US	CUL	CIR
PE										
EE	0.702									
SI	0.526	0.768								
FC	0.321	0.862	0.803							
PV	0.702	0.369	0.626	0.809						
HM	0.866	0.702	0.436	0.626	0.770					
HA	0.684	0.487	0.866	0.436	0.803	0.816				
US	0.477	0.411	0.889	0.866	0.620	0.539	0.477			
CUL	0.620	0.626	0.684	0.889	0.829	0.569	0.803	0.539		
CIR	0.461	0.436	0.670	0.684	0.461	0.640	0.620	0.702	0.680	

Table 8: Hypotheses testing

<i>Hypothesis</i>	<i>Path</i>			<i>Estimate</i>	<i>P-Value</i>	<i>Status</i>
H ₁	US	<-	PE	0.164	0.001	Supported
H ₂	US	<-	EE	0.146	0.006	Supported
H ₃	US	<-	SI	0.228	0.032	Supported
H ₄	US	<-	FC	0.194	0.000	Supported
H ₅	US	<-	PV	0.160	0.018	Supported
H ₆	US	<-	HM	0.126	0.021	Supported
H ₇	US	<-	HA	0.235	0.000	Supported
H ₈	CUL	<-	US	0.372	0.000	Supported
H ₉	CIR	<-	US	0.411	0.000	Supported

R^2 (US = 0.358; CUL = 0.138; CIR = 0.169)

p=0.006), social influence (H3: $\beta = 0.228$, p=0.032), facilitating condition (H4: $\beta = 0.194$, p=0.000), price value (H5), hedonic motivation (H6), and habit (H7) significantly affect user satisfaction.

Our research model explains 35% of user satisfaction. User satisfaction also increases customer loyalty (H8: $\beta = 0.372$, p=0.000) and reuse intention (H9: $\beta = 0.411$, p=0.000). Figure 2 shows the results' relationships.

trend, it is important to know what makes customers happy and engaged (Chang et al., 2022; Thakur, 2019). In order to do this, this study was done with users of mobile fitness apps (MFA) in India to find out how UTAUT2 affects user satisfaction and how user satisfaction affects the user's desire to keep using the app and their loyalty to the app. The statistical analysis of the research model shows that it is important and adds to the body of literature that already exists. The

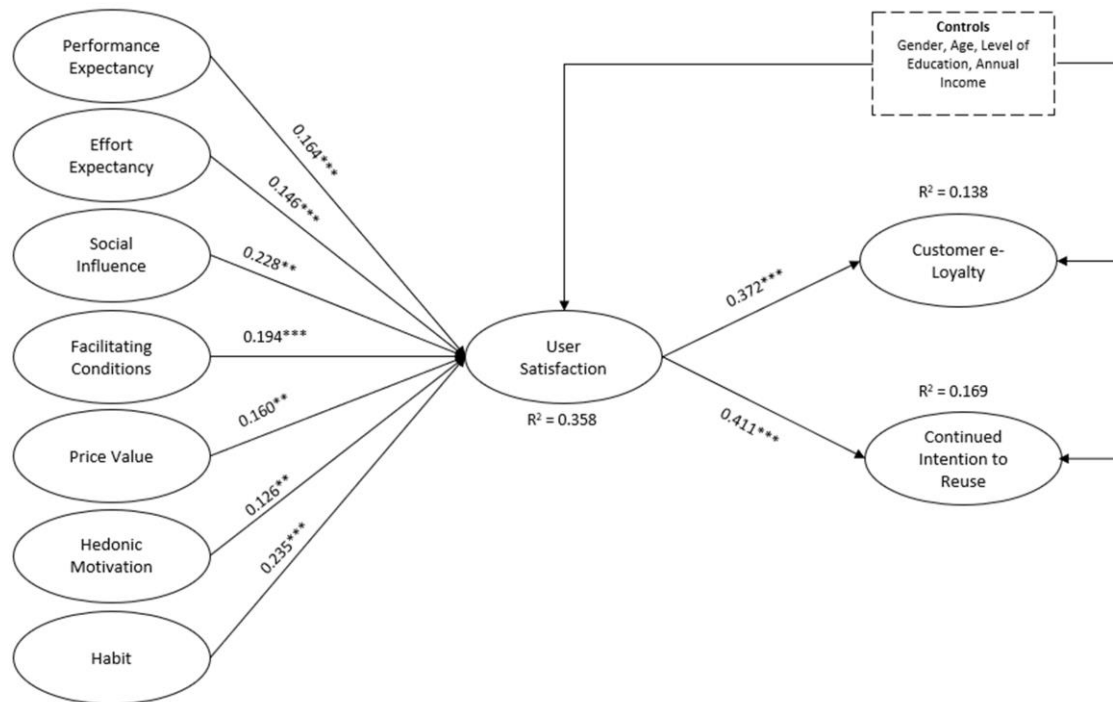


Figure 2: Measurement Model

3.8 Control Variables

The results of research indicated that demographic factors such as gender, age, level of education, and annual income do not influence the customer loyalty significantly. This aligns with historical evidence that these factors do not have a significant impact on continued intention to reuse. However, the study also found that age ($\beta = 0.205$, $p < .001$) and education level ($\beta = 0.102$, $p < .05$) had a confounding influence on the continued intention to reuse of MFAs.

4. Discussion

In the highly competitive and erratic world of today, emerging economies like India are using mobile apps more and more. This is due to a number of factors, such as rising incomes, widespread internet access, and the availability of smartphones. Because of this

bootstrapping method was used to test the hypotheses, as shown in table no. 9.

The findings of the study, which aimed to identify the various factors affecting consumer satisfaction and willingness to support MFA use, are thoroughly analyzed in this article. The study identified numerous factors that are essential in affecting consumer perceptions, such as performance expectancy (PE), effort expectancy (EE), social influence (SI), facilitating conditions (FC), hedonic motivation (HM), price value (PV), habit (HB), and customer satisfaction (CS). The study found that these factors statistically have a significant impact on consumer satisfaction. Contrarily, customer satisfaction significantly influenced both customer loyalty and the likelihood that they would use MFA again. The fact that the study's findings are

consistent with earlier work in the field further supports their validity. The study provides helpful insights into the factors influencing consumer behavior, which can help businesses develop effective marketing strategies to promote the use of MFA and improve customer satisfaction.

The purpose of the study was to look into the variables affecting consumer satisfaction and intent to recommend MFA. According to the findings, there is a significant correlation between a number of variables and consumer satisfaction, including performance expectations, effort expectations, social influence, enabling circumstances, hedonic motivation, habit, and customer satisfaction. These findings are in line with earlier studies in the area. Similar findings have been reported in several studies by Herrero et al. (2017), Siyal et al. (2019), Zhang et al. (2017), Alalwan et al. (2017), Venkatesh et al. (2012), and Chang et al. (2022).

The study's findings differ from those of Yuan et al. (2015) and Dhiman et al. (2019) in their predictions about users' adoption and continued usage of fitness apps, despite similarities in the examined constructs. Contrary to Yuan et al. (2015)'s findings, the study discovered no significant effects of effort expectancy, social influence, and facilitating conditions on user intention to continue using fitness apps. In addition, contrary to Dhiman et al. (2019), the study found no significant influence of performance expectancy, facilitating conditions, or hedonic motivation on the behavioral intention to adopt fitness apps.

According to the study, using MFA had a positive impact on customer satisfaction due to perceived usefulness. When customers find MFA useful, it improves their experience and increases loyalty and satisfaction. This result is consistent with earlier research by Herrero et al. (2017) and Siyal et al. (2021), which showed that perceived usefulness has a favorable effect on customer satisfaction.

The study found a number of elements that have a significant impact on consumer satisfaction and intention to suggest using MFAs. The findings offer developers and marketers practical insights to improve client loyalty and satisfaction.

According to the research done for H₂, using MFA has positive effects on EE on CS. According to the study, users prefer MFA apps that are simple to use and demand little effort. The study also shows that consumers with a propensity for repetition have a cognitive attachment to apps that are simple to use. These findings are in line with those of earlier studies by Salimon et al. (2017), who stressed the significance of user-friendliness in the adoption of technology.

This research supported H₃, indicating that there is a positive correlation between social influence (SI) and customer satisfaction (CS) in using MFA. Findings of the study revealed that people are more likely to use MFA when they are influenced by their social circle, such as family and friends, who encourage them to try out new technologies. This results in a satisfying experience and a desire to remain connected to these systems. Our results are consistent with previous studies conducted by Zhang et al. (2017).

The present study presented a comprehensive investigation of factors that influence customer satisfaction (CS) and intention to recommend (IR) the use of Mobile Fitness Applications (MFA). Our findings revealed that FC, HM, PV, HB, and CS significantly influenced consumer satisfaction and IR. Specifically, H₄ demonstrated that the compatibility of MFA with modern technologies and timely support from technical teams positively impacted customer satisfaction and loyalty to the system. These results support previous research by Salimon et al. (2017) and Alalwan et al. (2017).

H₅ proved that the enjoyment, entertainment, and fun people felt while using MFA had a positive impact on their level of customer satisfaction. Additionally, utilitarian elements like amusement and playfulness worked as motivators and raised consumers' satisfaction with MFA. These results are consistent with earlier work by Siyal et al. (2019).

Since H₆ revealed that consumers compared the perceived cost of technology use with other cutting-edge systems available on the market, the current study also demonstrated the beneficial effects of PV on CS. If consumers believed MFA to be relatively more

advantageous, they were more likely to keep using it, leading to higher customer satisfaction. Our results agree with those of earlier research by Alalwan et al. (2017) and Venkatesh et al. (2012).

H₇ provided proof that using MFA causes HB to have an impact on CS. Our results indicated that consistent use of technology produced a sense of satisfaction and improved overall experience, with usage frequency being a key factor in determining consumer satisfaction and their decision to keep using MFA. The findings support earlier studies by Baptista and Oliveira (2016), Kim et al. (2005), and Venkatesh et al. (2012).

H₈ demonstrated that CS significantly influenced IR, as satisfaction with technology fosters customer loyalty, which, in turn, leads to a higher likelihood of recommending MFA. These results are in congruence with the conclusions drawn by Al Amin et al. (2021).

5. Theoretical Implications

The results of this research indicated user satisfaction to the UTAUT2 model and contributed to fitness and sports literature. This study used the UTAUT2 because it is a good tool for analyzing consumer technology adoption behavior (Faqih, 2022; Cho et al., 2019). Several studies examined behavioral intention to use UTAUT and UTAUT2 using fitness apps (Beldad & Hegner, 2017; Dhiman et al., 2019; Ferreira Barbosa et al., 2021), but none led to user satisfaction or customer loyalty for their mobile apps. Given the lack of research on MFAs in India, it's important to understand Indian customers' views. Thus, this study enhances our understanding of MFA deployment in India. This study emphasizes user satisfaction, customer loyalty, and continuous intention to use rather than customer intention and initial adoption, contributing theoretically to the research.

6. Practical Implications

This research study provides practical and empirical information about MFA development and marketing. This study shows that performance expectancy is the most important factor in user satisfaction. Therefore, marketers must emphasize the role of promotional campaigns in convincing customers that MFAs require less time and

effort than traditional fitness methods like visiting fitness centers.

MFA service providers, application developers, network operators, and smartphone manufacturers are also affected by this research. The UTAUT2 framework's key components affect MFA users' satisfaction, loyalty, and intent to use them, according to the study. These findings suggest that businesses should prioritize utilitarian feature enhancements because performance and efficiency significantly affect MFA user satisfaction. Thus, industry stakeholders should prioritize MFA functionality to improve user experience.

Finally, the app's content boosts hedonic values. Thus, to improve customer relations, businesses should use MFAs with joy, happiness, and satisfaction. Additionally, habit influences the adoption and use of innovative technologies. If they have a good experience with MFAs, they'll use them again. It's crucial to lower MFA prices to improve user satisfaction. It's also crucial to inform consumers about MFA features and updates via popular social media platforms. By receiving regular updates and communication, users can take advantage of the MFA's latest features.

7. Limitations and future research directions

Like all research studies, this one has some restrictions. First, we were unable to work on the study with the companies that reach their users through MFAs. Collaboration with companies might have given us a comprehensive understanding of users' satisfaction. Second, to investigate the impact that fitness centers that are a part of the MFAs chain play in improving user satisfaction, here it was unable to include these physically existed fitness and wellness centers in the current study. Thirdly, all relationships cannot be concluded as causal because the study was not an experimental. At last, like other questionnaire-based research, its data and findings are a reflection of the individuals' perspectives and opinions. And because of this, most of the findings are subjective and not entirely objective. Thus, it is suggested that similar studies be conducted in other nations in the future. And it's recommended

to scholars to go for longitudinal study to find out the variations in the result.

8. Conclusion

This research aimed to provide light on the factors that could determine the level of satisfaction and likelihood of future MFA use among Indian customers. MFA is a segment that should be investigated deeper in the present day, particularly about the amount of their user satisfaction it provides, as this determines whether or not customers will remain loyal to the application and whether or not they will to use in future. The UTAUT2 model was considered to provide an appropriate theoretical basis for the suggested conceptual model. The results of this study provided substantial support for the developed model, confirming the significant influence of the hypothesized variables on user satisfaction, loyalty, and intention to continue using the app. CB-SEM was used for analysis of data.

Author contributions statement

Dr. Raturaj and Dr. Prerana conceptualized and designed the research. Dr Raturaj conducted data analysis, and Dr. Prerana did literature review and methodology. Both authors participated in drafting and revising the manuscript.

Disclosure of interest

There are no competing interests to declare. The authors confirm that there are no relevant financial or non-financial competing interests to report

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References

- Abou-Shouk, M. A., & Khalifa, G. S. (2017). The influence of website quality dimensions on e-purchasing behaviour and e-loyalty: a comparative study of Egyptian travel agents and hotels. *Journal of Travel & Tourism Marketing*, 34(5), 608-623. <https://doi.org/10.1080/10548408.2016.1209151>
- Ajzen, I. (1991). The theory of planned behavior. *Organizational Behavior and Human Decision Processes*, 50(2), 179-211. [https://doi.org/10.1016/0749-5978\(91\)90020-t](https://doi.org/10.1016/0749-5978(91)90020-t)
- Al Amin, Md., Arefin, Md. S., Sultana, N., Islam, Md. R., Jahan, I., & Akhtar, A. (2021). Evaluating the customers' dining attitudes, e-satisfaction and continuance intention toward mobile food ordering apps (MFOAs): Evidence from Bangladesh. *European Journal of Management and Business Economics*, 30(2), 211-229. <https://doi.org/10.1108/ejmbe-04-2020-0066>
- Alalwan, A. A. (2020). Mobile food ordering apps: An empirical study of the factors affecting customer e-satisfaction and continued intention to reuse. *International Journal of Information Management*, 50, 28-44. <https://doi.org/10.1016/j.ijinfomgt.2019.04.008>
- Alalwan, A. A., Algharabat, R. S., Baabdullah, A. M., Rana, N. P., Qasem, Z., & Dwivedi, Y. K. (2020). Examining the impact of mobile interactivity on customer engagement in the context of mobile shopping. *Journal of Enterprise Information Management*, 33(3), 627-653. <https://doi.org/10.1108/jeim-07-2019-0194>
- Alalwan, A. A., Dwivedi, Y. K., & Rana, N. P. (2017). Factors influencing adoption of mobile banking by Jordanian bank customers: Extending UTAUT2 with trust. *International Journal of Information Management*, 37(3), 99-110. <https://doi.org/10.1016/j.ijinfomgt.2017.01.002>
- Ali, A., Hameed, A., Moin, M. F., & Khan, N. A. (2022). Exploring factors affecting mobile-banking app adoption: A perspective from adaptive structuration theory. *Aslib Journal of Information Management*. <https://doi.org/10.1108/ajim-08-2021-0216>
- Al-Saedi, K., Al-Emran, M., Ramayah, T., & Abusham, E. (2020). Developing a general extended UTAUT model for M-payment adoption. *Technology in Society*, 62, 101293. <https://doi.org/10.1016/j.techsoc.2020.101293>

- Amoroso, D., & Lim, R. (2017). The mediating effects of habit on continuance intention. *International Journal of Information Management*, 37(6), 693–702. <https://doi.org/10.1016/j.ijinfomgt.2017.05.003>
- Aung, T. T. (2020). Factors influencing attitude and intention towards adoption of mobile banking in Myanmar. *International Journal of Information Communication Technologies and Human Development*, 12(3), 1–27. <https://doi.org/10.4018/ijcthd.2020070101>
- Baber, R., Baber, P., & Narula, S. (2024). Examining the moderating role of online celebrity trustworthiness and risk propensity in UTAUT2 framework: A mixed-method approach. *International Journal of Information Management Data Insights*, 4(2), 100239.
- Banerjee, S., & Sreejesh, S. (2021). Examining the role of customers' intrinsic motivation on continued usage of mobile banking: A relational approach. *International Journal of Bank Marketing*, 40(1), 87–109. <https://doi.org/10.1108/ijbm-06-2021-0216>
- Basuroy, T. (2022). *India: health and fitness mobile app downloads 2021*. Statista. <https://www.statista.com/statistics/1338907/india-health-and-fitness-mobile-app-downloads/>
- Beh, P. K., Ganesan, Y., Iranmanesh, M., & Foroughi, B. (2019). Using smartwatches for fitness and health monitoring: The UTAUT2 combined with threat appraisal as moderators. *Behaviour & Information Technology*, 40(3), 282–299. <https://doi.org/10.1080/0144929x.2019.1685597>
- Beldad, A. D., & Hegner, S. M. (2017). 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. *International Journal of Human-Computer Interaction*, 34(9), 882–893. <https://doi.org/10.1080/10447318.2017.1403220>
- Cardozo, É. A. A., Vera, L. A. R., Christino, J. M. M., Gosling, M. D. S., & Soares, J. L. (2020). Acceptance and use of e-hailing technology: A study of Uber based on the UTAUT2 model. *International Journal of Business Information Systems*, 34(4), 512. <https://doi.org/10.1504/ijbis.2020.10031211>
- Chakraborty, D., & Paul, J. (2023). Healthcare apps' purchase intention: A consumption values perspective. *Technovation*, 120, 102481. <https://doi.org/10.1016/j.technovation.2022.102481>
- Chan, F., Thong, J., Venkatesh, V., Brown, S., Hu, P., & Tam, K. (2010). Modeling citizen satisfaction with mandatory adoption of an e-government technology. *Journal of the Association for Information Systems*, 11(10), 519–549. <https://doi.org/10.17705/1jais.00239>
- Chang, M., Walimuni, A. C. S. M., Kim, M., & Lim, H. (2022). Acceptance of tourism blockchain based on UTAUT and connectivism theory. *Technology in Society*, 71, 102027. <https://doi.org/10.1016/j.techsoc.2022.102027>
- Cho, M., Bonn, M. A., & Li, J. J. (2019). Differences in perceptions about food delivery apps between single-person and multi-person households. *International Journal of Hospitality Management*, 77, 108–116. <https://doi.org/10.1016/j.ijhm.2018.06.019>
- Choi, J.-C. (2020). User familiarity and satisfaction with food delivery mobile apps. *SAGE Open*, 10(4), 215824402097056. <https://doi.org/10.1177/2158244020970563>
- Chopdar, P., Korfiatis, N., Sivakumar, V. J., & Lytras, M. D. (2018). Mobile shopping apps adoption and perceived risks: A cross-country perspective utilizing the Unified Theory of Acceptance and Use of Technology. *Computers in Human Behavior*, 86, 109–128. <https://doi.org/10.1016/j.chb.2018.04.017>

- Cochran, W. G. (1977). *Sampling techniques*. John Wiley & Sons.
- Davis, F. D. (1989). Perceived usefulness, perceived ease of use, and user acceptance of information technology. *MIS Quarterly*, 13(3), 319. <https://doi.org/10.2307/249008>
- Davis, F. D., Bagozzi, R. P., & Warshaw, P. R. (1989). User acceptance of computer technology: A comparison of two theoretical models. *Management Science*, 35(8), 982–1003. <https://doi.org/10.1287/mnsc.35.8.982>
- Dhiman, N., Arora, N., Dogra, N., & Gupta, A. (2019). Consumer adoption of smartphone fitness apps: An extended UTAUT2 perspective. *Journal of Indian Business Research*, 12(3), 363–388. <https://doi.org/10.1108/jibr-05-2018-0158>
- Duarte, P., Costa e Silva, S., & Ferreira, M. B. (2018). How convenient is it? Delivering online shopping convenience to enhance customer satisfaction and encourage e-WOM. *Journal of Retailing and Consumer Services*, 44, 161–169. <https://doi.org/10.1016/j.jretconser.2018.06.007>
- Faqih, K. M. S. (2022). Factors influencing the behavioral intention to adopt a technological innovation from a developing country context: The case of mobile augmented reality games. *Technology in Society*, 69, 101958. <https://doi.org/10.1016/j.techsoc.2022.101958>
- Ferreira Barbosa, H., García-Fernández, J., Pedragosa, V., & Cepeda-Carrion, G. (2021). The use of fitness centre apps and its relation to customer satisfaction: A UTAUT2 perspective. *International Journal of Sports Marketing and Sponsorship*, 23(5), 966–985. <https://doi.org/10.1108/ijsms-01-2021-0010>
- Fong, L. H. N., Lam, L. W., & Law, R. (2017). How locus of control shapes intention to reuse mobile apps for making hotel reservations: Evidence from Chinese consumers. *Tourism Management*, 61, 331–342. <https://doi.org/10.1016/j.tourman.2017.03.002>
- Fornell, C., & Larcker, D. F. (1981). Evaluating structural equation models with unobservable variables and measurement error. *Journal of Marketing Research*, 18(1), 39. <https://doi.org/10.2307/3151312>
- Gómez-Ruiz, A. A., Gálvez-Ruiz, P., Grimaldi-Puyana, M., Lara-Bocanegra, A., & García-Fernández, J. (2022). Investigating the intention to use fitness app: The role of the perceived attractiveness of fitness center customers. *Sport, Business and Management: An International Journal*, 12(4), 537–553. <https://doi.org/10.1108/sbm-12-2021-0145>
- Hair, J. F., Jr., Ringle, C. M., & Sarstedt, M. (2013). Partial least squares structural equation modeling: Rigorous applications, better results and higher acceptance. *Long Range Planning*, 46(1–2), 1–12. <https://doi.org/10.1016/j.lrp.2013.01.001>
- Hanif, Y., & Lallie, H. S. (2021). Security factors on the intention to use mobile banking applications in the UK older generation (55+). A mixed-method study using modified UTAUT and MTAM - With perceived cyber security, risk, and trust. *Technology in Society*, 67, 101693. <https://doi.org/10.1016/j.techsoc.2021.101693>
- Henseler, J., Ringle, C. M., & Sarstedt, M. (2014). A new criterion for assessing discriminant validity in variance-based structural equation modeling. *Journal of the Academy of Marketing Science*, 43(1), 115–135. <https://doi.org/10.1007/s11747-014-0403-8>
- Herrero, Á., San Martín, H., & Garcia-De los Salmones, M. de M. (2017). Explaining the adoption of social networks sites for sharing user-generated content: A revision of the UTAUT2. *Computers in Human Behavior*, 71, 209–217. <https://doi.org/10.1016/j.chb.2017.02.007>
- Hew, J. J., Lee, V. H., Ooi, K. B., & Wei, J. (2015). What catalyses mobile apps usage intention: An empirical analysis. *Industrial Management & Data Systems*, 115(7), 1269–1291.

- <https://doi.org/10.1108/imds-01-2015-0028>
- Jakowski, S. (2022). Self-tracking via smartphone app: Potential tool for athletes' recovery self-management? *German Journal of Exercise and Sport Research*, 52(2), 253–261. <https://doi.org/10.1007/s12662-022-00812-3>
- Jeyaraj, A., Rottman, J. W., & Lacity, M. C. (2006). A review of the predictors, linkages, and biases in IT innovation adoption research. *Journal of Information Technology*, 21(1), 1–23. <https://doi.org/10.1057/palgrave.jit.2000056>
- Ju, X., Chocarro, R., & Martín Martín, O. (2021). Value creation in mobile social media: A systematic review and agenda for future research. *Baltic Journal of Management*, 16(5), 745–764. <https://doi.org/10.1108/bjm-04-2021-0157>
- Kaewkitipong, L., Chen, C. C., & Ractham, P. (2016). Using social media to enrich information systems field trip experiences: Students' satisfaction and continuance intentions. *Computers in Human Behavior*, 63, 256–263. <https://doi.org/10.1016/j.chb.2016.05.030>
- Kalinic, Z., Marinkovic, V., Molinillo, S., & Liébana-Cabanillas, F. (2019). A multi-analytical approach to peer-to-peer mobile payment acceptance prediction. *Journal of Retailing and Consumer Services*, 49, 143–153. <https://doi.org/10.1016/j.jretconser.2019.03.016>
- Kasilingam, D. L. (2020). Understanding the attitude and intention to use smartphone chatbots for shopping. *Technology in Society*, 62, 101280. <https://doi.org/10.1016/j.techsoc.2020.101280>
- Kaya, A., Ozturk, R., & Altin Gumussoy, C. (2019). Usability measurement of mobile applications with system usability scale (SUS). In *Lecture Notes in Management and Industrial Engineering* (pp. 389–400). Springer International Publishing.
- http://dx.doi.org/10.1007/978-3-030-03317-0_32
- Kline, R. B. (2015). *Principles and practice of structural equation modeling, fourth edition*. Guilford Publications.
- Larson, R. B. (2018). Controlling social desirability bias. *International Journal of Market Research*, 61(5), 534–547. <https://doi.org/10.1177/1470785318805305>
- Liu, Y., Lu, X., Zhao, G., Li, C., & Shi, J. (2022). Adoption of mobile health services using the unified theory of acceptance and use of technology model: Self-efficacy and privacy concerns. *Frontiers in Psychology*, 13. <https://doi.org/10.3389/fpsyg.2022.944976>
- Locke, E. A., & Latham, G. P. (1990). *A theory of goal setting & task performance*. Prentice-Hall.
- Macedo, I. M. (2017). Predicting the acceptance and use of information and communication technology by older adults: An empirical examination of the revised UTAUT2. *Computers in Human Behavior*, 75, 935–948. <https://doi.org/10.1016/j.chb.2017.06.013>
- Malhotra, N. K., Birks, D. F., & Nunan, D. (2017). *Marketing research: An applied approach*.
- McLean, G., Osei-Frimpong, K., & Barhorst, J. (2021). Alexa, do voice assistants influence consumer brand engagement? – Examining the role of AI powered voice assistants in influencing consumer brand engagement. *Journal of Business Research*, 124, 312–328. <https://doi.org/10.1016/j.jbusres.2020.11.045>
- McLean, G., Osei-Frimpong, K., Al-Nabhani, K., & Marriott, H. (2020). Examining consumer attitudes towards retailers' m-commerce mobile applications – An initial adoption vs. continuous use perspective. *Journal of Business Research*, 106, 139–157. <https://doi.org/10.1016/j.jbusres.2019.08.032>

- Mehra, A., Paul, J., & Kaurav, R. P. S. (2020). Determinants of mobile apps adoption among young adults: Theoretical extension and analysis. *Journal of Marketing Communications*, 27(5), 481–509. <https://doi.org/10.1080/13527266.2020.1725780>
- Mishra, A., Baker-Eveleth, L., Gala, P., & Stachofsky, J. (2023). Factors influencing actual usage of fitness tracking devices: Empirical evidence from the UTAUT model. *Health Marketing Quarterly*, 40(1), 19–38. <https://doi.org/10.1080/07359683.2021.1994170>
- Mofokeng, T. E. (2021). The impact of online shopping attributes on customer satisfaction and loyalty: Moderating effects of e-commerce experience. *Cogent Business & Management*, 8(1). <https://doi.org/10.1080/23311975.2021.1968206>
- Natarajan, T., Balasubramanian, S. A., & Kasilingam, D. L. (2018). The moderating role of device type and age of users on the intention to use mobile shopping applications. *Technology in Society*, 53, 79–90. <https://doi.org/10.1016/j.techsoc.2018.01.003>
- Olasina, G. (2019). The impact of YouTube videos on academic writing performance. *The International Journal of Learning: Annual Review*, 26(1), 17–30. <https://doi.org/10.18848/1447-9494/cgp/v26i01/17-30>
- Podsakoff, P. M., MacKenzie, S. B., & Podsakoff, N. P. (2012). Sources of method bias in social science research and recommendations on how to control it. *Annual Review of Psychology*, 63(1), 539–569. <https://doi.org/10.1146/annurev-psych-120710-100452>
- Rahi, S., Othman Mansour, M. M., Alghizzawi, M., & Alnaser, F. M. (2019). Integration of UTAUT model in internet banking adoption context. *Journal of Research in Interactive Marketing*, 13(3), 411–435. <https://doi.org/10.1108/jrim-02-2018-0032>
- Ribbink, D., Van Riel, A. C., Liljander, V., & Streukens, S. (2004). Comfort your online customer: quality, trust and loyalty on the internet. *Managing Service Quality: An International Journal*, 14(6), 446–456.
- Roca, J. C., Chiu, C. M., & Martínez, F. J. (2006). Understanding e-learning continuance intention: An extension of the Technology Acceptance Model. *International Journal of human-computer studies*, 64(8), 683–696.
- Rogers, E. M. (1995). Diffusion of innovations: Modifications of a model for telecommunications. In *Die Diffusion von Innovationen in der Telekommunikation* (pp. 25–38). Springer Berlin Heidelberg. http://dx.doi.org/10.1007/978-3-642-79868-9_2
- Rokonuzzaman, M., Harun, A., Al-Emran, M., & Prybutok, V. R. (2020). An investigation into the link between consumer's product involvement and store loyalty: The roles of shopping value goals and information search as the mediating factors. *Journal of Retailing and Consumer Services*, 52, 101933. <https://doi.org/10.1016/j.jretconser.2019.101933>
- Salimon, M. G., Yusoff, R. Z. B., & Mohd Mokhtar, S. S. (2017). The mediating role of hedonic motivation on the relationship between adoption of e-banking and its determinants. *International Journal of Bank Marketing*, 35(4), 558–582. <https://doi.org/10.1108/ijbm-05-2016-0060>
- Singh, N., Sinha, N., & Liébana-Cabanillas, F. J. (2020). Determining factors in the adoption and recommendation of mobile wallet services in India: Analysis of the effect of innovativeness, stress to use and social influence. *International Journal of Information Management*, 50, 191–205. <https://doi.org/10.1016/j.ijinfomgt.2019.05.022>
- Siyal, A. W., Donghong, D., Umrani, W. A., Siyal, S., & Bhand, S. (2019). Predicting mobile banking acceptance and loyalty in Chinese bank customers. *SAGE Open*, 9(2), 215824401984408. <https://doi.org/10.1177/2158244019844084>
- Siyal, A. W., Hongzhan, C., & Gang, C. (2021). From consumer satisfaction to

- recommendation of mobile app-based services: An overview of mobile taxi booking apps. *SAGE Open*, 11(1), 215824402110041. <https://doi.org/10.1177/21582440211004179>
- Sun, J., & Chi, T. (2017). Key factors influencing the adoption of apparel mobile commerce: An empirical study of Chinese consumers. *The Journal of The Textile Institute*, 109(6), 785–797. <https://doi.org/10.1080/00405000.2017.1371828>
- Suo, L. (2022). How to influence users' willingness to explore the use of sports and fitness apps in China. *Asian Social Science*, 18(1), 7. <https://doi.org/10.5539/ass.v18n1p7>
- Szymkowiak, A., Melović, B., Dabić, M., Jeganathan, K., & Kundi, G. S. (2021). Information technology and Gen Z: The role of teachers, the internet, and technology in the education of young people. *Technology in Society*, 65, 101565. <https://doi.org/10.1016/j.techsoc.2021.101565>
- Tamilmani, K., Rana, N. P., Prakasam, N., & Dwivedi, Y. K. (2019). The battle of Brain vs. Heart: A literature review and meta-analysis of “hedonic motivation” use in UTAUT2. *International Journal of Information Management*, 46, 222–235. <https://doi.org/10.1016/j.ijinfomgt.2019.01.008>
- Tamilmani, K., Rana, N. P., Wamba, S. F., & Dwivedi, R. (2021). The extended Unified Theory of Acceptance and Use of Technology (UTAUT2): A systematic literature review and theory evaluation. *International Journal of Information Management*, 57, 102269. <https://doi.org/10.1016/j.ijinfomgt.2020.102269>
- Tan, G. W.-H., Lee, V. H., Lin, B., & Ooi, K.-B. (2017). Mobile applications in tourism: The future of the tourism industry? *Industrial Management & Data Systems*, 117(3), 560–581. <https://doi.org/10.1108/imds-12-2015-0490>
- Tan, G. W.-H., Lee, V.-H., Hew, J.-J., Ooi, K.-B., & Wong, L.-W. (2018). The interactive mobile social media advertising: An imminent approach to advertise tourism products and services? *Telematics and Informatics*, 35(8), 2270–2288. <https://doi.org/10.1016/j.tele.2018.09.005>
- Thakur, R. (2019). The moderating role of customer engagement experiences in customer satisfaction-loyalty relationship. *European Journal of Marketing*, 53(7), 1278–1310. <https://doi.org/10.1108/ejm-11-2017-0895>
- Venkatesh, V., Morris, M. G., Davis, G. B., & Davis, F. D. (2003). User acceptance of information technology: Toward a unified view. *MIS quarterly*, 425–478. <https://doi.org/10.2307/30036540>
- Venkatesh, V., Thong, J. Y., & Xu, X. (2012). Consumer acceptance and use of information technology: extending the unified theory of acceptance and use of technology. *MIS Quarterly*, 36(1), 157–178. <https://doi.org/10.2307/41410412>
- Vinnikova, A., Lu, L., Wei, J., Fang, G., & Yan, J. (2020). The use of smartphone fitness applications: The role of self-efficacy and self-regulation. *International Journal of Environmental Research and Public Health*, 17(20), 7639. <https://doi.org/10.3390/ijerph17207639>
- Wang, K., Varma, D. S., & Proserpi, M. (2018). A systematic review of the effectiveness of mobile apps for monitoring and management of mental health symptoms or disorders. *Journal of Psychiatric Research*, 107, 73–78. <https://doi.org/10.1016/j.jpsychires.2018.10.006>
- Wang, Y., & Collins, W. B. (2021). Systematic evaluation of mobile fitness apps: Apps as the Tutor, Recorder, Game Companion, and Cheerleader. *Telematics and Informatics*, 59, 101552. <https://doi.org/10.1016/j.tele.2020.101552>
- Wang, Y.-S., Tseng, T. H., Wang, W.-T., Shih, Y.-W., & Chan, P.-Y. (2019). Developing and validating a mobile catering app success model. *International Journal of Hospitality Management*, 77, 19–30.

<https://doi.org/10.1016/j.ijhm.2018.06.002>

- Wong, K., Wang, F. L., Ng, K. K., & Kwan, R. (2015). Investigating acceptance towards mobile learning in higher education students. In *Communications in Computer and Information Science* (pp. 9-19). Springer Berlin Heidelberg. http://dx.doi.org/10.1007/978-3-662-46158-7_2
- Yan, M., Filieri, R., Raguseo, E., & Gorton, M. (2021). Mobile apps for healthy living: Factors influencing continuance intention for health apps. *Technological Forecasting and Social Change*, 166, 120644. <https://doi.org/10.1016/j.techfore.2021.120644>
- Yang, Y., & Koenigstorfer, J. (2021). *Determinants of fitness app usage and moderating impacts of education-, motivation-, and gamification-related app features on physical activity intentions: Cross-sectional survey study (preprint)*. JMIR Publications Inc. <http://dx.doi.org/10.2196/preprints.26063>
- Yeo, S. F., Tan, C. L., Teo, S. L., & Tan, K. H. (2021). The role of food apps servitization on repurchase intention: A study of FoodPanda. *International Journal of Production Economics*, 234, 108063. <https://doi.org/10.1016/j.ijpe.2021.108063>
- Yuan, S., Ma, W., Kanthawala, S., & Peng, W. (2015). Keep using my health apps: Discover users' perception of health and fitness apps with the UTAUT2 model. *Telemedicine and E-Health*, 21(9), 735-741. <https://doi.org/10.1089/tmj.2014.0148>
- Zhang, T. (Christina), Lu, C., & Kizildag, M. (2017). Engaging generation Y to co-create through mobile technology. *International Journal of Electronic Commerce*, 21(4), 489-516. <https://doi.org/10.1080/10864415.2016.1355639>
