



# Impact Of Body Area Network (BAN) Market Products Towards Adoption Intention Of Wearable Fitness Devices Among Iot Customers In Bengaluru City-A Study

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## ARTICLE INFO

## ABSTRACT

The increasing demand for Body Area Network (BAN) products, a subset of the Internet of Things (IoT), has led to a surge in consumer interest, especially in wearable fitness devices (WFDs). This study aims to thoroughly understand the adoption of wearable fitness devices by reviewing existing literature on the subject. Additionally, the study intends to gather data from IoT customers through a survey to gain insights into their adoption intention and the impact of users' awareness, usability, and benefits of BAN market products. The study will be conducted in the Bengaluru city area, specifically focusing on IoT customers, and will use a purposive sampling method to collect data. The findings of this study will be valuable to manufacturers and marketers of wearable fitness devices, as well as researchers in the healthcare technology field. By understanding the factors that influence customers' adoption intention, manufacturers and marketers can tailor their marketing strategies and product development to meet the needs of their target audience. Moreover, the study will contribute to the advancement of knowledge in the field of healthcare technology by providing insights on the adoption of wearable fitness devices in the context of IoT customers.

To test the hypothesis, the study will employ ANOVA and regression analysis. The results of the study will provide a comprehensive understanding of the adoption of wearable fitness devices in the Bengaluru city area, and will serve as a useful reference for future studies in this field.

**Key Words:** Body Area Network, IoT Customers, Wearable fitness devices.

## 1. Introduction:

Wearable fitness devices have gained popularity as more people seek to improve their health and fitness. However, there are some challenges to their adoption, such as high cost, limited functionality, and lack of awareness. One potential solution to these issues is the integration of Body Area Network (BAN) products into these devices, which could enhance the user experience. This study aims to investigate the impact of BAN market products on the adoption of wearable fitness devices among IoT customers. The goal is to gain insights into the potential of BAN products to drive adoption and identify factors that influence customers' decision-making process. The research is significant because the adoption of wearable fitness devices has the potential to revolutionize healthcare and improve public health outcomes. However, additional research is needed to fully understand the factors that influence adoption. This study contributes to the existing literature by providing empirical evidence of the impact of BAN market products on the adoption of wearable fitness devices.

Health Consciousness was found to have no significant association with the intention to use WFDs. Conversely, Health Motivation played a crucial role in the actual adoption of these devices (Hayat et al., 2023).

## 2. Review of Literature:

The literature on the adoption intention of wearable fitness devices (WFDs) often considers the impact of various factors, including technological attributes, consumer behavior, and market trends.

Wearable devices present potential benefits for the health and life insurance industries, but they face some acceptability constraints when it comes to older adults. Barton et al. (2017) suggests that this could be a market driver for technology adoption.

In South Africa, the adoption of wearable activity trackers among Generation Y consumers is influenced by design aesthetics and brand name, which suggests that these factors play an important role in the intention to use WFDs (MULLER & KLERK, 2020).

Moreover, affective factors have been identified as key determinants of consumers' intention to adopt wearables in the U.S. Zhang and Mao (2023) found that price also plays a significant role in the decision to adopt wearables.

Research in developing countries like India and the Philippines highlights the influence of perceived benefits and individual characteristics on the intention to adopt WFDs, with country and gender differences affecting marketing strategies (Pandey et al., 2021). The awareness of wearable fitness trackers and factors such as consumer attitudes and health interests significantly associate with adoption intentions (Lee & Lee, 2018).

Continuance intention to use WFDs is influenced by technology innovativeness and eHealth literacy, with gender-specific responses to eHealth literacy improvements (Sun & Gu, 2022). The intention to use WFDs is significantly influenced by technology-level attributes, while health motivation plays a crucial role in the actual use of WFDs (Hayat et al., 2023). The unified theory of acceptance and use of technology (UTAUT) model shows that performance expectancy and effort expectancy are significant for both adopters and non-adopters of fitness wearables (Reyes-Mercado, 2018). Finally, the introduction of wearable fitness trackers in Corporate Wellness Programs may have negative implications for job satisfaction and employee well-being, suggesting potential unintended consequences of WFDs in the workplace (Giddens et al., 2019).

In summary, the adoption intention of wearable fitness devices is multifaceted, influenced by technological attributes, consumer perceptions, and market dynamics.

## 3. Statement of Problem:

The existing literature review reveals that extensive research has been conducted to identify the key factors influencing the purchase of wearable fitness devices in the BAN market. This study will focus on exploring the impact of two specific factors: the usability and awareness of IoT customers, as well as the benefits of BAN market products. The study also aims to investigate how these factors influence potential customers' intention to adopt wearable fitness devices in the BAN market. By doing so, the study will provide a more comprehensive understanding of the factors that drive the adoption and usage of these devices. Ultimately, this information can be utilized by businesses to develop more effective marketing and promotional strategies for their wearable fitness devices, and by consumers to make informed purchasing decisions.

## 4. Research Design:

### ✚ Objectives:

- ✓ To analyse the relationship between awareness of IoT products and adoption intention of wearable fitness devices.
- ✓ To examine the impact of awareness and usability of BAN market products towards adoption intention wearable fitness devices among IoT customers.
- ✓ To examine the impact of benefits of BAN market products adoption intention wearable fitness devices among IoT customers.

✚ **Data Collection Method:** It includes both primary and secondary.

✚ **Statistical Tools used:** Descriptive, ANOVA, Regression and SMART PLS.

✚ **Sampling Technique:** Purposive sampling among IoT customers in Bengaluru city.

✚ **Sample Collection:** Targeted Respondents: 120, Response Received: 133.

✚ **Limitation of the study:** The study only covers Bengaluru city from December 2023 to March 2024, so the findings are limited to this area and time period.

## 5. Data Analysis:

### i. Table representing the age distribution of respondents:

Frequencies of Age			
Age	Counts	% of total	Cumulative %
Upto 30 Years	62	46.6%	46.6 %
31- 40 Years	51	38.3%	85.0 %
41 years -50 Year	20	15%	100.0 %
51 years & above	Nil	--	

			Nil
TOTAL	133	100%	

As per the data presented in the table, it can be observed that the highest percentage of respondents, which is 46.6%, belong to the age group of up to 30 years. The age group of 31-40 years comprises 38.3% of the respondents, which is the second-highest group. The remaining 15% of the respondents belong to the age group of 41-50 years.

This data can provide valuable insights into the age distribution of the respondents and can be useful in understanding their preferences and behaviors. It can also be used for further analysis of the data to draw meaningful conclusions.

## ii. Table representing the academic qualification of respondents

Frequencies of Academic Qualifications:			
Academic Qualification	Counts	% of Total	Cumulative %
Upto SSLC / Diploma	7	5.3%	5.3 %
PUC/ Degree	80	60.15%	65.4 %
PG /Professional Courses	46	34.5%	100.0 %
TOTAL	133	100%	Nil

According to the table provided, the majority of the respondents, specifically 60.15%, have completed their education up to PUC/Degree level. 34.5% of the respondents have completed their education up to PG/Professional courses, while the remaining 5.3% have completed their education up to SSLC/Diploma courses. The data from the table indicates that a significant percentage of the respondents have pursued higher education, with a majority of them having completed PUC/Degree level courses.

## iii. Table representing the awareness of IoT products

Frequencies of Aware of IoT products			
Awareness of IoT products	Counts	% of Total	Cumulative
Partially Aware	29	21.8 %	21.8 %
Fully Aware	85	63.9 %	85.7 %
Not Aware	19	14.3 %	100.0 %

Based on the data presented in the table, it can be observed that a significant majority of 63.9% of individuals surveyed had a complete understanding of IoT products. On the other hand, 21.8% of respondents had a limited understanding of IoT products, while 14.3% of individuals had no awareness of IoT products at all. These findings suggest that there may be a need for further education and awareness campaigns to promote the benefits and potential applications of IoT products.

## iv. Table representing the frequency of using IoT products for physical fitness

Frequency of Using IoT products for physical fitness			
Frequency of Usage	Counts	% of total	Cumulative %
Frequently	103	77.4 %	77.4 %
Rarely	23	17.3 %	94.7 %
Not Applicable	7	5.3 %	100.0 %

According to the data presented in the table, it can be observed that a significant number of respondents seem to be utilizing IoT products for physical fitness. Specifically, out of all the respondents, 77.4% reported using IoT products for physical fitness purposes. This could indicate the growing popularity of IoT devices for tracking fitness-related activities such as steps taken, calories burned, and heart rate. Additionally, 17.3% of the respondents reported using IoT products for physical fitness purposes, but only rarely, which could suggest that they might not be fully convinced of the benefits of these devices. Furthermore, 5.3% of the respondents reported that they do not use IoT products for physical fitness purposes at all, which could be an indicator of a lack of awareness or interest in these types of devices.

## v. Realibility Analysis of the constructs used in the study

Scale Reliability Statistics- Awareness and Usability of BAN market products	
	Cronbach's $\alpha$
scale	0.894

Item Reliability Statistics				If item dropped	
ITEMS TESTED UNDER AWARENESS AND USABILITY			SD	Cronbach's $\alpha$	
I am aware of the use of nanotechnologies in the development of BAN market products – AW2.			1.020	0.842	
I am knowledgeable about the different data transmission techniques used in BAN market products - AW3.			0.978	0.873	
I am aware of the power consumption challenges in BAN market products-AW4.			0.991	0.908	
I am aware of the bandwidth limitations in BAN market products-AW5.			0.953	0.827	

Scale Reliability Statistics- Benefits of Using BAN Market products	
	<b>Cronbach's <math>\alpha</math></b>
scale	0.954

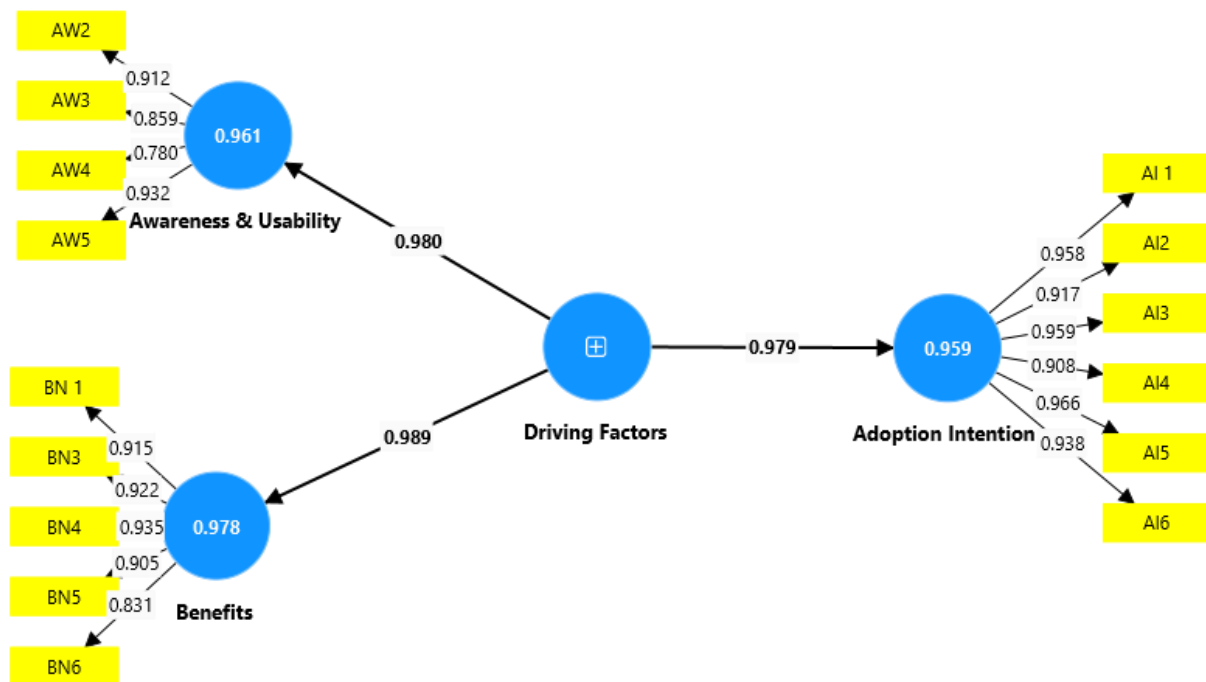
Item Reliability Statistics			If item dropped			
ITEMS TESTED UNDER BENEFITS OF USING BAN MARKET PRODUCTS		SD	Item-rest correlation	Cronbach's $\alpha$		
BAN market products improve the quality of life by offering continuous health monitoring- BN1.		0.889	0.849		0.948	
BAN market products provide valuable data for healthcare and government organizations- BN3.		0.811	0.923		0.938	
BAN market products support intelligent decision-making in healthcare—BN4.		1.110	0.909		0.940	
BAN market products are beneficial in emergency situation detection- BN5.		0.917	0.833		0.950	
BAN market products are crucial for the health monitoring of the elderly population- BN6.		1.013	0.889		0.941	

Scale Reliability Statistics-Adoption Intention	
	<b>Cronbach's <math>\alpha</math></b>
scale	0.971

Item Reliability Statistics				If item dropped	
ITEMS USED UNDER ADOPTION INTENTION		SD	Item-rest correlation	Cronbach's $\alpha$	
I am likely to adopt BAN market products if they are convenient to use- AI 1.		1.011	0.932	0.962	
I would intend to use BAN market products if they were perceived as irreplaceable in monitoring health - AI 2.		0.700	0.881	0.971	
I believe BAN market products health benefits influence intention to adopt them- AI 3.		1.004	0.941	0.961	
I believe that social influence affects the decision to adopt BAN market products - AI 4.		0.818	0.871	0.969	
I believe that lifestyle compatibility impacts the intention to use BAN market products - AI 5.		1.059	0.952	0.961	
I believe that trust in the technology influence the intention to adopt BAN market products - AI 6.		1.064	0.916	0.965	

**Table representing the Outer Loadings of Measurement Model of items using SMART PLS**

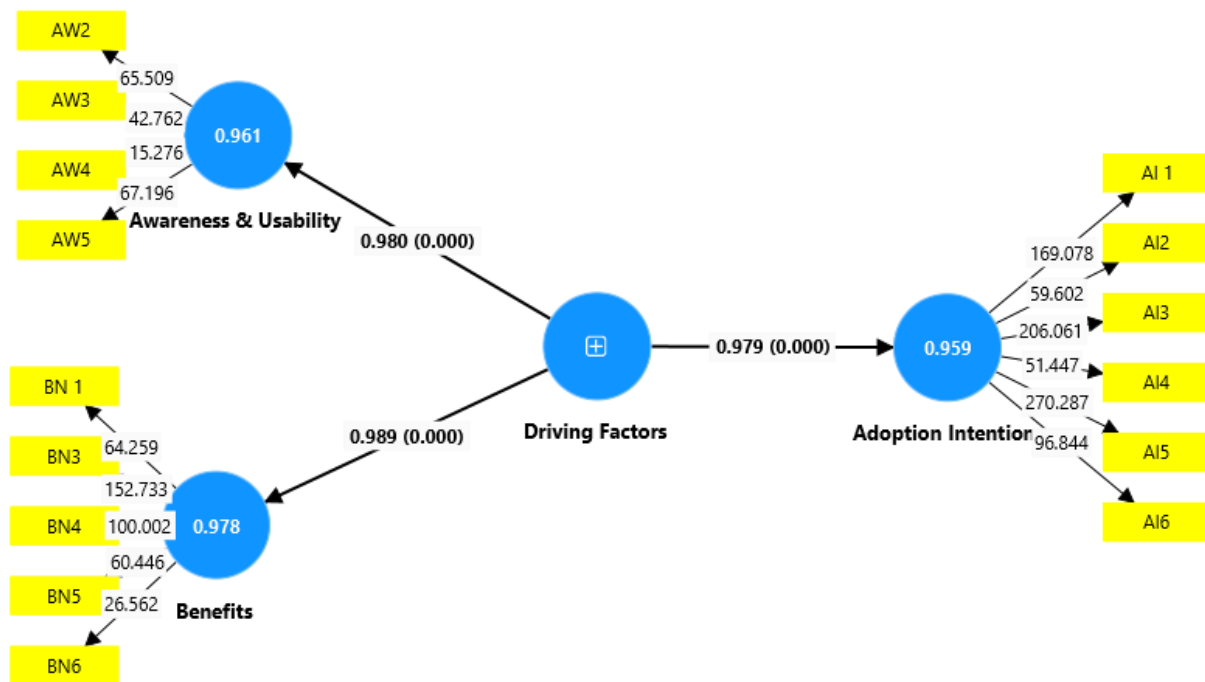
	Adoption Intention	Awareness & Usability	Benefits	Driving Factors
AI 1	0.958			
AI2	0.917			
AI3	0.959			
AI4	0.908			
AI5	0.966			
AI6	0.938			
AW2		0.912		
AW2				0.905
AW3				0.853
AW3		0.859		
AW4		0.78		
AW4				0.739
AW5				0.912
AW5		0.932		
BN 1			0.915	
BN 1				0.879
BN3				0.886
BN3			0.922	
BN4				0.937
BN4			0.935	
BN5				0.907
BN5			0.905	
BN6			0.831	
BN6				0.851

**Figure: Outer Loadings of Measurement Model****Table representing the reliability and validity**

	Cronbach's alpha	Composite reliability	Composite reliability	Average variance extracted (AVE)
Adoption Intention	0.974	0.975	0.979	0.886
Awareness & Usability	0.894	0.903	0.927	0.762
Benefits	0.943	0.944	0.956	0.815
Driving Factors	0.962	0.964	0.967	0.767

**VIF Results:**

Path	VIF
Driving Factors -> Adoption Intention	1
Driving Factors -> Awareness & Usability	1
Driving Factors -> Benefits	1



**Figure: Bootstrapping estimates of PLS SEM Model**

- ✚ **Objective: 1** To analyse the relationship between awareness of IoT products and adoption intention of wearable fitness devices.

#### One way ANOVA

H<sub>0</sub>: There is no significant relationship between awareness of IoT products and adoption intention

H<sub>1</sub>: There is a significant relationship between awareness of IoT products and adoption intention

One-Way ANOVA (Welch's)					
	F	df1	df2	p	
Avr AI	6.24	3	6.07	0.028	

Inference: According to the data presented in the table, the statistical analysis indicates a p-value of 0.028, which suggests a significant correlation between the level of awareness of IoT (Internet of Things) products and the likelihood of individuals to adopt wearable fitness devices. In other words, the findings suggest that people who are more familiar with IoT products are more likely to show an interest in using wearable fitness devices. This information could be valuable for businesses and marketers who are looking to target specific demographics with their wearable fitness technology products.

- ✚ **Objective: 2** To examine the impact of awareness and usability of BAN market products towards adoption intention of wearable fitness devices among IoT customers.

#### Regression Analysis:

H<sub>0</sub>: There is no significant impact of benefits of BAN market products towards adoption intention of wearable fitness devices.

H<sub>1</sub>: There is a significant impact of benefits of BAN market products towards adoption intention of wearable fitness devices.

Model Fit Measures		
Model	R	R <sup>2</sup>
	0.986	0.972

Model Coefficients - Avr AI									
Predictor		Estimate		SE		t		p	
Intercept		0.400		0.0524		7.63		< .001	
AVG Benefits- BAN		0.836		0.0142		58.84		< .001	

Inference: The R<sup>2</sup> value of 0.972 in the above model fit measure suggests that there is a strong correlation between the benefits of Body Area Network (BAN) market products and the adoption intention of wearable fitness devices. This means that users who perceive greater benefits of BAN market products are more likely to adopt wearable fitness devices. Additionally, the p-value of <0.001 indicates that the impact of these benefits on the adoption intention of wearable fitness devices is statistically significant. In other words, it is highly unlikely that this result is due to chance. Overall, this information suggests that BAN market products play an important role in driving the adoption of wearable fitness devices.

✚ **Objective: 3 To examine the impact of benefits of BAN market products towards the adoption intention of wearable fitness devices.**

#### Regression Analysis:

H<sub>0</sub>: There is no significant impact of awareness and usability of BAN market products towards adoption intention of wearable fitness devices

H<sub>1</sub>: There is a significant impact of awareness and usability of BAN market products towards adoption intention of wearable fitness devices

Model Fit Measures		
Model	R	R <sup>2</sup>
	0.955	0.913

Model Coefficients – Average of Awareness and Usability									
Predictor		Estimate		SE		t		p	
Intercept		0.659		0.0869		7.59		< .001	
Avg Awareness and Usability		0.768		0.0236		32.54		< .001	

Inference: The R<sup>2</sup> value of 0.913 obtained from the model fit indicates a very strong correlation between the level of awareness and usability of BAN (Body Area Network) market products and the adoption intention of wearable fitness devices. This means that if people are more aware of and find BAN market products easier to use, they are more likely to adopt wearable fitness devices. The p-value of <0.001 is a statistical measure that confirms this relationship is significant and not just by chance. This finding is important as it underscores the crucial role of promoting awareness of and usability of BAN market products in driving the adoption of wearable fitness devices.

#### Findings and Conclusion of the Study :

The study referred to above provides in-depth insights into the growing trend in the Body Area Network (BAN) market, which is the use of wearable technology. The research highlights that people who have knowledge about the Internet of Things (IoT) are highly inclined to use wearable fitness devices. The statistical significance of this inclination is evident through the p-value of 0.028, which was obtained through ANOVA analysis.

To further investigate the relationship between awareness, usability of BAN products, and the benefits of wearable fitness devices in the BAN market, a regression analysis was conducted. The findings of this analysis revealed that awareness and usability of BAN products, as well as the benefits offered by wearable fitness devices, are highly correlated. The high r<sup>2</sup> values of 0.972 and 0.913, respectively, indicate the strength of this correlation. This emphasizes the importance of these factors in influencing the adoption of wearable fitness devices in the BAN market.



In conclusion, this study provides valuable insights into the growing trend of wearable technology in the BAN market. It highlights the significance of awareness, usability of BAN products, and the benefits of wearable fitness devices in shaping the adoption of these devices.

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