Investigating the Effect of Social Influence and Gender on the Willingness to Use IOT Technology in Sports: From Consumer Perspective

Received: 2023-03-29
Accepted: 2023-09-23
Vol. 4, No.4. Authumn.2023, 28-41

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Abstract

Purpose: This research was conducted with the aim of investigating the effect of social influence and gender on the willingness to use IOT technology in sports from consumer perspective. The current research was applied and correlational. The statistical population of the research was the insured athletes at least for 1 year.

Methods: According to Morgan's table, 394 people were selected as samples. Standard questionnaires were used to collect data. Data analysis was done using structural equations through SmartPLS3 software.

Results: The results of the research showed that the attitude variable has a significant effect on the willingness to use IOT technology in sports. The positive and direct effect of the social influence variable on the willingness to use was confirmed; But the relationship of social influence on attitude did not have the appropriate level of significance. Perceived ease of use has a significant effect on the variable of attitude and perceived usefulness, and the effect of perceived ease of use on perceived usefulness was greater. Also, perceived usefulness has a significant effect on the variable of willingness to use and attitude, which has a greater effect on attitude. The effect of gender as a moderating variable on social influence, attitude and willingness to use IOT technology in sports did not have an acceptable level of significance.

Conclusion: By introducing marketing 5.0 and based on the results, it is suggested that, in line with the desire to use IOT technology in sports, the perceived usefulness should increase the perceived ease of use in order to improve the attitude towards the use of this technology and ultimately increase the desire to use it.

Keywords: Internet of Things; sportswear; Sport Technology acceptance model.

Introduction

For years, technology has become an integral part of our social and personal lives, but recently, with the tremendous developments in IOT technology and sensors, the use of devices, including wearable technologies, has increased (Mitrasinovic et al., 2015). Research has shown that sports wearables account for 50% of global wearable technology unit sales, and the number of units sold is expected to increase from 61 million in 2016 to 187 million units in 2020 (Insight, 2016). Of course, it should be noted that the use of sports wearables is still in its early stages and more than 30% of users abandon their sports wearables after the novelty of the devices wears off (Moore, 2016). This usage pattern results in companies not being able to get enough data from users to better develop their products (Ledger, 2014). And on the other hand, users cannot benefit from the results of fitness and health if they do not use them for a long time. So having a better understanding of the acceptance and use of sports wearables may have significant effects on management practices and even the quality of life of user (Lee et al., 2016).

Chamorro-Koc et al., (2021) recommended that manufacturers invest in this area by consulting with users to improve the usefulness of their products. Because the many capabilities of the Internet of Things play an important role in increasing business benefits, efficiency, saving time and reducing operating costs (Nagaty, 2023). Technology acceptance by users is one of the most important success factors of a technology. If the technology is not accepted by the users or if it is weak in its acceptance, the capabilities of the system will be greatly reduced and it will cause a waste of resources. In addition, the adoption of new technologies does not happen instantly; Rather, it is a process that is formed over time and in case of continuous use and habit, successful acceptance occurs (Mollahosseini & Foroozanfar, 2019).

Momani (2020) and Kim & Wang, (2021) state that advances in technology have promised new beneficial and compelling changes in consumer behavior. Therefore, it recommends that they promote IOT as a necessary, practical, and valuable mechanism that enhances success and try to demonstrate the constructability and usefulness of IOT to increase consumer purchase intention (Nagaty, 2023).

During the last few years, most researches have paid special attention to the usefulness and ease of use as factors that determine the acceptance of information systems and information and communication technology by customers (Amin et al., 2014; Dalle, 2010; Straub et al., 1997). These constructs are the foundation of the Technology Acceptance Model (TAM), which has been widely used to describe the factors affecting the acceptance of systems by users and customers, and their purpose is to provide a description of acceptance parameters that was general and It has the ability to predict users' behaviour in a wide range of computing technologies, in this case, researchers and managers will be able to identify why a particular system may not be accepted, so that they can choose appropriate corrective steps based on that. to follow(Roberts & Henderson, 2000; Venkatesh & Morris, 2000).

Of course, it should be considered that until now the technology acceptance model has been used in various researches in the field of sports(Kehrizsangi et al., 2017; Zardoshtian & Yousefjan, 2023). But it is important to note that people will depend on the opinions of others in deciding to use a particular technology that is largely unknown or unfamiliar, so the influence of social influence as an important social force that strongly influences decisions for Acceptance of a technology shapes, becomes apparent (Shin, 2007; Venkatesh et al., 2003). In addition, gender differences can also affect its severity. But it can be stated that in the past researches in the field of TAM technology acceptance, little attention has been paid to the two important structures of social influence and

gender (Gefen & Straub, 1997). These two constructs are potentially critical to our understanding of adoption, as both can play an important role in determining how users decide to adopt and use new technologies (Venkatesh & Morris, 2000). Therefore, in this research, we investigate the effect of the variable of social influence and gender on the willingness to use IOT technology in sports .Technology Acceptance Model (TAM) is one of the most effective approaches to accept new information technologies by users(Baier & Stüber, 2010) . Based on the definition of Davis in 1989, this model seeks to explain and predict users' acceptance of information technology. This model is an adaptation of the theory of reasoned action(Kim et al., 2008), which has determined behavioural tendencies and the usefulness of using technology (Lin, 2007). In this model, perceived usefulness is defined as users' deep view of specific and practical use of the system that improves their performance at work, and ease of use refers to the degree to which users expect the use of the system to be effortless (Lee, 2009). These two beliefs are effective on the user's attitude towards using the system, and the attitude also affects the desire to use technology (Chang, 2004). Attitude is considered as a determining factor of behavioural intention and is influenced by people's beliefs, and for this reason, it is important to analyse people's real attitude towards products and services(Venkatesh et al., 2003) .

Many studies have used the technology acceptance model for the sports industry(Gholamian et al., 2022; Shekari et al., 2020). For example, in a research entitled Factors affecting the acceptance of new information technologies in the General Directorate of Sports and Youth of Isfahan province, based on the TAM model, in the form of the structures of the technology acceptance model, they came to the conclusion that the variable of attitude towards use had the greatest impact on acceptance (Kehrizsangi et al., 2017). In addition, (Furqani et al., 2017), they investigated the effect of technology acceptance on the willingness to use SMS advertisements among sports equipment consumers (a case study of Tehran) and the results in the technology acceptance model of this research showed that Perceived ease of use has a significant effect on perceived usefulness; However, the perceived ease has not had a significant effect on the attitude towards the acceptance of SMS advertising, therefore, in this research, the following hypotheses have been proposed regarding the acceptance and willingness to use IOT technology in sports:

H1: Perceived usefulness has a significant effect on the willingness to use IOT technology in sports.

H2: Perceived usefulness has a significant effect on the willingness to use IOT technology in sports with a mediating role of attitude.

H3: Perceived ease has a significant effect on perceived usefulness.

H4: Perceived ease has a significant effect on the willingness to use IOT technology in sports with a mediating role of attitude.

H5: Attitude has a significant effect on the willingness to use IOT technology in sports.

Social influence is the degree to which the consumer believes in the beliefs of others (Yang, 2010) Bearden and her colleagues in 1989 have defined social influence as the ability or readiness of the consumer to be influenced by social pressures or individual mutual influence .(Hoon Ang et al., 2001).Although in many researches such as TRA theory and Theory of Planned Behaviour (TPB), social influence has been an important determinant of intention or acceptance, but in the technology acceptance model, this variable has been completely removed (Hartwick & Barki, 1994; Taylor & Todd, 1995). But it should be noted that the variable of social influence is one of the vital and

effective factors in accepting a new technology and has many effects (Venkatesh, 2000)

In addition, some studies have concluded that these effects are evaluated differently depending on the gender of each person(Straub et al., 1997; Venkatesh & Davis, 2000). Sun and Zhang (2006) state that three characteristics determine these differences: (1) men are more pragmatic, (2) women experience more anxiety when faced with new activities, and (3) women are more strongly influenced by are their immediate environment (Sun & Zhang, 2006).

Research related to this field shows that men and women differ in the extent to which they are influenced by others(Becker, 1986; Eagly & Carli, 1981). Although the socialization patterns of women in today's society are different compared to two decades ago, it can be argued that some of the findings regarding the influence of women over men may be dated, but recent evidence has shown that women tend to They are more compatible with society, which is also consistent with the view of gender schema(Crawford et al., 1995). It is even possible to explain these gender differences in people's behaviour with social psychology and various studies. According to social psychology, men are more pragmatic and highly task-oriented and result-oriented than women (Ramkissoon & Nunkoo, 2012).

Here, it should be stated that many studies have confirmed the significant impact of the gender variable on the relationships between the variables of the TAM model (Gefen & Straub, 1997; Nysveen et al., 2005; Venkatesh et al., 2003). But the review of the literature has shown that gender can also affect the variable of social influence, for example, it can be said that women have a greater tendency to conform to the opinions of the majority compared to men (Hamza & Shah, 2014; Riquelme & Rios, 2010). So, on this basis, the following assumptions have been made in this research:

H6: Social influence has a significant effect on the willingness to use IOT technology in sports.

H7: Social influence has a significant effect on the willingness to use IOT technology in sports with a mediating role of attitude.

H8: The effect of social influence on the willingness to use IOT technology in sports is moderated by gender.

H9: The effect of social influence on the attitude towards the use of IOT technology in sports is moderated by gender.

Materials and Methods

The current research was conducted with the aim of investigating the impact of social influence and gender on the willingness to use IOT technology in sports; therefore, it is considered as applied-descriptive research. The statistical population of this research included all the athletes who got sports insurance this year, therefore, non-probability sampling method was used and 394 people were selected as the research sample using Morgan's table. Also, from the questionnaires of (Shin & Lee, 2014), (Aksoy et al., 2020), (Tan et al., 2014), (Kim & Shin, 2015) which contained 20 questions was used to get people's opinions. This questionnaire had five variables of perceived usefulness (four questions), perceived ease (three questions), social influence (five questions), attitude (four questions) and willingness to use (four questions). The scale of questions in the Likert questionnaire is five options and the reliability of the questionnaire is also calculated through Cronbach's alpha. To check the face validity, the questionnaire was given to 10 sports management professors, and to analyse the data and test the research hypotheses, structural equation modelling (SEM) was used through Smart PLS version 3 and SPSS software. Version 22 is used.

Results

In table number one, the demographic status of the research samples is reported.

Table 1. Description of the demographic characteristics of the research samples

Demographic variables of the research		Frequency	Relative Frequency percentage	Cumulative frequency percentage
Age	men	154	39.1	39.1
	women	240	60.9	100
Gender	Up to 20 years	183	46.4	46.4
	21 to 30 years	96	24.4	70.8
	31 to 40 years	72	18.3	89.1
	41 to 50 years	31	7.9	97.0
	Over 51 years old	12	3.0	100

The results of the demographic description of this research showed that most of the research samples were female (240 people) and less than 20 years old (183 people). In order to check the internal consistency of the questionnaire constructs, Cronbach's alpha index and composite reliability were used, and to check the convergent validity, the extracted average variance index was used, and the results in Table 2 show that the variables have sufficient usefulness.

Table 2. Reliability and convergent validity coefficients of research variables

Variable	Cronbach's alpha	Composite reliability	Average Variance Extracted
willingness to use	0.845	0.896	0.684
attitude	0.821	0.882	0.651
Gender on attitude	0.725	0.563	0.281
Gender on desire	0.725	0.791	0.446
Social influence	0.723	0.816	0.474
Perceived ease of use	0.630	0.794	0.563
Perceived usefulness	0.808	0.874	0.635

Also, to check the divergent validity, the Fornell-Locker index has been extracted, and based on the obtained results listed in Table 3, the divergent validity of the research variables is also confirmed.

Table 3. Divergent validity of research variables

Variable	(1)	(2)	(3)	(4)	(5)
(1) Willingness to use	0.827	-	-	-	-
(2) Attitude	0.523	0.807	-	-	-
(3) social influence	0.452	0.437	0.689	-	-
(4) perceived ease of use	0.503	0.539	0.387	0.750	-
(5) perceived usefulness	0.565	0.579	0.547	0.450	0.797

According to the researchers, the measurement model is a homogeneous model if the absolute value of the factor loadings of the observable variables is at least 0.7, although others have accepted at least 0.4 and have suggested removing the variables that have a factor loading less than 0.4. As table (4) shows, the factor loading of all research variables has a favourable condition.

Table 4. Factor loadings of obvious variables

Abbreviation	Variable name	Questions	Factor load amount
pu	Perceived usefulness	PU1	0.770
		PU2	0.850
		PU3	0.800
		PU4	0.760
PEOU	Perceived ease of use	PEO1	0.780
		PEO2	0.690
		PEO3	0.770
AT	Attitude to use	AT1	0.830
		AT2	0.770
		AT3	0.840
		AT4	0.780
AI	willingness to	AI1	0.810

	use	AI2	0.830
		AI3	0.860
		AI4	0.810
Si	Social influence	Si1	0.690
		Si2	0.770
		Si3	0.500
		Si4	0.710
		Si5	0.740

The basic value of the evaluation of endogenous variables is the coefficient of determination, which three values of 0.25, 0.5, and 0.75 indicate the small, medium, and large size of one structure over another, respectively. The values of the coefficient of determination related to the variables of willingness to use, attitude to use and perceived ease of use are respectively equal to 0.40, 0.45 and 0.20, which shows the appropriate fit of the structural model. The quality index of the structural model also examines the ability of the structural model to predict in an eye-opening way. Q2 values greater than zero indicate that the model has predictive ability. The Q2 values obtained for the variables of willingness to use, attitude to use, and perceived ease of use in this research are 0.250, 0.269, and 0.117, respectively, which shows the appropriate quality of the structural model in predicting.

Table 6 shows the results of the path coefficient analysis and significance level of this research.

Table 6. Evaluation indices of the structural model

Direction	Path coefficient	standard deviation	T level	Significance level	Result
Attitude → Willingness to use IOT technology in sports	0.264	0.053	4.985	0.00	confirmation
Social influence → Willingness to use IOT technology in sports	0.152	0.046	3.317	0.01	confirmation
Social influence → Attitude towards the use of IOT technology in sports	0.108	0.056	1.766	0.07	rejection
Social influence → Gender → Willingness to use IOT technology in sports	-0.002	0.039	0.057	0.95	rejection
Social influence → Gender → Attitude towards the use of IOT technology in sports	-0.068	0.038	1.822	0.06	rejection

Perceived Ease of Use → Attitude towards the use of IOT technology in sports	0.324	0.043	7.567	0.00	confirmation
Perceived ease of use → Perceived usefulness	0.454	0.042	10.753	0.00	confirmation
Perceived usefulness → Willingness to use technology	0.321	0.050	6.387	0.00	confirmation
Perceived usefulness → attitude to use	0.359	0.053	3.892	0.00	confirmation

According to the results listed in table (6), it can be said that the attitude variable has a significant effect on the willingness to use IOT technology in sports (p=0.00, β=0.264). The positive and direct effect of the social influence variable on the willingness to use (β=0.152, p=0.01) was confirmed; But the relationship of social influence on attitude did not have the appropriate level of significance (p=0.07). Perceived ease of use has a significant effect on the attitude variable (β=0.324, p=0.00) and perceived usefulness (β=0.454, p=0.00), and the effect of perceived ease of use on perceived usefulness is greater. Also, the perceived usefulness has a significant effect on the variables of willingness to use (β=0.321, p=0.00) and attitude (β=0.359, p=0.00), which is more influenced by the perceived usefulness of the attitude to use. The effect of gender variable on the attitude and willingness to use IOT technology in sports as a moderator also did not have an acceptable level of significance. Figure 1 shows the test results of the research hypotheses and the structural relationships between the variables of the research model.

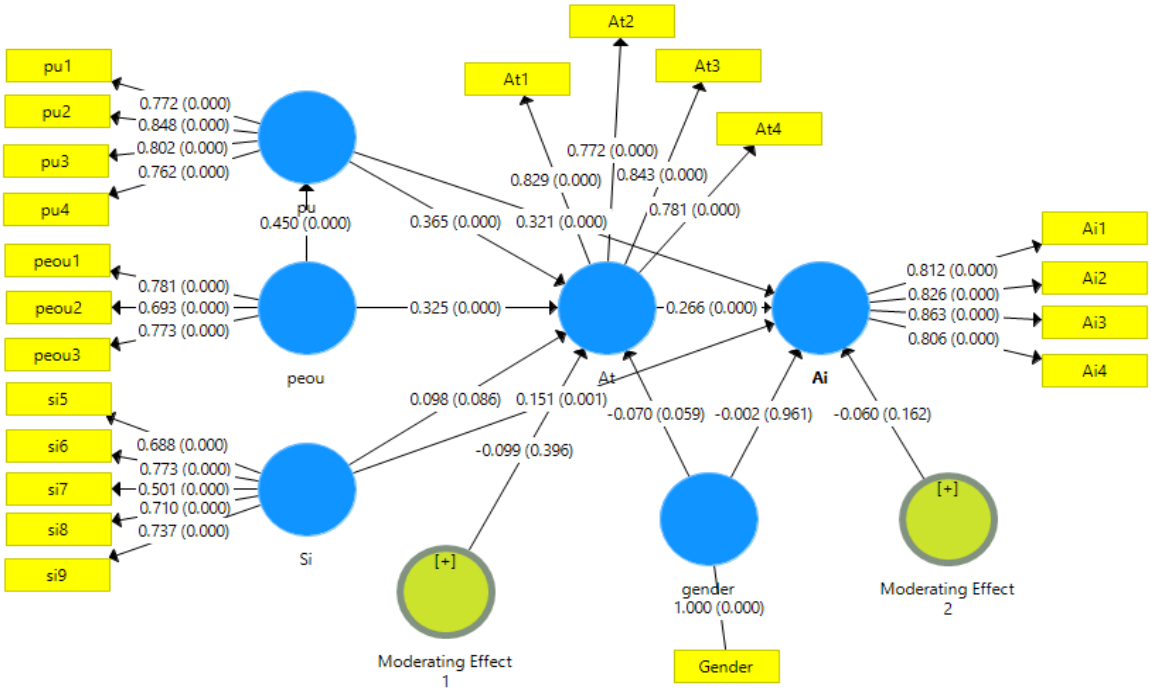

Figure 1. Structural model of the research

Discussion

Within the scope of this study, the influence of social influence and gender on the willingness to use IOT technology in sports, which represents a growing market in the sports industry, was investigated. Understanding people's attitude towards these new generation consumer products can be of vital importance from the point of view of consumer behaviour. The results of this research showed that attitude has a significant effect on the willingness to use IOT technology in sports. It is assumed that attitude is a determinant of behavioural intention and is influenced by individual's beliefs (Davis et al., 1989; Venkatesh et al., 2003) For this reason, it is important to analyse the real attitude of people towards products and services. This situation can be even more important for a relatively new product group, such as wearable devices, because one way to observe a person's behaviour that has not yet been translated into action is to examine that person's attitudes (Holbrook et al., 2005). Luuney et al. (2016) also found that if a person has a positive attitude towards a wearable fitness device, they are likely to use it, which is consistent with the results of previous researchers (Aksoy et al., 2020; Kehrizsangi et al., 2017).

Also, the results of this research showed that the variable of social influence only has a significant effect on the willingness to use IOT technology in sports, which is in line with the results of Hosseininia et al.'s research (nia et al., 2022) , but the effect of this variable on attitude was not significant, which (Tan et al., 2014) agreed. Several researches have been done in relation to social influence and its effect on attitude and willingness to use (Aksoy et al., 2020; Athena & Maryam; Venkatesh et al., 2003) which shows the importance of this variable on the willingness to use a technology. In fact, social influence is a conscious effort by an individual or a social group to change people's opinions and tastes, which will also lead to a change in behaviour patterns(Venkatesh et al., 2003)

So, the positive and significant effect of social influence on the desire to use IOT technology in sports means that effective measures can be taken by using people with high social influence in spreading this technology in sports. Of course, it should be taken into account that considering the rejection of the hypothesis of the effect of gender on the relationship between social influence and the attitude and willingness to use IOT technology in sports, the same solutions can be considered for both men and women. Hai Sun and Zhang (2006) and Hamzah Amin and Asadullah Shah (2014) are inconsistent.

The results of this research showed that the variable of perceived ease of use has a positive and significant effect on the attitude and perceived usefulness, and with the results of the research, investigating the effect of the developed technology acceptance model on the use of online education in the Corona era: a case study of physical education students Zardashtian, Yousefjan, (1400) who showed that the effect of perceived ease on perceived usefulness was greater than attitude is in line. Perceived ease of use refers to the extent to which a particular technology will require no physical or mental effort to understand, learn, and operate, and is related to intrinsic motivation by addressing the process (pleasant system experience) that facilitates the achievement of desired outcomes(Venkatesh et al., 2003)

Therefore, it is obvious that the greater the ease of using IOT technology in sports, it can affect the perceived usefulness, because it has been able to bring comfort, energy and time savings. In addition, the results of the research showed that the perceived usefulness variable has a positive and significant effect on the attitude and willingness to use IOT technology in sports, and this effect is greater on the attitude variable. The results of this research are consistent with the results of the studies of (Sukendro et al., 2020) and (Salloum, 2018). Perceived usefulness is the

second factor in the technology acceptance model and is the degree to which a person believes that using the system will increase his efficiency (Davis et al., 1989).

If athletes understand that the use of IOT technologies is very useful for them, their desire to use that technology increases, and in general, consumers turn to different analyses when buying a product or service, and when their desire to use a technology It will be more likely that they will understand a greater share of the benefit, so introducing and raising awareness of the benefits of IOT technology in sports will lead to a greater understanding of the benefits that can be taken into account by managers and provide excellent services or facilities and infrastructure to athletes in a way that can save money. Consideration and concreteness in their time, cost and energy will lead to a greater understanding of usefulness and a higher willingness to use.

Conclusion

The importance of sports wearable technologies such as sports smart watches, wristbands and heart rate monitors is that they have been able to greatly change the way we exercise, live and work. Despite the fact that the number of devices connected to the Internet is increasing, it can be said that it affects different aspects of people's lives, but few researchers have paid attention to the acceptance behaviour or the desire of users for sports wearables. Dramatic advances in technology have caused changes in consumption patterns and have had significant implications for products and brands, promoting advanced marketing techniques to influence businesses around the world to meet the needs of the modern market. Process technologies are forced to strengthen the link with digital marketing capabilities. Today, new technologies have allowed marketers to penetrate deeper into the market space, so they feel the changing customer needs, and perhaps this dynamic interaction in the market uses modern technologies to increase consumer participation, and as a result Improves company performance (Denga & Rakshit, 2023).

By introducing marketing 5.0 and based on the results, it is suggested that, in line with the desire to use IOT technology in sports, the perceived usefulness should increase the perceived ease of use in order to improve the attitude towards the use of this technology and ultimately increase the desire to use it. Although the variable of social influence and the moderating role of gender were used in this research, it is still possible to include different structures in the model to discover different aspects of the acceptance of this technology. In addition, using a more comprehensive approach, it is possible to analyse wearable devices with different purposes such as entertainment, specialization and communication in different sports communities. For example, the differences between smart watches and fitness wristbands can be examined in terms of behavioural outcomes related to attitude, intention, actual use, etc. Also, due to the fact that the motivation and purpose of athletes to do sports and use sports equipment and wearable technologies can be different, so the investigation in this field is also suggested. Solutions such as launching advertising campaigns with the aim of influencing people's attitudes, introducing the performance and usefulness of this technology along with its competitive advantage, simple and easy design, and even benefiting from celebrities and famous people due to their popularity and influence among people in society, emphasizing the use of Products based on IOT technology are suggested in sports.

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