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Technology Acceptance of Health-tracking Wearables Among University Students in Bangladesh: An Extended Technology Acceptance Model Study

Nafiz Yousuf¹, *Moni Akter¹, Mst. Farhana Rahman¹, and Ashikur Rahman¹
¹Department of Information Technology & Management, Daffodil International University

*Email: akter.itm@diu.edu.bd

Abstract: Wearable health technologies are increasingly being adopted for personal health monitoring and wellness management. However, the factors influencing university students' acceptance and behavioral intention toward health-tracking wearable devices remain underexplored in developing countries such as Bangladesh. This study investigates the determinants of university students' acceptance and behavioral intention toward health-tracking wearable devices using an extended Technology Acceptance Model (TAM). A quantitative cross-sectional survey was conducted among 235 university students in Bangladesh using stratified random sampling. The study incorporated perceived usefulness, perceived ease of use, trust, privacy concern, social influence, and health consciousness as predictor variables. Data were analyzed using Partial Least Squares Structural Equation Modeling (PLS-SEM). The findings reveal that perceived usefulness ($\beta = 0.288$, $p < 0.001$), perceived ease of use ($\beta = 0.311$, $p < 0.001$), social influence ($\beta = 0.170$, $p = 0.002$), and health consciousness ($\beta = 0.166$, $p = 0.001$) significantly influence attitude toward using health-tracking wearables, explaining 79.2% of the variance in attitude ($R^2 = 0.792$). Attitude significantly influences behavioral intention ($\beta = 0.649$, $p < 0.001$), explaining 42.1% of the variance in behavioral intention ($R^2 = 0.421$). Trust and privacy concerns were found to have no significant effect on attitude. The study highlights the importance of usability, perceived benefits, social influence, and health consciousness in shaping wearable technology adoption among university students. The findings contribute to wearable technology acceptance research and provide practical implications for wearable developers, marketers, university

administrators, and health promotion initiatives in emerging economies.

Keywords: Health-tracking wearables; Technology Acceptance Model (TAM); PLS-SEM; University students; Bangladesh; Privacy concern; Trust; Social influence; Health consciousness.

1. Introduction

Wearable health devices are transforming personal health management. Fitness trackers, smartwatches, and Internet of Medical Things (IoMT) devices enable continuous real-time monitoring of physical activity, heart rate, sleep patterns, and other essential health indicators [1,2]. These technological advancements have created new opportunities for individuals to engage in preventive healthcare and maintain healthier lifestyles through self-monitoring and personalized health data. Over the past decade, the wearable health device market has grown rapidly due to the increasing demand for self-care and individualized health information [3,4].

Despite the growing popularity of wearable technologies, their long-term adoption remains uncertain. Users may discontinue using these devices if they perceive them as difficult to use, lacking clear benefits, or incompatible with their daily routines. In addition, concerns related to personal data management and privacy can negatively influence user acceptance, particularly because wearable devices collect sensitive health information. Issues related to data privacy and security may therefore reduce individuals' willingness to adopt and continue using these technologies [5-7].

Previous studies have shown that the adoption of wearable health technologies is increasing in countries

such as the United States, China, and several European nations. However, the situation differs considerably in developing countries such as Bangladesh, where variations in digital literacy, awareness of health data privacy, and attitudes toward technology adoption create unique challenges [8-10]. Understanding how young adults perceive and adopt health-tracking wearable devices is important for both researchers and practitioners. University students represent a digitally literate group that is generally more open to adopting emerging technologies and can contribute to the wider diffusion of such technologies within society[11].

1.1 Problem Statement and Contributions

Despite the increasing global adoption of health-tracking wearable technologies, there is still limited empirical research examining the factors that influence their acceptance among university students in developing countries such as Bangladesh. Most previous studies on wearable technology adoption have focused on developed countries, where technological infrastructure, healthcare systems, digital literacy, and privacy awareness differ significantly from those in emerging economies. As a result, findings from prior studies may not fully reflect the realities of the Bangladeshi context.

Although the Technology Acceptance Model (TAM) has been widely used to explain technology adoption behavior, the traditional TAM framework may not be sufficient to fully explain the acceptance of wearable health technologies. In addition to usability and perceived usefulness, wearable health technologies involve factors related to social influence, health consciousness, trust, and privacy concerns. However, there remains limited understanding of how these factors influence university students' attitudes and behavioral intentions toward health-tracking wearable devices in Bangladesh.

To address this research gap, this study extends the traditional Technology Acceptance Model by incorporating trust, privacy concern, social influence, and health consciousness to examine university students' acceptance and behavioral intention toward health-tracking wearable devices in Bangladesh. The contributions of this study are as follows:

1. Empirically validating an elongated TAM of health-tracking gadgets among university students in Bangladesh.
2. Estimating the degree of relative meaningfulness of utilitarian value, usability,

social context, and health orientation to attitudes and intentions.

3. Offering real-world guidance to wearable developers, marketers, and university wellness stakeholders who would like to see more young adults adopt and use it consistently.

The remainder of this paper is organized as follows. Section 2 reviews the relevant literature on wearable health technologies and the Technology Acceptance Model and develops the research hypotheses. Section 3 describes the research methodology. Section 4 presents the empirical findings and hypothesis testing results. Section 5 discusses the findings in relation to previous studies and theoretical implications. Section 6 highlights the practical and theoretical implications of the study. Section 7 outlines the limitations of the study and directions for future research. Finally, Section 8 concludes the paper.

2. Literature Review

2.1. Theory of Technology Acceptance Model

One of the most common theoretical frameworks that are used to explain the adoption of information technologies by users is known as the Technology Acceptance Model (TAM). According to the model, perceived usefulness (PU) and perceived ease of use (PEOU) are the most common beliefs that interfere with the attitude of a user to a technology which further impacts on behavioral intention to use the technology [12]. Perceived usefulness is the level to which an individual think that the use of a technology will improve the performance or results, whereas perceived ease of use is the level to which the use of technology consumes a minimum amount of effort.

When it comes to the health-tracking wearables, the perception of usefulness indicates how much users can think that the wearable devices will be useful in enabling them to track their health indicators, manage their fitness programs, and allow them to live healthy lifestyles. Perceived ease of use means the extent of ease with which people can learn, use and incorporate wearable devices in their daily lives. These two factors have always been proved by previous researchers as the key determiners of the willingness to use wearable technologies and digital health apps [3,13].

2.2. Expanding TAM in health-tracking wearables

Despite the fact that TAM concerns usability and perceived advantages, wearable health technologies imply constant measurements and gathering of personal health information. Thus, other psychological and

social variables can affect the acceptance decision of the users. Earlier studies indicate that social influence, health motivation, trust in technology, and privacy issues are some of the variables that can significantly influence wearable device attitudes[5,3].

Social influence is the extent to which individuals feel that significant individuals feel they should use technology. Peer advice and observable use of devices can be very powerful influencers on the technology acceptance behavior in social contexts like the university. Health consciousness is the level of awareness and the desire of the individual to take care of his or her health and enhance it. Those who are more health-conscious tend to be more open to the technologies that help to track and work on health behaviors[3].

Trust indicates the confidence of how wearable gadgets and its service providers will operate effectively and responsibly address personal information. The evidence on trust is one of the most prominent determinants in most studies on the adoption of digital health since users need to trust the health data and the reliability of service providers [6]. Privacy concern is the issue that users are concerned about the possibility of such things as the potential misuse of the data, unauthorized access, and even loss of control over the personal health data gathered with the help of wearable technologies. Given that the wearable devices can gather sensitive biometric data, privacy is likely to affect how users perceive the idea of adopting the technology [5].

2.3.1. Perceived Usefulness (PU)

Perceived usefulness is a concept that describes the extent to which the university students believe that the utilization of health-tracking wearable devices would increase their capacity to monitor and manage their personal health effectively [12, 13]. As far as health-tracking wearables are concerned, the PU implies a set of beliefs that such devices can offer relevant health information, assist in sustaining fitness objectives, preventive health behaviors, and overall wellbeing [14,3]. Empirical research has repeatedly indicated that perceived usefulness is among the most powerful predictors of attitude and behavioral intention under various circumstances involving technologies and wearable health devices are no exception [3,13,15]. The more students believe that health-tracking wearables are helpful apps in health management, the more positive attitudes towards these gadgets they will develop and the more intentions to use them they will have [16,17].

H1: Perceived usefulness positively and significantly influences the attitude of students to use health-tracking wearables.

2.3. Hypotheses

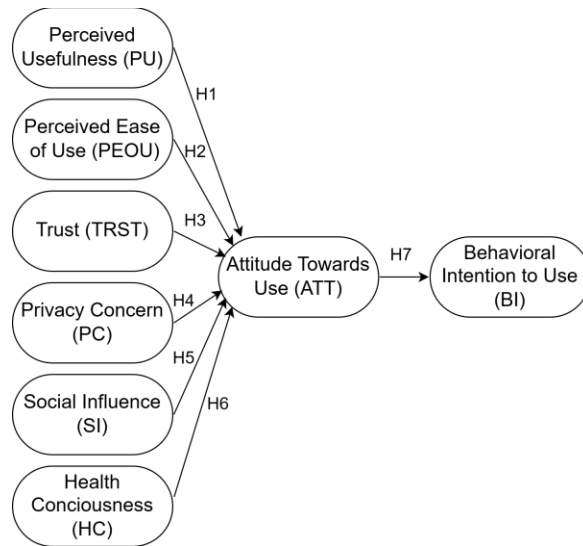


Fig. 1. Research Model (Technology Acceptance Model)

2.3.2. Perceived Ease of Use (PEOU)

Perceived ease of use means that students think that using health-tracking wearable devices are not associated with a lot of effort, include a user-friendly interface, and can be used without the need to undertake extensive training or technical knowledge [3,18]. In the case of wearable health technologies, PEOU includes perceptions regarding the ease of the device installation, the simplicity of navigation the health data displays, the ease of devices to work with smartphones, and the flexibility [13, 14]. Studies have shown that PEOU does not only have a direct effect on attitude towards technology use but also has an indirect effect on perceived usefulness, due to the fact that a system that is easier to use can be considered more useful [3,12]. The wearable technology research has shown that students can easily reach health-tracking devices, which makes them more inclined towards the device and willing to adopt it [13,18].

H2: Considered ease of use is positively and significantly related to the attitude of students towards the use of health-tracking wearables.

2.3.3. Trust (TRST)

Trust in health-tracking wearables is the extent to which the university students feel confident that the manufacturers of wearable devices, data processing platforms, and related healthcare systems are trustworthy, secure, reliable, and responsible in working with personal health data [5,15]. Trust refers to

technological reliability (sensors work correctly, the performance does not decrease suddenly) and institutional trustworthiness (ethical data management, well-defined privacy policies) [19,20]. Trust is especially essential when it comes to the issue of health technology, as such devices require sensitive biometric and behavioral information that users rely on the certainty that such information will stay confidential [5, 16]. Empirical research proves that the greater the level of trust, the more favorable the attitude toward health-tracking gadgets and the willingness to adopt and use them [15,19,20]. Trust may also prevail over perceived usefulness as a health technology acceptance determinant in certain settings [15].

H3: There is positive and significant influence of trust on student attitude towards the usage of health-tracking wearables.

2.3.4. Privacy Concern (PC)

The concept of privacy concern describes how worried university students are about possible misuse, unauthorized access, ineffective protection, or unethical use of their personal health data which is gathered by wearable devices [5,6]. In a wearable health technology, privacy issues comprise concerns about data breaches, commercial use of health data, disclosure to third-party users, and policies regarding the use of data that are not disclosed. Studies confirm that the concern of privacy has a negative effect on attitude towards the use of technology and behavioral intention to use health-tracking wearables [6,17,19]. In case of high perceptions of risks to their health data privacy, students get less positive attitudes toward the use of wearables, and are more reluctant to use them, despite identifying them as useful [21,22].

H4: The issue of privacy is found to negatively and significantly influence the attitude of the students towards the use of health-tracking wearables.

2.3.5. Social Influence (SI)

Social influence is the degree of presumption that university students hold that significant others, e.g., friends, family members, peers, and influential persons believe they should wear health-tracking devices and the degree to which the observation of others using the devices triggers their own use [5,23]. The social influence is based on the Theory of Planned Behavior and displays the subjective norms (including social pressure) and observational learning (adoption of peer behavior) [4]. The studies prove that the social influence is especially salient in young age groups, such as university students, who are more prone to peer pressures and fashion trends in technology adoption [5,23]. Based on the empirical data, students are more

likely to form positive attitudes and intentions of adopting health-tracking wearables when they believe that their social networks support and use these devices [3,5].

H5: Social influence positively and significantly impacts the attitude of students towards the use of health-tracking wearables.

2.3.6. Health Consciousness (HC)

Health consciousness is the extent of understanding, caring and active practices which are undertaken by university students to monitor preventive behaviors, and health promoting activities that maintain and improve their own personal health status [4,24]. Health-aware people are more motivated to measure health indices, perform regular physical exercises, track their diets, and search information regarding their health. The studies that are based on the Health Belief Model reveal that personal health motivation is one of the key factors that affect the use of health-related technologies such as wearable devices [1,25]. Empirical research also proves that more health-conscious students tend to view health-tracking wearables as useful devices, develop a positive attitude to them, and report stronger intentions to use them and continue being users [4,5].

H6: Health consciousness positively and significantly influences the student attitude towards health-tracking wearable use.

2.3.7. Attitude Toward Use (ATT)

Attitude toward use is the positive or negative assessment connected to taking on and wearing a health-tracking wearable device by university students [12,26]. Attitude is the way that all the cognitive beliefs (usefulness, ease, trust), affective (liking, enjoyment), and concerns (privacy) are merged and summarize whether or not it is desirable and beneficial to use the technology [23]. TAM indicates that attitude is an important mediating variable, which directs the impact of external factors (perceived usefulness, ease of use, trust, privacy concern, social influence, health consciousness) to behavioral intention [12,26]. It has been empirically proven that the attitude is a robust and reliable predictor of behavioral intention in a variety of technology settings, including wearable health devices [13,23,26]. In case students have positive attitudes toward health-tracking wearables, they will be much more likely to plan to adopt and stay using such devices.

H7: The attitude towards use significantly and positively influences behavioral intention to use health-tracking wearables among students.

2. Methodology

3.1. Research design and study context

This research paper is based on the quantitative, cross-sectional survey research design as it relies on the extended Technology Acceptance Model (TAM) to test the hypothesis that perceived usefulness, perceived ease of use, trust, privacy concern, social influence, and health consciousness are related to the attitude towards use and intention to use health-tracking wearables empirically. The respondents are surveyed through a structured self-administered questionnaire and at one point in time. It is a suitable design since cross-sectional surveys fit best when testing theoretical models and hypothesized connections between latent constructs; are cost and time-effective; allow the researcher to gather large samples that can be subjected to multivariate analysis; and results may be analyzed to determine the relationship between latent constructs and evaluate theoretically formulated hypotheses by using Partial Least Squares Structural Equation Modeling (PLS-SEM).

3.2. Sampling and data collection

The survey received 235 responses. The sample population of this research is defined as university students joined to institutions of higher learning in Bangladesh and who know about, use or could use health-tracking wearable devices and are aged 18 years and above. The subjects of the research include these students who are representative of both government and non-government universities and diverse academic fields. The wider scope of the target population comprises all university students in Bangladesh who either have experience with or heard about health-tracking wearables, and this is appropriate considering the focus of the study to examine the factors that contribute to their attitude towards wearables and their will to adopt them (Gao et al., 2015; Chuah et al., 2016; Khin Shoon Lei Thant Zin et al., 2023).

3.3. Measures

The structured questionnaire that will be used in data collection has been developed on the basis of this study. The questionnaire will consist of three major sections: Age: 55 years old.<|human|>Gender: Female. These items describe the background features of respondents: - Gender (Male/Female/y) - Age group (18-20, 21-23, 24-26, 27+) - Study level (Bachelor/Master/Other) - Type of university (Public/Private) - Education level 1st to 4 th year.

Section 2: Measurement Items: The following section includes the statements describing the core constructs of the extended TAM model:

Perceived Usefulness (PU) - 3 items. Perceived Ease of Use (PEOU)- 6 items. Trust (TRST) - 3 items Privacy Concern (PC) 4 items Social Influence (SI) 4 items Health Consciousness (HC) 3 items. Attitude toward Use (ATT) 8 items. Behavioral Intention to Use (BI) 6 items. Total: 37 measurement items

3.4. Data analysis approach

The analysis logically satisfies the objectives of the research and proves the hypothesis relations in the extended Technology Acceptance Model (TAM) framework. The chapter starts with the description of respondent demographic profiles, and then the measure of common method variance is provided with the help of Harman Single Factor Test. The measurement model (outer model) is then tested to determine construct reliability and validity in terms of Average Variance Extracted (AVE), Composite Reliability (CR) and Discriminant validity using Fornell-Larcker Criteria. Analysis of the structural model (inner model) is then done to test Coefficient of Determination (R²) and Path Coefficients that give evidence in testing the hypothesis. The chapter also ends with the last research model having important findings. The data were gathered using a structured online web questionnaire that was sent to undergraduate and post-graduate students who attend both public and private Bangladesh based universities and most respondents were located in large urban centers like Dhaka.

4. Result

4.1. Respondent profile

A total of 235 responses were analyzed for this study. Table 1 summarizes the demographic profile of the respondents, including gender, age group, academic year, and university type.

Table 1. Respondent demographics (n = 235).

Characteristic	Category	Frequency	Percentage (%)
Gender	Male	102	43.4
	Female	133	56.6
Age group	18–20	78	33.2
	21–23	98	41.7
	24–26	28	11.9
	27+	31	13.2
Academic year	1st year	60	25.5
	2nd year	70	29.8
	3rd year	52	22.1
	4th year	53	22.6
University type	Public	134	57.0
	Private	101	43.0

4.2. Common method bias assessment

Because the study uses self-reported survey data, common method bias (CMB) was assessed using Harman's single-factor test. The first factor accounted for 53.322% of the total variance. This value is slightly above the commonly cited 50% guideline, suggesting that CMB cannot be completely ruled out. However, procedural remedies (e.g., clear instructions, anonymity, and careful item wording) and the pattern of statistically distinct relationships in the structural model reduce the likelihood that CMB fully explains the reported results.

4.3. Measurement model evaluation

Reliability and convergent validity were evaluated using Cronbach's alpha, rho_A, composite reliability (CR), and average variance extracted (AVE). As shown in Table 2, all constructs exceed commonly recommended thresholds for internal consistency (≥ 0.70) and convergent validity ($AVE \geq 0.50$).

Table 2. Construct reliability and convergent validity.

Construct	Cronbach's alpha	rho_A	Composite reliability	AVE
ATT	0.942	0.943	0.952	0.712
BI	0.924	0.926	0.940	0.724
HC	0.929	0.930	0.955	0.876
PC	0.897	0.899	0.929	0.765
PEOU	0.909	0.909	0.929	0.687
PU	0.884	0.885	0.928	0.812
SI	0.889	0.891	0.923	0.750
TRST	0.857	0.873	0.913	0.778

AVE: average variance extracted.

Discriminant validity was assessed using the Fornell-Larcker criterion. The square root of AVE for each construct (diagonal) was higher than the correlations with other constructs, supporting discriminant validity (Table 3).

Table 3. Discriminant validity (Fornell-Larcker criterion). Note: diagonal values are \sqrt{AVE} .

	ATT	BI	HC	PC	PEOU	PU	SI	TRST
ATT	0.841							
BI	0.841	0.851						
HC	0.841	0.841	0.936					
PC	0.841	0.841	0.841	0.877				
PEOU	0.841	0.841	0.841	0.841	0.829			
PU	0.841	0.841	0.841	0.841	0.841	0.901		
SI	0.841	0.841	0.841	0.841	0.841	0.841	0.866	
TRST	0.841	0.841	0.841	0.841	0.841	0.841	0.841	0.882

ATT	0.844							
BI	0.844	0.851						
HC	0.844	0.844	0.936					
PC	0.844	0.844	0.844	0.877				
PEOU	0.844	0.844	0.844	0.844	0.829			
PU	0.844	0.844	0.844	0.844	0.844	0.901		
SI	0.844	0.844	0.844	0.844	0.844	0.844	0.866	
TRST	0.844	0.844	0.844	0.844	0.844	0.844	0.844	0.882

ATT: Attitude, BI: Behavioral Intention, HC: Health conciseness, PEOU: Perceived ease of use, PU: Perceived of Usefulness, SI: Social Influence, TRST: Trust.

4.4. Structural model evaluation

The structural model was assessed using the coefficient of determination (R^2) and hypothesis testing via bootstrapping. As shown in Table 4, the model explains a substantial proportion of variance in attitude toward use ($R^2 = 0.792$) and a moderate proportion of variance in behavioral intention ($R^2 = 0.421$).

Table 4. Coefficient of determination (R^2).

Endogenous construct	R^2	Adjusted R^2
ATT	0.792	0.787
BI	0.421	0.418

Table 5 reports the bootstrapped path coefficients for the hypothesized relationships. PU, PEOU, SI, and HC show significant positive effects on attitude, while trust and privacy concern are not statistically significant. Attitude shows a strong positive effect on behavioral intention.

Table 5. Structural model path coefficients and hypothesis testing (bootstrapping = 5,000).

Hypothesis	Path	β	t	p	Result
H1	PU → ATT	0.288	4.877	0.000	Supported
H2	PEOU → ATT	0.311	3.811	0.000	Supported
H3	SI → ATT	0.170	3.095	0.002	Supported
H4	HC	0.16	3.308	0.00	Support

	→	6		1	ed
H5	TRST → ATT	0.06 6	1.272	0.20 4	Not support ed
H6	PC → ATT	0.00 1	0.022	0.98 2	Not support ed
H7	ATT → BI	0.64 9	8.578	0.00 0	Support ed

Note: ATT: Attitude, BI: Behavioral Intention, HC: Health conciseness, PEOU: Perceived ease of use, PU: Perceived of Usefulness, SI: Social Influence, TRST: Trust. *p<0.05,***p<0.001.

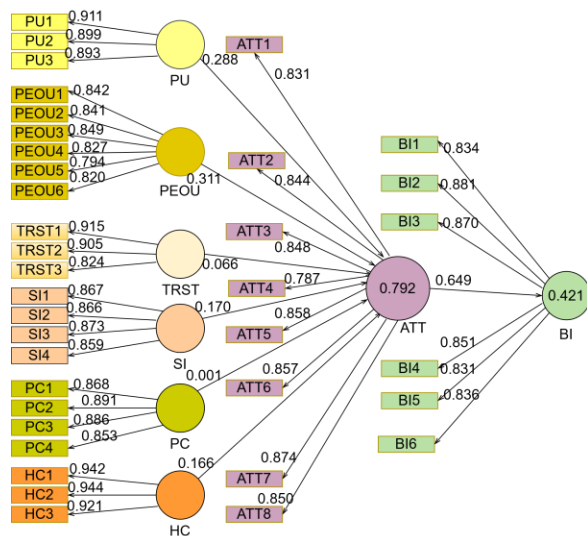


Fig. 2. Visualizes the final structural model with standardized path coefficients, consistent with the PLS-SEM results..

5. Discussion

This chapter is based on the in-depth discussion of the empirical results obtained based on the PLS-SEM analysis, interprets the results in terms of the existing literature, and discusses the theoretical and practical conclusions. The chapter is divided into five major sections. Section 5.2 presents the results of the connections between constructs explaining each result of the hypothesis concerning previous research. Section 5.3 presents implications of the study, which is split into theoretical and practical contributions. Section 5.4 takes cognizance of the shortcomings of the current study and gives suggestions on how future studies can be done. Lastly, Section 5.5 summarizes the thesis by summarizing the most important findings and their

implications to the research question on how the health-tracking wearables are accepted by the university students.

5.1. Perceived usefulness and Attitude

The regression analysis indicated that Perceived Usefulness (PU) positively influences Attitude toward Use (ATT) ($b = 0.288, t = 4.877, p < 0.001$), which demonstrates that H4 is correct. This result is similar to the fundamental principles of the Technology Acceptance Model, which presupposes that the perceived usefulness is a key factor affecting the user attitude towards the usage of the technology. The finding suggests that the more students of universities feel that health-tracking wearables can be helpful in tracking their health, fitness, and the overall well-being, the more positive attitudes toward the usage of these gadgets they are inclined to have. This is in line with past research literature on wearable technology acceptance that have revealed that perceived benefits like health monitoring, fitness tracking, and real-time feedback can greatly increase acceptance among users. The path coefficient is relatively high, which indicates that utilitarian value is one of the leading factors influencing the formation of attitudes in the wearable health technology context in relation to the interviewee group, being Bangladeshi university students.

5.2. Perceived Ease of Use and Attitude

Attitude towards Use ($b = 0.311, t = 3.811, p < 0.001$) showed a significant positive impact of Perceived Ease of Use (PEOU), which supported H3. This result validates the fact that the perceived ease of use and simplicity of health-tracking wearables is instrumental in influencing the attitudes of students. The outcome is in line with the findings in the literature of TAM, which recognizes perceived ease of use as a core determinant of technology acceptance. In the case of wearable devices, this implies that students will tend to form good attitudes when they believe that the devices are user friendly, comfortable to wear and that they need not go out of their way to incorporate them in their day to day lives. The high path coefficient highlights the role of an intuitive design of the interface, smooth integration with smartphones, and low learning curves as the factors that drive positive attitudes toward wearable health technology. This observation is especially helpful in cases with technology developers and marketers who are interested in increasing the adoption rates of university students.

5.3. Social Influence and Attitude

Attitude toward Use ($b = 0.170, t = 3.095, p = 0.002$) had a significant positive effect on Social Influence (SI), which supports H5. This result proves that peer pressure, exposure on social media, and peer

recommendations and support by friends and family play a significant role in influencing students to adopt health-tracking wearables. This finding goes in line with social influence theory, which highlights the influence of interpersonal relationships and social networks in technology adoption decisions. This can be applied to the situation of Bangladeshi university students who are more likely to be positively influenced by the attitude towards watching other students wearing wearable devices, receiving the recommendation of their friends, or reading positive articles in social media. The moderate path coefficient implies that social factors are significant but they work in collaboration with utilitarian and usability factors. This result demonstrates the possibility of social marketing campaigns and peer endorsement programs in encouraging the use of wearable technology among university students.

5.4. Health Consciousness and Attitude

Health Consciousness (HC) was found to have a strong positive influence on Attitude toward Use ($b = 0.166$, $t = 3.308$, $p = 0.001$), which confirms H6. This result suggests that students who are more health-active, i.e. those who watch their nutrition, engage in physical activity, and are more concerned with their wellbeing, will have an increased probability of forming positive attitudes to health-tracking wearables. The finding is in line with the health behavior literature, which proposes that more health-conscious people are more open to health promoting technologies. The strong correlation substantiates the fact that personal health values and wellness orientation are motivation factors in wearable technology acceptance. In the case of Bangladeshi university students, this means that students who already live healthy lifestyles or need to do so will be more attracted by health-tracking wearables. The results of this discovery portend significant significance in the market segmentation and targeted marketing of health-aware student audiences.

5.5. Trust and Attitude

Surprisingly, Trust (TRST) did not significantly affect the Attitude toward Use ($b = 0.066$, $t = 1.272$, $p = 0.204$) leading to the nullification of H7. This result is rather unexpected because the previous studies have stressed the significance of trust as an aspect of technology acceptance, especially in terms of data privacy and security. This outcome can be explained by a number of reasons. First, university students as digital natives might already have an existing level of trust in wearable technology and that when famous companies are involved, proper security is maintained. Second, the perceived immediate advantages of health tracking and

fitness monitoring can be more than a privacy concern among this group of people. Third, the scope of the data collection and privacy implications of wearable devices might not be fully understood by the students, creating the lack of concern in terms of the trust issues. Alternatively, trust can be indirect by means of other constructs instead of it directly affecting attitude. This surprising study should be investigated further in future research to learn more about the importance of trust in wearable technology acceptance among university students in third world countries.

5.6. Privacy Concern and Attitude

Privacy Concern (PC) had no significant impact on Attitude toward Use ($b = 0.001$, $t = 0.022$, $p = 0.982$), which allowed H4 to be rejected. This observation is especially interesting, considering that it is in contrast to most of the literature on privacy being cited in terms of impediments to the adoption of wearable technology. There are a number of contextual factors which could be in this outcome. To begin with, wearable devices can be considered concerning functionality and usability by university students in Bangladesh rather than privacy considerations. Second, the high rate of social media use and information sharing among the younger generations could have desensitized the process of data disclosure, and made the process less sensitive to privacy concerns. Third, study participants might view health information that wearables capture as being less sensitive than monetary or personal identity information. Fourth, the understanding of data privacy-related concerns about wearable technology might be low among the Bangladeshi students since they lack digital literacy on the subject of data rights and data security. This result implies that much as the importance of privacy is theoretically important, it might not have a substantial impact on attitudes in practice among this particular demographic and cultural group. Future studies could examine the possibility of how privacy awareness intervention can modify such a relationship.

5.7. Attitude and Behavioral Intention

As a result of the analysis, the Attitude toward Use was shown to be strongly positive and significantly significant in influencing Behavioral Intention to Use ($b = 0.649$, $t = 8.578$, $p < 0.001$), which supports H1. This is the greatest relationship in the whole structural model, which proves the idea that attitude plays the key role in influencing behavioral intentions. The result is very much congruent with both TAM and TPB models that put the attitude as the main predictor of behavioral intention. The significant path coefficient denotes that students who form positive attitudes to health-tracking

wearables that they regard as positive, entertaining, and useful have a high probability of planning to use these devices to monitor their health and track their fitness. This finding highlights the immense significance of attitude formation as a mediating construct in terms of which external variables (perceived usefulness, ease of use, social influence and health consciousness) finally affect behavioral intentions. The implication of this finding to the practitioners is that the promotion of wearable technology usage should be based on the development of positive attitudes by focusing on benefit realization, usability improvement, social proof, and health values.

6. Implications

The proposed research has a number of theoretical and practical implications on the study of wearable health technologies. Theoretically, the results can be used to expand the Technology Acceptance Model by proving that health specific and social variables can be used complementary to the conventional TAM variables in the context of wearable health technologies. The results indicate that health consciousness and social influence are important factors in shaping attitudes toward wearable devices, which aligns with previous studies highlighting the roles of personal motivation and social environment in the adoption of wearable technologies. Moreover, the results also add empirical data of a developing-country situation, emphasizing that TAM can still be helpful to explain the implementation of wearable technology among the young adults in the emerging markets.

In a real-world context, the results indicate that developers and marketers of wearable devices need to consider both usefulness and usability when designing products that are targeted at the student population. Devices which are evident in terms of health benefits and can offer easy and intuitive interfaces are more likely to create positive user attitudes. Wearable technologies can be adopted in universities and health promotion programs as well by incorporating them into wellness programs and health promotion through peer programs. Since students are socially affected, the suggestion of their peers and the visible use with student populations can be significant to wearable adoption.

Even though trust and privacy concerns were not accurately realized as a predictor in this research, they are, nevertheless, concerns that organizations ought to proactively solve. Open data management principles, data security, and user awareness of privacy concerns have the potential to enhance long-term trust and facilitate long-term adoption of wearable technologies.

6.1. Theoretical implications

The research has three contributions to the wearable health technology acceptance studies. First, it expands TAM and shows that domain-specific variables (health consciousness) and social setting (social influence) contribute to explanatory power when discussing health-tracking wearables to PU and PEOU. Second, it brings to the table evidence on a developing-country (Bangladesh) context, which assists the cross-context applicability of TAM, as well as points to possible boundary conditions. Third, the insignificance of trust and privacy issue is an indicator that these variables might differ between demographics and culture and needs to be studied further (e.g., they may be mediated by privacy literacy or prior negative experience or perceived health risk).

6.2. Practical implications

This study has useful practical implications to the various stakeholders involved in the development, marketing, and deployment of wearable health technologies. To technology developers and manufacturers, the significance of perceived usefulness and perceived ease of use on attitude should underscore the need to ensure that wearable devices have easy-to-use interfaces, easy smartphone interfaces, and the ability to demonstrate the health benefits of using the device. The developers are advised to focus on user friendly designs that are less learning and less technical oriented especially where the university students in developing countries are targeted. Also, the high importance of the health consciousness implies that marketing efforts must focus on the ability to monitor their health, track fitness, and enhance wellness to attract health-conscious students.

To university administrators and health promotion professionals, the results show that there is a possibility to incorporate wearable health technology into campus wellness programs, physical activities and health promotion campaigns. Universities can adopt more health promoting habits within their students by using social influence via peer endorsement and establishing social environments that are conducive to the use of wearable technology.

The significance of social influence to marketers and brand managers implies the possibility of influencer marketing, peer testimonials, and social media campaigns being effective in marketing wearable devices to the university students. Designing online communities, where students will be able to exchange the information about the health gains and fitness progress can contribute to increasing the social influence and motivation to adopt it. The alarming

absence of trust and privacy concerns among students can warn the policymakers about the possibility of introducing digital literacy education classes that increase awareness of the right to data privacy and the security risks, as well as the responsible use of wearable devices.

Although it is unlikely that the students are interested in privacy yet, teaching them about the protection of their data is a requirement to their future protection of their consumers and making informed decisions. Last but not least, the findings of the research indicate that the market segmentation strategy, which focuses on students who are health-conscious, might be quite effective, since the latter prove to be more receptive to wearable health technology.

7. Limitations and Future Research

While this study provides valuable insights into the factors influencing university students' acceptance of health-tracking wearables, few limitations should be acknowledged, which continuously present opportunities for future research. First, the study employed a cross-sectional research design, capturing data at a single point in time. This limits the ability to establish causal relationships and track changes in attitudes and behavioral intentions over time. Future research should adopt longitudinal designs to examine how acceptance factors evolve as students gain experience with wearable technology and as the technology itself advances.

Second, the study depends exclusively on self-reported data collected through online surveys, which may be subject to common method bias and social desirability effects despite statistical correction efforts. Future studies could incorporate objective behavioral data, such as actual usage patterns and device adoption rates, to complement self-reported intentions.

Third, the sample was limited to university students in Bangladesh, which may restrict the generalization of findings to other demographic groups, educational contexts, or cultural settings. Future research should replicate this study across diverse populations, including working professionals, older adults, and students in other countries, to assess the cross-cultural validity of the findings.

Fourth, the study focused on a relatively limited set of predictors within the extended TAM framework. Future research could explore additional factors such as perceived health benefits, device aesthetics, cost

considerations, compatibility with existing devices, and post-adoption satisfaction to provide a more comprehensive understanding of wearable technology acceptance.

Fifth, the unexpected non-significance of trust and privacy concern warrants further investigation through qualitative research methods, such as interviews and focus groups, to deeply explore students' perceptions, concerns, and awareness regarding data privacy and security in wearable technology.

Sixth, future studies could examine moderating variables such as gender, age, academic discipline, prior technology experience, and health status to identify subgroup differences in acceptance drivers. Finally, experimental or intervention-based research designs could test the effectiveness of specific strategies such as privacy awareness campaigns, peer endorsement programs, or usability training in enhancing wearable technology acceptance among university students.

8. Conclusion

This study explored the factors that influence university students' acceptance and behavioral intention toward health-tracking wearable devices in Bangladesh using an extended Technology Acceptance Model (TAM). By integrating factors such as perceived usefulness, perceived ease of use, social influence, health consciousness, trust, and privacy concern, the study provides a more comprehensive understanding of wearable technology adoption within a developing-country context.

The findings indicate that perceived usefulness, perceived ease of use, social influence, and health consciousness positively influence students' attitudes toward using health-tracking wearables. Among these, perceived ease of use and perceived usefulness were found to be the strongest predictors of attitude. In addition, attitude toward use significantly influenced behavioral intention, highlighting the important role of positive user perceptions in encouraging wearable technology adoption. However, trust and privacy concerns did not show significant effects on students' attitudes in this study.

This research contributes to the existing body of knowledge by extending the TAM framework and providing empirical evidence from Bangladesh, where studies on wearable health technology adoption are still limited. The findings also offer practical insights for wearable device developers, marketers, university

administrators, and health promotion practitioners. Focusing on user-friendly features, clear health benefits, and socially engaging strategies may encourage greater adoption of wearable health technologies among young adults. The study improves the understanding of wearable technology acceptance among university students and provides a useful foundation for future research in emerging economies.

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Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Data availability

The data that support the findings of this study are available from the corresponding author upon reasonable request.

Ethics statement

Participation was voluntary. Respondents were informed about the study purpose and provided consent before completing the anonymous online questionnaire. No personally identifying information was collected.

Appendix A. Survey measurement items

All items were measured on a seven-point Likert scale (1 = strongly disagree; 7 = strongly agree). The wording below reflects the questionnaire used in the study.

Construct	Item code	Item statement
Perceived usefulness (PU)	PU1	Using a health-tracking wearable would improve my ability to monitor my health.
	PU2	Overall, health-tracking wearables would be useful for managing my fitness and wellbeing.

	PU3	Using health-tracking wearables would help me maintain a healthy lifestyle and prevent diseases.
Perceived ease of use (PEOU)	PEOU1	Learning to operate a health-tracking wearable would be easy for me.
	PEOU2	I find health-tracking wearable devices easy to use.
	PEOU3	The interface of health-tracking wearable devices would be user-friendly and intuitive.
	PEOU4	I would require minimal training to use health-tracking wearables effectively.
	PEOU5	Syncing health-tracking wearables with my smartphone would be straightforward and uncomplicated.
	PEOU6	Navigating health data and analytics on wearable devices would be simple for me.
Trust (TRST)	TRST1	I trust that health-tracking wearables provide accurate and reliable health data.
	TRST2	I believe that wearable device providers handle my health data responsibly and securely.

	TRST3	Device manufacturers can be trusted with my personal health information and biometric data.			
Privacy concern (PC)	PC1	I am concerned that my health data collected by wearables could be misused by third parties.	Health consciousness (HC)	HC1	I am very conscious about maintaining and improving my personal health.
	PC2	I worry about the privacy of my personal health information when using wearables.		HC2	I actively look for ways to monitor and improve my health through available technologies.
	PC3	I am concerned about unauthorized access to my health data from wearable devices.		HC3	Staying healthy and preventing diseases is very important to me.
	PC4	Data privacy and security issues make me hesitant to use health-tracking wearables.	Attitude toward use (ATT)	ATT1	Using health-tracking wearables is a good idea.
Social influence (SI)	SI1	People who are important to me think that I should use health-tracking wearables.		ATT2	Using health-tracking wearables for health tracking would be a pleasant and enjoyable experience.
	SI2	My friends' use of health-tracking wearables encourages me to use them as well.		ATT3	I have a favorable attitude toward using health-tracking wearables.
	SI3	Using health-tracking wearables is becoming more common and socially accepted among my peers.		ATT4	Overall, I have a positive view of health-tracking wearables.
	SI4	My family members believe that I should use wearable devices to monitor my health.		ATT5	I believe that health-tracking wearables are beneficial for my health and wellbeing.
				ATT6	Using wearables to track health metrics is a smart personal health management strategy.
				ATT7	I like the idea of using health-tracking wearables to monitor my fitness levels.

	ATT8	Health-tracking wearables would make me feel more confident about managing my personal health.
Behavioral intention (BI)	BI1	I intend to use health-tracking wearables regularly in the future.
	BI2	I will try to use health-tracking wearables whenever they are available to me.
	BI3	I plan to use health-tracking wearables to monitor my health and fitness regularly.
	BI4	If I had the opportunity, I would use health-tracking wearables.
	BI5	I will recommend health-tracking wearables to my friends and family.
	BI6	I am committed to adopting and using health-tracking wearables as part of my daily health management routine.

References

- [1] B. K. Hensel et al., "Wearable health devices in healthcare: Narrative systematic review," *JMIR mHealth uHealth*, vol. 9, no. 11, p. e28911, 2021.
- [2] I. Veiga, T. Oliveira, M. Naranjo-Zolotov, R. Martins, and S. Karatzas, "Adoption of Internet of Things in health care: Weighted and meta-analytical review of theoretical frameworks and predictors," *J. Med. Internet Res.*, vol. 28, 2026, doi: 10.2196/64091.
- [3] S. H.-W. Chuah, P. A. Rauschnabel, N. Krey, B. Nguyen, T. Ramayah, and S. Lade, "Wearable technologies: The role

of usefulness and visibility in smartwatch adoption," *Comput. Human Behav.*, vol. 65, pp. 276–284, 2016.

[4] M. L. Cheung, K. Y. Chau, M. H. S. Lam, G. Tse, K. Y. Ho, S. W. Flint, and K. Y. Lee, "Examining consumers' adoption of wearable healthcare technology: The role of health attributes," *Int. J. Environ. Res. Public Health*, vol. 16, no. 13, p. 2257, 2019.

[5] A. Beldad and S. Hegner, "Expanding the TAM with the inclusion of trust, social influence, and privacy concern: The case of wearable fitness trackers," *Int. J. Human-Comput. Interact.*, vol. 34, no. 12, pp. 1037–1048, 2018.

[6] D. Dhagarra, M. Goswami, and G. Kumar, "Impact of trust and privacy concerns on technology acceptance in healthcare: An Indian perspective," *Int. J. Med. Inform.*, vol. 141, p. 104164, 2020.

[7] N. Hayat, A. Al Mamun, J. Gao, Q. Yang, and W. M. H. W. Hussain, "Envisaging the intention and adoption of electronic health applications among middle-aged and older adults: Evidence from an emerging economy," *Digit. Health*, vol. 10, 2024, doi: 10.1177/20552076241237499.

[8] Z. Zhang et al., "Impact of the moderating effect of national culture on wearable adoption intention," *JMIR mHealth uHealth*, vol. 10, no. 6, p. e30960, 2022.

[9] Q. Yang, A. Al Mamun, M. Wu, and F. Naznen, "Strengthening health monitoring: Intention and adoption of Internet of Things-enabled wearable healthcare devices," *Digit. Health*, vol. 10, 2024, doi: 10.1177/20552076241279199.

[10] M. S. Rahman, N. Hasan, J. Zhang, I. H. Moral, and G. M. S. Hossain, "Women's adoption of wearable health-monitoring technology: Empirical evidence from a least developed country," *Aslib J. Inf. Manag.*, vol. 77, no. 3, pp. 577–598, 2025.

[11] X. W. Tan, S. C. Ong, C. M. Christopher, M. H. Elnaem, and M. Mohammed, "Adoption and impact of wearable healthcare devices on health outcomes among Malaysian tertiary students," *Digit. Health*, vol. 11, 2025, doi: 10.1177/20552076251386666.

[12] F. D. Davis, "Perceived usefulness, perceived ease of use, and user acceptance of information technology," *MIS Quarterly*, vol. 13, no. 3, pp. 319–340, 1989.

[13] Y. Gao, H. Li, and Y. Luo, "An empirical study of wearable technology acceptance in healthcare," *Ind. Manage. Data Syst.*, vol. 115, no. 9, pp. 1704–1723, 2015.

[14] K. J. Kim and D.-H. Shin, "An acceptance model for smart watches: Implications for the adoption of future wearable technology," *Internet Res.*, vol. 25, no. 4, pp. 527–541, 2015.

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- [15] M. J. Kang and Y. C. Hwang, "Exploring the factors affecting the continued usage intention of IoT-based healthcare wearable devices using the TAM model," *Sustainability*, vol. 14, no. 19, p. 12492, 2022.
- [16] R. S. Al-Marroof, K. Alhumaid, A. Q. Alhamad, A. Aburayya, and S. Salloum, "User acceptance of smart watch for medical purposes: An empirical study," *Future Internet*, vol. 13, no. 5, p. 127, 2021.
- [17] W. W. Chin, B. L. Marcolin, and P. R. Newsted, "A partial least squares latent variable modeling approach for measuring interaction effects: Results from a Monte Carlo simulation study and an electronic-mail emotion/adoption study," *Inf. Syst. Res.*, vol. 14, no. 2, pp. 189–217, 2003.
- [18] C. Domingos, P. Costa, N. Santos, and J. Pêgo, "Usability, acceptability, and satisfaction of a wearable activity tracker in older adults: Observational study in a real-life context in Northern Portugal," *JMIR mHealth uHealth*, vol. 24, no. 1, p. e26652, 2022.
- [19] M. Methlagl, "Technological trust perceptions in wearable fitness trackers: A person-centered approach," *J. Technol. Behav. Sci.*, vol. 8, pp. 392–401, 2023.
- [20] H. Rathore et al., "Security risks and user perception toward adopting wearable Internet of Medical Things (WIoMT)," *Int. J. Environ. Res. Public Health*, vol. 20, no. 8, p. 5519, 2023.
- [21] K.-H. Hwang, "Adoption model of healthcare wearable devices," *Technol. Forecast. Soc. Change*, vol. 174, p. 121286, 2022.
- [22] V. Toftgård, "Employee acceptance of wearable fitness trackers: A privacy perspective," M.S. thesis, Uppsala Univ., Uppsala, Sweden, 2022.
- [23] K. S. L. T. Zin, S. Kim, H.-S. Kim, and I. F. Feyissa, "A study on technology acceptance of digital healthcare among older Korean adults using extended TAM," *Admin. Sci.*, vol. 13, no. 2, p. 42, 2023.
- [24] S. Hermsen, J. Moons, P. Kerkhof, C. Wiekens, and M. De Groot, "Determinants for sustained use of a physical activity app: The case of the Fitbit," *JMIR mHealth uHealth*, vol. 5, no. 10, p. e164, 2017.
- [25] K. J. Brickwood, G. Watson, J. O'Brien, and A. D. Williams, "Consumer-based wearable activity trackers increase physical activity participation: Systematic review and meta-analysis," *JMIR mHealth uHealth*, vol. 7, no. 4, p. e11819, 2019.
- [26] Z. Wang, D. Fang, X. Liu, L. Zhang, H. Duan, C. Wang, and K. Guo, "Consumer acceptance of sports wearables: The role of functional attributes," *Sage Open*, vol. 13, no. 3, p. 2158440231182653, 2023.