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Identifying the influence of obsolescence risk and health beliefs in fitness wearable healthcare technology

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ABSTRACT

This study aimed to examine factors influencing the adoption of fitness wearable technologies (FWTs) by extending the Unified Theory of Acceptance and Use of Technology (UTAUT2). A survey was conducted with 574 fitness wearable users in India to test a conceptual Fitness Wearable Adoption Model (FWAM) incorporating additional constructs of obsolescence risk, health belief, and perceived accuracy alongside UTAUT2 variables. Structural equation modeling revealed performance expectancy, effort expectancy, social influence, hedonic motivation, price value, health belief, and obsolescence risk positively affected adoption intentions, while perceived security had no effect. Perceived accuracy mediated the impact of performance expectancy, while price value mediated the relationship between obsolescence risk and intentions. The research makes key contributions by adapting UTAUT2 to a new context, integrating additional adoption factors, identifying mediating mechanisms, and revealing moderating effects of age. Findings provide valuable insights into consumer acceptance of fitness wearables that can inform strategies for manufacturers, marketers, and health practitioners to promote adoption. A major focus of the investigation is to develop strategies for increasing the adoption of wrist-worn fitness technology that provides an opportunity for fitness wearable technology manufacturers to strengthen relationships with older age groups through effective communication techniques.

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Technology adoption; fitness wearables; purchase intentions; health belief; obsolescence

1. Introduction

In recent years, there has been a growing interest in contemporary healthcare technology, specifically fitness wearables, which encompass eyeglasses, watches, clothing, or jewelry

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(Ertio & Rasanen, 2019; Tischleder & Wasserman, 2015). Moreover, the integration of fitness wearable healthcare technology has become a prominent domain influenced by factors such as obsolescence risk and health beliefs. Many fitness wearables are designed with tools that enable the continuous monitoring of health and well-being (Jayawardena, Quach, Bandyopadhyay, et al., 2023; Yap et al., 2021). Therefore, it is crucial to identify and comprehend fitness wearable healthcare technology, given that manufacturers and developers of these devices persist in creating products tailored to meet user expectations, while also considering gender and age differences (Dehghani et al., 2018; H. Li et al., 2016; Lunney et al., 2016). Fitness trackers and wearables lead the wellness product category, combining technology with sleep, exercise, nutrition, and mindfulness tracking (Dehghani et al., 2018; Jayawardena, Quach, Perera, et al., 2023). hese devices are highly popular due to their multifunctionality and versatile usage (Dehghani et al., 2018; H. Li et al., 2016).

Furthermore, wearable technology facilitates the detection of changes in an individual's health status or the health status of a group (Goutam et al., 2022; Tischleder & Wasserman, 2015). Individuals suffering from chronic diseases, such as heart conditions and asthma, derive significant benefits from continuous monitoring (Lunney et al., 2016). Healthcare devices alter users' lifestyles by providing preventive and diagnostic capabilities related to food consumption, sleep tracking, heart rate and electrocardiogram monitoring, fall prevention, and calorie consumption (Duarte & Pinho, 2019). These healthcare devices possess the potential to address significant demographic trends, such as population aging (Lunney et al., 2016; Zhang et al., 2022).

Research on smart wearables and FWT (Fitness Wearables Trackers) is still in its early stages, with a primary focus on accuracy and reliability (Lunney et al., 2016; Zhang et al., 2022). Limited studies have explored the abandonment of smart wearables and FWT devices (Dehghani et al., 2018; Tischleder & Wasserman, 2015). The novelty of wearable technology, coupled with the scarcity of research, leaves ample room for future investigation. One major challenge in technological innovation is the relentless pace that often leads to obsolescence. While this is welcomed by stakeholders, it may act as a barrier to adoption, as consumers wait for a "settled" and "refined" product.

The dynamics of obsolescence are driven by tendencies of persistence and supersessions. The former rejects the proposition of the complete disappearance of an entity, whereas the latter is premised on the belief in a continuum of improvements (Tischleder & Wasserman, 2015). Consequently, abandonment is also influenced by a gap between preconceived benefits and actual value, highlighting the potential for further research into the novelty of wearable technology for future researchers.

While fitness trackers and other wearables are gaining popularity, questions have been raised about their effectiveness (Sapp & Weng, 2007; Zhang et al., 2022). In recent years, devices such as smartwatches, activity trackers, and other health monitoring tools have become widely popular for their ability to promote physical activity and provide insights into individuals' health and fitness status (Sapp & Weng, 2007; Zhang et al., 2022). The effectiveness of fitness trackers can vary depending on individual preferences and goals, as well as the features offered by different devices. For instance, the encouragement of users to be more physically active by providing real-time feedback on steps taken, distance covered, and calories burned can influence their effectiveness (Lunney et al., 2016). Lunney et al. (2016) propose that wearable devices contribute to promoting

a healthy lifestyle and encouraging users to be more active, leading to perceived benefits. Previous studies have integrated the Health Belief Model (HBM) with TAM, as demonstrated by Sapp and Weng (2007) and Zhang et al. (2022). Therefore, we propose to test the relevance of health belief in conjunction with UTAUT2 (Unified Theory of Acceptance and Use of Technology) antecedents.

Following the recommendations of G. Shin et al. (2019), we are investigating the impact of consumers' perceived accuracy on their adoption intention. This study contributes to the existing literature by identifying the most significant factors influencing the purchase of Fitness Wearable Technology (FWT), thereby extending the UTAUT2 model. Focusing on FWT adoption in India, our study enhances the literature on technology adoption and provides novel, well-measured insights into the factors influencing FWT utilization in the Indian context.

Previous research has explored technological adoption, abandonment, and acceptability, revealing associations between the utilization of wearables and well-validated models (G. Shin et al., 2019; Talukder et al., 2019). More recently, J. Li et al. (2019) introduced the SWAM (Smart Wearable Adoption Model), which integrates TAM and UTAUT with additional factors specific to smart wearables. However, it is specifically designed to measure Information Technology Utilization (ITU) among older adults.

Similarly, Zhang et al. (2022) integrated TAM, HBM (Health Belief Model), the snob effect, conformity, and reference group theory to measure consumers' adoption intentions toward healthcare wearables in Chinese markets. However, these two recent studies suggest the importance of adopting a more contextual approach for future research, considering social and cultural factors. When dealing with products featuring a high number of devices, it was identified that technology acceptance and the higher rate of accuracy claims among manufacturers play a vital role (Feehan et al., 2018; Hackley et al., 2018; Huang et al., 2016). Moreover, the absence of risk associated with technology obsolescence represents a notable inconsistency, as perceived risk is relevant in most generic buying situations (G. Shin et al., 2019; Talukder et al., 2019). It is crucial to acknowledge that inconsistency and perceived risk are important concepts influencing how people assess and respond to various situations in the context of decision-making, particularly in consumer behavior and risk perception (Feehan et al., 2018; Lima et al., 2022).

Studies on Fitness Wearable Technology (FWT) adoption have explored the impact of consumer-perceived accuracy on Behavioral Intention/Information Technology Use (BI/ITU) by considering habits as a form of long-term use and repeated behavior (Feehan et al., 2018; Huang et al., 2016; Lima et al., 2022). However, fewer studies have delved into FWT adoption variables. Therefore, this study aims to address the following research questions:

(a) *What is the influence of facilitating conditions and perceived performance expectation on the perceived accuracy of FWTs?*
(b) *What factors contribute to or hinder consumers' adoption intention of Fitness Wearable Trackers among different age segments?*
(c) *What is the effect of obsolescence risk and perceived ease of use on the perceived value of consumers?*

This study employed a quantitative approach, surveying 574 respondents who use fitness wearables healthcare technology. To ensure methodological rigor, we employed simple random sampling techniques to mitigate bias and enhance generalizability (Hair et al., 2016). The subsequent section of this paper delves into the proposed conceptual model and research hypotheses. Section 3 details the research methodology, while Section 4 encompasses the results of the data analysis. The concluding two sections explore implications along with limitations and outline the future research agenda.

2. Theoretical background and hypotheses development

In Fitness Wearable Technology (FWT) research, the Innovation Diffusion Theory (Goldsmith & Goldsmith, 2011; Soodan & Rana, 2020), the Technology Acceptance Model (TAM) (Schierz et al., 2010), and the Theory of Planned Behavior (TPB) (Lunney et al., 2016) have been extensively utilized. The predominant models in technology adoption research include TAM (Davis, 1989) and IDT (Innovation Diffusion Theory) (Moore & Benbasat, 1991). TAM and its extensions stand out as widely accepted models for comprehending technology adoption globally over the past two and a half decades (T. Kim & Chiu, 2019; Reyes-Mercado, 2018). Nasir and Yurder (2015) employed TAM and demonstrated that perceived risk and compatibility are significant factors influencing the acceptability of FWTs. Similarly, Lunney et al. (2016) conducted a study on Caucasian mTurk workers using TAM to confirm the influence of fitness wearable adoption on projected health outcomes.

Venkatesh et al. (2012) proposed the UTAUT model, addressing the limitations of TAM in the context of advanced technology adoption. UTAUT can be assessed using the theoretical constructs of expectancy theory by measuring performance expectancy (PE) and effort expectancy (EE). Additionally, it incorporates the theoretical constructs of social cognitive theory by measuring social influence (SI) and facilitating conditions (FC) (Reyes-Mercado, 2018). Applying UTAUT, Reyes-Mercado (2018) recognized PE and EE as significant factors concerning actual use and the intention to adopt Fitness Tracker (FT) devices. TAM and UTAUT have been synthesized into the more adaptive UTAUT2 for greater adaptability and insights (Soodan & Rana, 2020; Venkatesh et al., 2012) by integrating three new constructs (hedonic motivation, price value, and habit). Therefore, we propose the Fitness Wearable Adoption Model (FWAM) based on UTAUT2 and extend it with "hedonic motivation" (attitude formation based on pleasure), "health belief" (HBM), "obsolescence risk," and "perceived accuracy" (Soodan & Rana, 2020; Venkatesh et al., 2012).

2.1. Obsolescence risk

Obsolescence typically arises from the availability of a superior product (Mohr et al., 2013). According to Chung et al. (2012), buyers of high-tech products consistently grapple with the new/obsolete paradox. In contrast to the objective nature of product obsolescence, software obsolescence is subjective (Bowlds et al., 2018; Seyed Esfahani & Reynolds, 2021), and customers rely on factors such as the replacement period to

determine product substitution (Kuppelweiser et al., 2019). The rate of innovation is a primary factor in accelerating technological obsolescence (Bowlds et al., 2018).

In general, technology faces dual risks, namely out-of-date and out-of-use risks, and effective management practices are essential to minimize the negative impact of obsolescence and replace it with long-term benefits (Trabelsi et al., 2020). The perceived risk of obsolescence has not garnered significant attention in Fitness Wearable Technology (FWT) adoption research until recently. With the swift influx of new and improved FWT devices into the market, consumers are compelled to factor in the product's lifespan and the manufacturer's service support capabilities. Additionally, consumers' perceptions of price value may be influenced by the potential for devices and technology to become obsolete. This leads to the following hypothesis based on the Fitness Wearable Adoption Model (FWAM):

H_1: There is a positive relationship between consumers' perceived obsolescence risks and intention to use FWTs.

2.2. Performance expectancy

Performance expectation (PE) refers to the utilitarian value or degree of performance effectiveness of an activity (A. Mishra et al., 2022; Talukder et al., 2019). Recent research in the context of Fitness Wearable Technology (FWT) and PE has demonstrated a positive relationship between utilitarian value or degree of performance effectiveness (A. Mishra et al., 2022; Talukder et al., 2019). Similarly, Yoganathan and Kajanan (2014) demonstrated that performance expectations are equivalent to "PEU" (TAM) and are influenced by the accuracy of data captured by fitness wearables. This can be further justified as A. Mishra et al. (2022) linked FWT usage to effort expectancy, while Reyes-Mercado (2018) asserts that PEU has a significant influence on users' acceptance of FWT. Additionally, when considering the storing and sharing of data, FWTs play a vital role as they measure physical activities and meet stringent performance requirements of the users. Therefore, we propose the following hypothesis:

H_2: The consumers' performance expectations and their intention to use FWTs are positively correlated.

2.3. Facilitating conditions

When considering facilitating conditions (FC), it refers to consumers' perceptions about the technical infrastructure facilitating behavioral control (Apasrawirote et al., 2022; Venkatesh et al., 2003; Yeoh & Chin, 2022). For example, in the context of information technology and information systems, facilitating conditions mainly focus on consumers' perceptions of having access to the required resources to utilize a technology (Katoch & Rana, 2023; Yeoh & Chin, 2022). Furthermore, there is solid evidence showing that facilitating conditions have a positive impact on technology adoption among users (Alalwan et al., 2018).

When compared with other product categories, Fitness Wearable Technology (FWT) devices are distinguished by vast heterogeneity based on usability, particularly

concerning the back-end and front-end support systems. For instance, a back-end system is used to store and retrieve data collected by fitness wearables, while a front-end system is used to provide an interface through which the wearable device and accompanying applications can be accessed by the user (A. Mishra et al., 2022; Talukder et al., 2019). Varying levels of support and assistance are necessary for consumers to take full advantage of the potential applications of FWT devices. Consequently, this study proposes the following hypothesis:

H_3: There is a positive relationship between consumers' perceived facilitating conditions and their intention to use FWT.

2.4. Health belief

There is a positive relationship between health beliefs and consumer confidence in the effectiveness of health-enhancing behaviors (Rosenstock, 1966; Zhang et al., 2022). Existing research provides insight into how health-related motivations affect the adoption of Fitness Wearable Technology (FWT) (T. B. Kim & Ho, 2021). Fitness wearable trackers reportedly have a positive influence on health behavior attitudes (Barkley et al., 2020). The healthcare industry is introducing an increasing number of technology-driven products that are beneficial in improving the health status of users as self-monitoring becomes more important (Zhang et al., 2022).

In the context of Fitness Wearables, individuals' atypical health behaviors motivate them to use tracking devices to manage their activities (Lee et al., 2016). Wearable technologies benefit consumers by providing health data that facilitates the tracking and monitoring of users' overall fitness. Additionally, these devices are useful for planning workout schedules and designing exercises (Lee et al., 2016). Based on perceived health benefits, consumers are anticipated to express a favorable adoption intent. Given the previously mentioned beliefs and advantages of FWTs, this study proposes the following:

H_4: There is a positive relationship between consumers' perceived health belief and their intention to use FWT.

2.5. Hedonic motivations

Hedonic motivation refers to the pleasure an individual derives from adopting or employing a technology (Venkatesh et al., 2012). Individuals' behaviors and choices, including the adoption and use of fitness wearables, are heavily influenced by hedonic motivations. Wearable fitness devices often offer social features, allowing users to connect with friends, participate in virtual challenges, and share their achievements (J. Kim & Park, 2019). Interactions with others contribute to a sense of community and enjoyment. Fitness wearables often incorporate gamification elements such as challenges, rewards, and badges, as these features enhance the fitness experience and make it more engaging. Literature suggests that hedonic goals have a direct effect on individuals' technology adoption and usage intentions (J.

Kim & Park, 2019). The measurement of performance and physical activity through the use of smart wearables may be motivated by hedonistic objectives (Reyes-Mercado, 2018). However, Talukder et al. (2019) challenged the significance of hedonic motivations on the usage and recommendation intention of FWT users in China. To establish the significance of hedonic motivations, we, therefore, propose the following hypothesis:

H_5: There is a positive relationship between consumers' hedonic motivation and their intention to use FWT.

2.6. Perceived security

The amount and variety of data generated through IT technology are of great importance to marketers, and interestingly, a plethora of research unequivocally supports the positive influence of consumers' perceived security on the adoption of technology such as m-banking, e-banking, and e-commerce (Saprikis et al., 2022). Research on perceived security in the context of Fitness Wearable Technologies (FWTs) is limited, as the credibility of a device encompasses perceived security and is a significant contributing factor to customer intention to adopt health wearables (D.-H. Shin, 2010). Perceived security in this context can be explained as the perception of the customer that the device manufacturer will incorporate features to ensure risk-free usage of technology (D.-H. Shin, 2010). Previous research demonstrated a lack of understanding regarding data security concerns associated with Fitness Wearable Trackers (Liezel, 2019; D.-H. Shin, 2010). Hence, we suggest the following hypothesis:

H_6: There is a positive relationship between consumers' perceived security and their intention to use FWT.

2.7. Social influence

Social Influence, recognized as subjective norms in TAM, TRA, and TPB models, relates to changes in individual behavior or attitude resulting from group or individual communications (Rashotte, 2007). In other words, it is an individual's impression of the significance of beliefs toward their system utilization and the role of family in intention development (Venkatesh et al., 2003). This aligns with studies in IT adoption (Cho & Chan, 2021). Fitness Wearable Technology (FWT) adoption literature also confirms a positive bearing of social influence on intentions (Gao et al., 2015; A. Mishra et al., 2022; Talukder et al., 2019). Additionally, it is pertinent to mention that the perceived social influence of fitness wearables tends to decrease with an increase in experience (Lavuri et al., 2023; Rani & Chu, 2022). As communication frequency and variety are increasing, it would be interesting to know whether these consumers are prejudiced by social influence or not. This leads to the formation of the below hypothesis:

H_7: There is a positive relationship between social influence and intentions to use FWT.

2.8. Perceived price value

The marketing and consumer behavior disciplines provide a substantial theoretical foundation for discussing the significance of value/price that the marketer seeks and the consumer perceives as appropriate (Alalwan et al., 2018). Furthermore, Venkatesh (2000) acknowledges price value (a cognitive tradeoff between perceived benefits and monetary costs) as a significant predictor of consumers' adoption and usage intentions. Price value is often considered a continuous process to maintain a relationship between the manufacturer and target customers (Chi & Kilduff, 2011). Recent research supports the importance of monetary value in IT/IS adoption (Alalwan et al., 2018).

Value perceived in the context of an Information System (IS) has stimulated researchers to investigate its effect on adoption behavior (Shaw & Sergueeva, 2019). Talukder et al. (2019) found contradictory evidence in relation to China's adoption of Fitness Wearable Technologies (FWTs). Alternatively, price value has been used as a mediator to determine the relationship between variables in an IS setting (Chen & Lin, 2019). Due to the importance of perceived price value in determining the balance between the benefits and risks of adopting new technology, its role as a mediator in FWT acceptance is crucial. Therefore, the current study proposes to examine the role of perceived price value as a mediator in relationships between obsolescence risk – Intention and performance expectation – intention to use FWT. In addition, consumers in developing nations can be price-sensitive and exhibit a value-driven approach to product/service selection. In light of the preceding arguments, the study proposes three hypotheses:

H_8: There is a positive and significant relationship between perceived price value and intention to use FWTs.

H_9: Perceived Price value mediates the relationship between perceived obsolescence risk and intention to use FWTs.

H_{10}: Perceived Price value mediates the relationship between performance expectancy and intention to use FWTs.

2.9. Perceived accuracy

Previous studies have examined the significance of Fitness Wearable Technology (FWT) accuracy (Feehan et al., 2018; Huang et al., 2016). Providing marketers with inaccurate results is arguably their worst service nightmare. In future adoption research, Lunney et al. (2016) assert that the measurement inaccuracy of FWTs necessitates consideration of perceived accuracy. According to Devine et al. (2022), wearables are marketed as consumer accessories; consequently, the inaccuracy of these devices may not hinder their adoption. G. Shin et al. (2019) conducted a meta-analysis of research on wearable fitness devices and discovered a paucity of studies on how users perceive and care about the accuracy of fitness-

tracking devices and how this affects adoption/abandonment decisions. We also hypothesize that supportive conditions and performance expectations may influence users' perceptions of accuracy. There is some evidence that FWTs can mediate between performance acceptancy and adoption intention because the perceived benefits of using FWTs can be linked to the accuracy of the device (Lunney et al., 2016). It is also helpful to facilitate conditions such as software upgrades from time to time to improve the accuracy of the devices (Talukder et al., 2019). Therefore, the study proposes the following hypotheses:

H_{11}: There is a positive and significant relationship between perceived accuracy and intention to use FWTs.

H_{12}: Perceived accuracy mediates the relationship between performance expectancy and intention to use FWTs.

H_{13}: Perceived accuracy mediates the relationship between perceived facilitating conditions and intention to use FWTs.

2.10. Intention to use

Ajzen (1991) suggested that a person's behavior can be predicted based on their underlying intentions. Researchers have utilized intention in various contexts to measure the acceptance, continuance, or sharing of technology-related information (Kumar et al., 2018; To & Trinh, 2021). Although the gap between intention and conduct appears to be small, the difficulty in hypothesizing and operationalizing technology-use behavior is challenging due to the intention-behavior relationship (Liu et al., 2019; Wu & Du, 2012). Furthermore, age is a vital demographic factor that explains usage behavior (Lian & Yen, 2014; Okazaki & Mendez, 2013). Previous research has proven the existence of a digital divide between generations and stressed standardization of resources across age groups (Pirhonen et al., 2020). Even though older persons adopt technology at a lower rate than younger generations, this gap is closing rapidly (Anderson & Perrin, 2017).

Furthermore, based on research citing age group classifications in mobile-based health service adoption, including wearables (Zhao et al., 2018), we have established three categories of individuals based on their age: Young adults (18–30 years old), Middle-aged adults (31–45 years old), and Older adults (45 years and older). Several studies have shown that the prospects of gaining efficacy with new technologies are likely to play a decisive role in the likelihood of adoption behavior based on the various age groups of the population (Guo et al., 2015; Zhao et al., 2018). This leads to the formation of the below hypothesis:

H_{14}: There is a significant difference in the relationships between factors of technology adoption and perceived price value, perceived accuracy, and intention across different segments.

3. Research methodology

This study employed a mono-method quantitative approach. The survey utilized a personally administered questionnaire comprising 35 items to gather data on the intention to use fitness wearables. These items were developed based on existing literature. For instance, obsolescence risk was measured by drawing from previous studies by Solomon et al. (2000), Pantano et al. (2013), and Trabelsi et al. (2020). Health belief was assessed with reference to the studies of Rosenstock (1966), Zhang et al. (2022), and Barkley et al. (2020). Hedonic motivation, performance expectancy, and facilitating conditions were measured using the works of Venkatesh et al. (2012), J. Kim and Park (2019), and Alalwan et al. (2018). Perceived security, perceived price value, and perceived accuracy were gauged based on studies by Y. S. Wang et al. (2003), Sim et al. (2014), and Feehan et al. (2018). Social influence and intention to use were assessed with reference to the studies of Lee & Chen-Yu (2018) and Talukder et al. (2019).

The data were collected from existing fitness wearable users in shopping malls and other public spaces. Participants were thoroughly informed about the aims of the investigation and were given the option to withdraw from the study at any time, before, during, or after data collection. To enhance the questionnaire, a screening test was conducted with the assistance of an expert panel comprising academicians, researchers, and retail technology professionals. The panel's suggestions were incorporated to improve the final questionnaire. Furthermore, to assess the feasibility of the approach on a larger scale, researchers conducted a pilot study involving 65 customers, as recommended by previous studies. Based on the findings of the pilot study, four statements and other grammatical errors were removed from the questionnaire.

The information was collected using a mall intercept sampling procedure in the Indian capital (New Delhi) and adjoining territories of neighboring states (Uttar Pradesh and Haryana), colloquially known as the NCR or National Capital Region. Participants were provided with monetary incentives in the form of e-wallet credits or mobile balance recharge, depending on applicability, to encourage accurate responses.

After removing invalid and incomplete questions, 547 respondents (out of 642) were identified as suitable for further analysis. The gender distribution among participants was 53.02% male and 46.98% female. Regarding age groups, 29.98% of participants were between the ages of 18–30, 46.07% were between 31–45, and 23.95% were older than 45. The completed surveys underwent analysis to detect common method bias (CMB). To prevent specious covariances among the constructs, following the recommendations of Podsakoff et al. (2012), Harman's single-factor test was performed. The findings indicated that a single component could explain 29.01% of the variance, suggesting that the data is free from CMB, as the variance is well below the threshold limit of 50. To further ensure data suitability for analysis, the common latent factor technique and the CFA marker variable were utilized (MacKenzie & Podsakoff, 2012).

4. Results

The data were initially examined for normality and the presence of outliers. Following Stevens' suggestion (Stevens, 1984), Cook's distance was employed to identify three outlier responses. Skewness and Kurtosis values adhered to Kline's recommendations

(Kline, 2011). To reduce the number of variables and obtain more filtered and accurate data, factor analysis was employed. All thirty-five variables underwent the Kaiser-Meyer-Olkin (KMO) test. Additionally, the Bartlett test of sphericity was significant at $p < .05$, further confirming the suitability of the data for analysis.

For clarification, the following factors were subjected to the varimax rotation. The results showed that two of the thirty-five items did not affect the specific factors. As a result of the first round of EFA, one item from Facilitating Conditions (FC 4) and Perceived Accuracy (PA 3) failed to load on respective factors. The EFA was then performed again after removing the two items, resulting in a ten-factor solution with 77.91% variance and a KMO value of .763, which is greater than the threshold value of .70 (Hair et al., 2016).

4.1. Reliability and validity measurement

In order to investigate causal relationships between variables, the structural equation modeling (SEM) method was used in the study (J. Wang & Wang, 2012). In this study, AMOS was used to test hypotheses based on the recommendations from scholarly studies (Hair et al., 2016). Before generating the bootstrapped path model, the responses are subjected to confirmatory factor analysis (CFA). Cronbach's alpha is found to be well above the threshold limit (.60 to .90), indicating that the scales used in the study as the most reliable (Chin et al., 1997). It was also found that the convergent validity (CV) of the model was within the suggested limit (Nunnally & Bernstein, 1994). In addition, it was found that AVE values were within the acceptable range and significantly lower than the Composite Reliabilities (CR) values. This confirms the scales' Convergent Validity (Hair et al., 2016), as shown in Table 1. AVE values were used to re-establish discriminant validity (Table 2).

4.2. Measurement model

Based on theoretical deduction, a measurement model was developed to test the reliability and validity of the constructs (Hair et al., 2016) before running the structural model. The first measurement model specified removing 2 items as factor loading was below the specified value of .70 (Hair et al., 2016). The measurement model reflected that model fits well with the data depicted in Table 3.

4.3. Structural model

The structural model was performed for the analysis of data and obtained results were summarized covering the minimum indices required to be reported for a model fit (Figure 1).

The hypothesized effects of FWAM variables and additional factors on intentions to adopt fitness trackers are presented in Table 4 (H_1-H_9). As anticipated, most of the relationships were significant, except hypothesis H_6. Thus, H_1-H_5 & H_7-H_9 were supported. The relationship (perceived security→ and intention to use: $\beta = .039$, $p = .66$; shows an insignificant relationship with intentions. Hence, the proposed research model discovered a decent fit with observed data as shown by the values.

Table 1. Construct validity.

Factors	Items	λ	CR	AVE	Skewness	Kurtosis
Obsolescence Risk	OR_1	.889	.940	.798	−.266	.509
	OR_2	.814				
	OR_3	.964				
	OR_4	.899				
Health Belief	HB_1	.923	.957	.847	.410	1.102
	HB_2	.909				
	HB_3	.950				
	HM_4	.898				
Hedonic Motivation	HM_1	.896	.912	.775	−.009	−.443
	HM_2	.894				
	HM_3	.851				
Performance Expectancy	PE_1	.987	.978	.917	.599	.171
	PE_2	.961				
	PE_3	.909				
	PE_4	.972				
Facilitating Conditions	FC_1	.854	.931	.819	−.033	−1.418
	FC_2	.920				
	FC_3	.939				
	FC_4	.591*				
Perceived Security	PS_1	.990	.983	.952	−.254	−1.073
	PS_2	.952				
	PS_3	.984				
Perceived Price Value	PV_1	.961	.948	.859	.044	1.149
	PV_2	.844				
	PV_3	.963				
Perceived Accuracy	PA_1	.951	.952	.868	−.066	−.187
	PA_2	.940				
	PA_3	.412*				
	PA_4	.904				
Social Influence	SI_1	.943	.941	.841	.081	.074
	SI_2	.912				
	SI_3	.895				
Intention to Use	ITU_1	.964	.962	.895	.217	.435
	ITU_2	.907				
	ITU_3	.966				

Table 2. Discriminant validity.

Construct	OR	HB	HM	PE	FC	PS	PV	PA	SI	ITU
OR	.893									
HB	.198	.920								
HM	.366	.329	.880							
PE	.197	.091	.311	.957						
FC	.012	.422	.376	.119	.904					
PS	.190	.181	.222	.348	.349	.975				
PV	.021	.233	.069	.141	.124	.334	.926			
PA	.171	.312	.175	.431	.068	.132	.338	.931		
SI	.317	.076	.343	.327	.265	.354	.217	.397	.917	
ITU	.211	.019	.248	.397	.591	.189	.319	.543	.331	.946

Table 3. Summary of model-fit.

Fit index	Threshold values (Hair et al., 2016)	Measurement Model	Structural Model
χ^2/df	Less than 3	1.26	1.33
Goodness-of-fit index (GFI)	Greater than .90	.95	.97
Adjusted goodness-of fit index (AGFI)	Greater than .80	.95	.90
Comparative fit index (CFI)	Greater than .90	.94	.94
Root mean square error of approximation (RMSEA)	Less than .08	.04	.07
Normed fit index (NFI)	Greater than .90	.91	.91
Parsimony normed fit index (PNFI)	Greater than .60	.68	.68

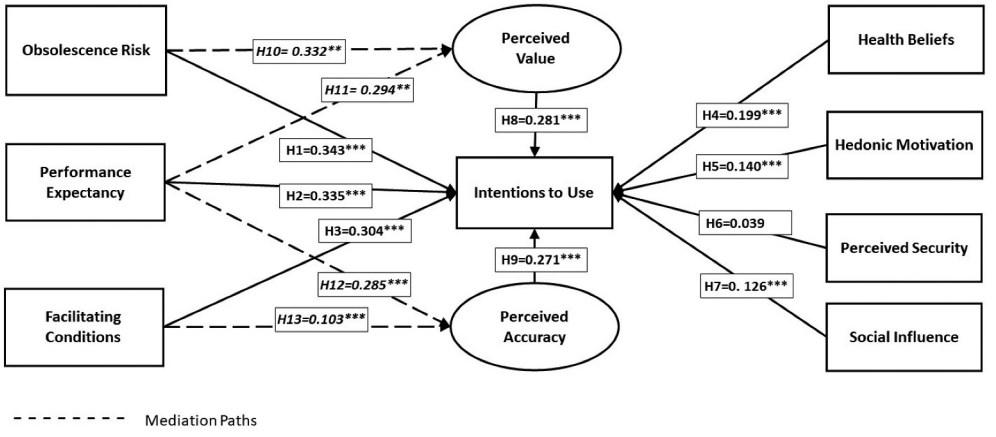

Figure 1. Validated research model. Source: Authors' compilation.

Table 4. Hypotheses testing result.

Hypothesis No.	Path Description	Standardized Coefficient (β value)	Critical Ratio (t-value)	P value	Results
H1	OR →ITU	.343	6.009	<.01	Supported
H8	PV→ITU	.281	4.447	<.01	Supported
H2	PE → ITU	.335	5.694	<.01	Supported
H9	PA→ITU	.271	4.423	<.01	Supported
H3	FC → ITU	.304	5.131	<.01	Supported
H4	HB→ ITU	.199	3.438	<.01	Supported
H5	HM→ ITU	.140	3.156	<.01	Supported
H6	PS→ITU	.039	.475	.66	Not Supported
H7	SI→ ITU	.126	2.091	<.01	Supported

OR=Obsolescence Risk; PV= Perceived Price Value; PE=Performance Expectancy; PA= Perceived Accuracy; FC=Facilitating Conditions; HB=Health Belief; HM= Hedonic Motivation; PS= Perceived Security; SI= Social Influence; ITU= Intention to Use.

Further, the mediation model showed how variables are related. PV and PE served as intervening or mediating variables in the study, while OR, PE, and FC served as exogenous variables and ITU as endogenous variables. The mediation variables were chosen based on previous research (Baron & Kenny, 1986). This study used simple random sampling to generate 5000 samples for mediation analysis (Zhao et al., 2010). The main reason to use this sampling technique is that due to higher population size, this statistical technique is used which provides a chance for all members of a population to have an equal chance of being selected as a sample member from that population (Baron & Kenny, 1986). Generally speaking, this type of sampling is considered unbiased and is often used in research to draw conclusions about an entire population (Hair et al., 2016). Obsolescence Risk (OR), an exogenous variable, has a significant positive relationship of .226 with FWT intention (ITU). It also has an indirect relationship with the perceived value of .332 as a mediating variable (PV). This leads to the conclusion that the perceived value of fitness wearables moderated the influence of obsolescence risk on the intention to use.

4.4. Mediating effects

This study focused on whether technology adoption components (perceived accuracy and perceived value) serve as a mediator in determining consumers' intentions to adopt Fitness

Table 5. Bootstrapping direct and indirect effects at 95% confidence intervals.

Hypothesis sign	Variables X_>>M_>> Y[a]	Direct β	Indirect β	Total Effect	Result
H10	OR>> PV>> ITU	.226*	.332**	.557	Complementary mediation
H11	PE >> PV>> ITU	.187*	.294*	.481	Complementary mediation
H12	PE>> PA>> ITU	.196**	.285**	.481	Complementary mediation
H13	FC>> PA>> ITU	.409**	.103	.511	Direct only non-mediation

X: exogenous variable; M: mediating variable; Y[a]: endogenous variable.
*$p \leq .05$, **$p \leq .01$, ***$p \leq .001$.

Wearable Trackers (Talukder et al., 2019), (H_{10}-H_{13}). Findings indicated that obsolescence risk and performance expectancy influence intention to use in both direct and indirect ways (through mediators). It was identified that FWTs are influenced by the interaction of obsolescence risk, price value, perceived accuracy, and performance expectancy. The invariance test for three adoption groups was performed to assess the equivalence of FWAM across different age groups. The participant's age moderated the effects of obsolescence risk and health belief on intention. Middle-aged adults employed wearables to monitor their health. As a result, middle-aged adults want regular updates and more accurate results from such devices with an adjusted R square value of .57 towards obsolescence risk and .79 towards health beliefs. Older adults were unfamiliar with the features and potential upgrades. When compared to other age groups, older adults showed an adjusted R square value of .42 for obsolescence risk and .90 for health beliefs demonstrating a little impact on intentions to purchase fitness wearables. Young adults showed an adjusted R square value of .44 for obsolescence risk and .55 for health beliefs.

Similarly, Performance Expectancy (PE) had a direct and indirect (via PV) relationship with use-related intentions (ITU) (Table 5). It was determined that the perceived value of fitness wearable trackers partially mediates the impact of PE on ITU. Furthermore, the relationship between PE and ITU is significant both directly and indirectly through the mediator variable PA. As a result, the PA of fitness trackers partially mitigated the effect of PE. The direct relationship between variables FC and ITU was significant, however, the indirect relationship via mediating variable PA was insignificant. This demonstrated that FWT Perceived Accuracy does not mitigate the impact of Facilitating Conditions on ITU. Hence, the indirect effect was calculated as the product of two indirect paths to assess the aforementioned relationships (Preacher & Hayes, 2004).

5. Discussion of the findings

This section discusses the detailed findings of this study based on the hypothesis results.

5.1. The consumers' perceived obsolescence risks and intention to use FWTs

According to the results of Hypothesis 1 (H_1), consumers' perceived obsolescence risks are positively associated with the intention to use Fitness Wearable Technologies (FWTs). This aligns with findings identified by Hartl et al. (2023), which suggest that perceived obsolescence risks may be linked to negative sentiments about a technology becoming outdated or obsolete in the near future. Such perceptions can discourage users

from adopting the technology due to concerns about obsolescence risks (Bowlds et al., 2018; Seyed Esfahani & Reynolds, 2021; Trabelsi et al., 2020).

However, a research gap is evident in the existing literature, particularly in understanding how perceived obsolescence risks shape attitudes and intentions (Tanner & Wölfing Kast, 2003; Vermeir & Verbeke, 2006). Further investigations across various contexts are warranted, exploring the relationship between perceived obsolescence risks and the intention to use FWTs (Hartl et al., 2023; Seyed Esfahani & Reynolds, 2021; Trabelsi et al., 2020). This could include inquiries into innovation as a primary element in accelerating technological obsolescence (Bowlds et al., 2018) and recognizing the dual risks of technical factors as out-of-date and out-of-use risks. Proper management practices are crucial to minimize the negative impact of obsolescence rates (Trabelsi et al., 2020). The study raises questions that necessitate further investigation, as few studies have explored UTAUT2 by considering obsolescence risk alongside variables such as health belief, price value, and perceived accuracy on the intent to adopt FWT (Miraz et al., 2022; Reyes-Mercado, 2018). The substantial impact of obsolescence risk on adoption intentions for exercise equipment is evident, supporting the idea that old technology and its obsolescence might have a considerable adverse effect on the adoption of FWT (Y. S. Wang et al., 2003).

5.2. The role of performance expectancy among consumers and intentions to use FWTs

The results of Hypothesis 2 (H_2) revealed a very strong positive relationship between performance expectancy among consumers and their intention to use Fitness Wearable Technologies (FWTs). This suggests the potential for individuals to perform better with FWTs, as implicated by Reyes-Mercado (2018) and Y. S. Wang and Shih (2009).

The findings affirm the significance of performance expectancy among consumers and their intention to use FWTs, which can be attributed to several reasons, including collaborative features and ease of use (Reyes-Mercado, 2018; Y. S. Wang & Shih, 2009). For instance, consumers are likely to be more inclined to use FWTs if they believe that these technologies will enhance their productivity levels (Reyes-Mercado, 2018). Many of the features available in FWTs can contribute to improving productivity, such as remote collaboration tools, time management apps, and virtual communication platforms (A. Mishra et al., 2022; Talukder et al., 2019).

It is recommended that the existing literature on the adoption of fitness wearables has sufficiently explained various factors influencing behavioral intentions in adopting Fitness Wearable Technologies (FWTs) (Ferrer & Klein, 2015; Y. S. Wang et al., 2003). When considering performance expectancy, it is heavily influenced by perceived ease of use (Rahardjo et al., 2020), as consumers find it easier to use and integrate FWTs into their existing work processes. Furthermore, they are more likely to perceive FWTs as valuable tools for progressing in the future (Miraz et al., 2022; Rahardjo et al., 2020).

This research has raised numerous questions that warrant further investigation, as few studies have explored UTAUT2 by considering obsolescence risk along with variables such as health belief, price value, and perceived accuracy in the intention to adopt FWT (Miraz et al., 2022; Reyes-Mercado, 2018). It is increasingly challenging to ignore the

substantial impact of obsolescence risk on adoption intentions for exercise equipment, supporting the idea that old technology and its obsolescence might have a significant adverse effect on the adoption of FWT (Y. S. Wang et al., 2003).

5.3. The role of consumers' perceived facilitating conditions and intention to use FWTs

Regarding the results of Hypothesis 3 (H_3), it is essential to note that consumers' perceived facilitating conditions had a positive relationship with their intention to use FWTS. Perceived facilitating conditions refer to an individual's ability to support or facilitate a particular technology, encompassing factors such as technical support, infrastructure access, and ease of use. In this context, facilitating conditions may involve ensuring that necessary infrastructure, including a stable internet connection and compatible devices, is available when communicating with particular customers. Moreover, consumers are more likely to use fitness wearables if they feel the infrastructure supports their well-being, as they are more likely to use these devices if they perceive them to be user-friendly.

While these findings differ from a previous study (Reyes-Mercado, 2018), they align with the results of the study by Dwivedi et al. (2017). Individuals interested in using FWT received special consideration for facilitating conditions (Reyes-Mercado et al., 2022), possibly due to the distinct functions of wearable devices from various brands and technological platforms (Reyes-Mercado et al., 2022). Furthermore, FWT can sync with devices such as mobile phones and tablets, supplementing the requirements for normal functionality (Gao et al., 2015; Venkatesh et al., 2003). These results deviate from the original UTAUT model and subsequent research (Gao et al., 2015; Venkatesh et al., 2003).

5.4. The consumers' perceived health belief and their intention to use FWT

Regarding Hypothesis 4 (H_4), the results indicate that consumers' perceived health belief had a very low coefficient value with the intention to use Fitness Wearable Technologies (FWTs). This implies that consumers are more likely to use FWTs if they believe that using them can improve work-life balance, reduce stress, and enhance overall well-being. FWT adoption is influenced by health-related motivations (T. B. Kim & Ho, 2021; Zhang et al., 2022). Health behavior attitudes are positively influenced by fitness wearable trackers (Barkley et al., 2020).

The increasing introduction of technology-driven products in the healthcare industry aligns with the growing importance of self-monitoring (Jayawardena et al., 2022; Zhang et al., 2022). The utilization of tracking devices for managing activities is motivated by typical health behaviors in Fitness Wearables (Lee et al., 2016). By providing health data through wearable technologies, consumers can track their overall fitness levels and monitor progress over time. Additionally, these devices can be used to plan workout schedules and design exercises to improve fitness levels (Lee et al., 2016).

5.5. The consumers' hedonic motivation and their intention to use FWT

In relation to Hypothesis 5 (H_5), the results suggest that the impact of consumers' hedonic motivation on their intention to use Fitness Wearable Technologies (FWTs) is

very weak. Hedonic motivation refers to a desire for pleasure and avoidance of pain, and it plays a significant role in shaping consumers' intentions to use products and technologies, such as FWTs, as it influences their desires for pleasure and avoidance of pain (Venkatesh et al., 2012).

The importance of intrinsic utilities was established through a significant positive relationship discovered between hedonic motivation and purchase intentions. This indicates that potential customers exhibit an increased level of hedonic motivations, such as enjoyment and happiness, in the development of wearables adoption intention (Alalwan et al., 2018; Soodan & Rana, 2020; Venkatesh et al., 2012).

5.6. The consumers' perceived security and their intention to use FWT

Consumers' perception of security is a crucial factor influencing their intention to use fitness wearables (Saprikis et al., 2022). However, it was observed that H_6 did not achieve statistical significance. In the case of wearables, security can encompass various aspects, including the protection of personal data, privacy, and the overall safety of using the device. The lack of significance may be attributed to consumers' existing familiarity with mobile wireless technologies (Al Hogail, 2018). Perceived security in this context can be explained as the customer's perception that the device manufacturer will incorporate features to ensure risk-free usage of technology (D.-H. Shin, 2010). Previous research has highlighted a lack of understanding regarding data security concerns associated with Fitness Wearable Trackers (Liezel, 2019; D.-H. Shin, 2010).

5.7. The social influence and intentions to use FWT

According to Rashotte (2007), social influence is defined as a change in individual behavior or attitude resulting from group or individual communication. It is recognized as subjective norm in TRA, TAM, and TPB models. However, it was revealed that social influence has the weakest impact on intentions to use FWTs (H_7). In other words, it is an individual's perception of the significance of beliefs regarding how they use their system and the role the family plays in the development of intention (Venkatesh et al., 2003). Similarly, IT adoption studies have been supported by Fan et al. (2020). There is also evidence from the FWT adoption literature that social influence has a positive impact on intentions (Gao et al., 2015; A. Mishra et al., 2022; Talukder et al., 2019).

5.8. The perceived price value, perceived accuracy and intention to use FWTs

As per H_8 and H_9, perceived price value and perceived accuracy are significantly related to the intention towards Fitness Wearable Technologies (FWTs) usage. Price value, reflecting consumer costs, has a significant impact on adoption intention. The findings contradict previous research (Talukder et al., 2019) and are consistent with Han et al. (2017). Marketing and consumer behavior disciplines provide a significant theoretical basis for disputing the significance of value/price that marketers seek and consumers perceive as appropriate (Alalwan et al., 2018; Chi & Kilduff, 2011). Users' perceptions of perceived accuracy refer to the degree to which they believe that FWTs can deliver accurate and reliable results (Gao et al., 2015; A. Mishra et al., 2022). FWTs can have

a positive impact on a user's overall confidence in the technology if they perceive them as accurate tools that can effectively facilitate their work-related tasks and responsibilities (Gao et al., 2015; A. Mishra et al., 2022).

5.9. The factors of technology adoption and perceived price value, perceived accuracy, and intention across different segments

The perceived accuracy, performance expectancy, perceived facilitating conditions and intention to use FWTs had a very insignificant relationship as per the results of H_{11}, H_{12} and H_{13}. Marketing and consumer behavior disciplines provide a significant theoretical basis for disputing the significance of value/price that marketers seek and consumers perceive as appropriate (Alalwan et al., 2018; Chi & Kilduff, 2011). The users' perceptions of perceived accuracy refer to the degree to which they believe that the FWTs can deliver accurate and reliable results as part of their support for flexible work (Gao et al., 2015; A. Mishra et al., 2022). FWTs can have a positive impact on a user's overall confidence in the technology if they perceive them as accurate tools that can effectively facilitate their work-related tasks and responsibilities (Gao et al., 2015; A. Mishra et al., 2022).

5.10. The factors of technology adoption and perceived price value, perceived accuracy, and intention across different segments

The results of H_{10}, H_{11}, H_{12}, and H_{13} indicate a significant difference in the relationships between factors of technology adoption and perceived price value, perceived accuracy, and intention across different segments. As per Venkatesh (2000), price value is an important predictor of consumer adoption and usage intentions when it comes to perceived benefits as opposed to monetary costs (a cognitive trade-off). To maintain an ongoing relationship between a manufacturer and their target customers, the value of the price is often taken into account as important (Chi & Kilduff, 2011). Researchers have investigated how perceived value affects adoption behavior in the context of an information system (U. Mishra et al., 2023; Shaw & Sergueeva, 2019).

Contradictory results exist regarding China's adoption of Fitness Wearable Technologies, as per the study by Talukder et al. (2019). Furthermore, consumers in developing nations are generally more price-sensitive and are more likely to choose products and services based on their value rather than their price. The structural results for three age groups in the main research model demonstrated a reasonable fit to the data with a beta coefficient (β) of .46 for middle-aged adults, .37 for older adults, and .30 for younger adults. This is mainly due to the research model's ability to capture variations in the relationships between variables across different age groups (Tables 6 and 7).

6. Theoretical implications

In recent years, technological advancements in Fitness Wearable Technologies (FWTs) have led to numerous applications in continuous fitness and health monitoring. Despite the benefits of FWTs, their limited use for fitness and health monitoring and the insufficient understanding of the determinants of their use necessitate further exploration. This study significantly contributes to knowledge development by constructing

Table 6. Structural results for three age groups in the main research model.

Path Description	Young Adults (18–30 Years)	Middle aged Adults (31–45 Years)	Older Adults (More than 45 Years)
OR →ITU	.30*	.46**	.37*
PV→ITU	.34***	.43	.21*
PE → ITU	.28*	.02**	.47
PA→ITU	.32***	.38***	.22**
FC → ITU	.29*	.27**	.36*
HB→ ITU	.12	.20	.25*
HM→ ITU	.19**	.16*	.11*
PS→ITU	.40*	.42***	.41
SI→ ITU	.10	.14**	.14*
Goodness of fit indices	χ^2/df = 1.13 GFI=.94 AGFI=.90 CFI=.95 RMSEA=.07 NFI=.91 PNFI=.67	χ^2/df = 1.24 GFI=.93 AGFI=.90 CFI=.96 RMSEA=.07 NFI=.91 PNFI=.66	χ^2/df = 1.26 GFI=.95 AGFI=.91 CFI=.96 RMSEA=.07 NFI=.91 PNFI=.68

*$p \le .05$, **$p \le .01$, ***$p \le .001$.

OR=Obsolescence Risk; PV= Perceived Price Value; PE=Performance Expectancy; PA= Perceived Accuracy; FC=Facilitating Conditions; HB=Health Belief; HM= Hedonic Motivation; PS= Perceived Security; SI= Social Influence; ITU= Intention to Use.

Table 7. Regressing values for obsolescence risk and health Belief.

	Age Groups	Adjusted R Square	F	Unstandardized Coefficients
Obsolescence Risk	Young Adults	.44	1.056	(Constant) .71 *Obsolescence Risk .172*
	Middle Aged Adults	.57	1.617	(Constant) .51 *Obsolescence Risk .079*
	Older Adults	.42	.243	(Constant) .84 *Obsolescence Risk .162*
Health Belief	Young Adults	.55	6.162	(Constant) 2.24 *Health Belief .162*
	Middle Aged Adults	.79	23.440	(Constant)89.411 *Health Belief 104.216*
	Older Adults	.90	50.419	(Constant)14.653 *Health Belief 71.438*

a comprehensive research model integrating the extended Unified Theory of Acceptance and Use of Technology (UTAUT2), with perceived vulnerability as moderators.

The study makes two primary contributions to the UTAUT2 model. Firstly, it identifies the most significant FWT buying factors by extending the UTAUT2 model, offering novel insights into developing markets. Utilizing Structural Equation Modeling (SEM) for descriptive and inferential results, the study provides reliable and generalizable findings (Urbach & Ahlemann, 2010). Secondly, the study builds upon the UTAUT2 foundation by incorporating constructs from the Health Belief Model and previous validated studies. It explores the evolution of technology service situations, specifically Wearable Trackers for Fitness (Basoglu et al., 2017; Urbach & Ahlemann, 2010; Venkatesh, 2000). Facilitating conditions, encompassing the availability of infrastructure and consumers' perception of behavioral control supporting FWTs, are examined. FWTs with complex user interfaces may pose challenges, but as long as operational

infrastructure supports their use, there is a positive influence on users' intention to adopt FWTs (Apasrawirote et al., 2022; Yeoh & Chin, 2022).

The study concludes that facilitating conditions, according to the UTAUT2 model, positively influence users' intention to use the technology (Apasrawirote et al., 2022; Venkatesh et al., 2003; Yeoh & Chin, 2022). The findings suggest a need for further research into individual models of acceptance and intention to recommend, particularly focused on FWT adoption. Additionally, the conceptual model presented can be tested across diverse product categories and age groups for validation and further refinement in future research endeavors.

7. Managerial implications

The findings of this study carry important implications for the development of Fitness Wearable Technologies (FWTs), suggesting that manufacturers can enhance their relationships with consumers across different age groups through effective communication methods (Alalwan et al., 2018; Soodan & Rana, 2020; Venkatesh et al., 2012). Understanding effective communication strategies tailored to the preferences of various age groups is crucial, particularly for individuals in older age groups (Talukder et al., 2019; Zhang et al., 2022). Clear and straightforward communication methods that avoid technical terms may be appreciated by both older individuals and younger adults, potentially improving sales (Alalwan et al., 2018; Soodan & Rana, 2020). In addition, understanding that obsolescence risk perceptions deter adoption indicates manufacturers should communicate product longevity, continued support, and value over time to consumers. Since health beliefs influence acceptance, messaging should emphasize health/fitness benefits consumers can achieve using the wearables. The mediating effects of accuracy and value perceptions imply that manufacturers need to convincingly convey device accuracy and overall value. Salespeople and consumer education tools should highlight performance gains, health impacts, and ease of use to increase adoption. Companies should leverage hedonic motivations by making wearables fun to use via gamification, social sharing, and customization.

The study's success in identifying facilitating conditions in the adoption environment of FWTs implies that marketers should focus on maintaining consistency in information dissemination, incorporating technology-related resources, and utilizing self-service technologies (Talukder et al., 2019; Zhang et al., 2022). This underscores the significance of facilitating conditions in the technology adoption landscape, providing added value to customers and assisting marketers in ensuring the consistency of information.

Furthermore, the study suggests an opportunity for FWT manufacturers to strengthen their relationships with older individuals, especially those aged 60 and beyond, through effective communication techniques (Alalwan et al., 2018; Soodan & Rana, 2020; Venkatesh et al., 2012). This underscores the importance of tailoring communication strategies to different age segments for successful adoption and acceptance of FWTs. Overall, the insights provided by the study offer valuable guidance for marketers and manufacturers in optimizing their communication strategies and enhancing relationships with diverse consumer age groups in the context of FWT adoption and firms can utilize the FWAM model empirically validated by the study to predict consumer adoption and receptiveness.

8. Conclusion, limitations, and future directions

The study provides valuable insights into the acceptance of Fitness Wearable Technologies (FWTs) in the clinical setting, emphasizing the predictive power of the proposed model in understanding FWT adoption intentions. The identified factors, including obsolescence risk, price value, perceived expectancy, perceived accuracy, facilitating conditions, health beliefs, hedonic motivations, and social interactions, contribute to a comprehensive understanding of product choice in this context.

However, the study acknowledges certain limitations. First, the novelty of FWTs and their slow diffusion among Indian consumers led to the exclusion of "habit" as an antecedent. The authors did not explore potential connections between habits and FWT use, highlighting a gap in the literature for future research (Talukder et al., 2019; Zhang et al., 2022). Future researchers are encouraged to investigate habits and their influence on FWT adoption, particularly in emerging countries like India, through longitudinal research methods.

Secondly, the empirical data used for hypotheses testing was collected at a single point in time, which limits the study's ability to capture changes over time. The study suggests that a longitudinal investigation in the future could provide more detailed insights into customer attitudes toward FWTs. Longitudinal studies would enable researchers to track changes in attitudes and behaviors over an extended period.

Furthermore, the study extends an invitation to future researchers to explore the accuracy levels of health metrics measured by FWTs, such as heart rate, sleep patterns, and calorie expenditure. Investigating the reliability and accuracy of these health metrics is deemed essential, highlighting an important avenue for further research in the field. In summary, the study not only contributes to the understanding of FWT adoption in the clinical setting but also identifies areas for future research, including the exploration of habits, the need for longitudinal investigations, and the assessment of the accuracy of health metrics measured by FWTs. Future studies should assess impact of factors like privacy concerns, technology anxiety, and social competition. Further research should also study moderating effects of individual differences like personality traits on adoption and analyze differences between types of fitness wearables – watches vs bands vs glasses.

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