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An Analysis of the Emerging Market and Future Trends of Smart Wearable in Indian Fitness Periphery

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Abstract

This is a study to find the growth potential in the smart fitness wearables market and understanding about the consumer's perception for the same. Fitness trackers have become extremely popular and accessible to the general public. The global fitness tracker market was valued at USD 36.34 billion in 2020 and is expected to grow at a CAGR of 15.4% between 2021 and 2028, from USD 36.34 billion in 2020 to USD 114.36 billion in 2028. According to our calculations, the global market will grow by 19.5% in 2020. COVID-19 has had an unprecedented and staggering global impact, with fitness trackers experiencing a positive demand shock across all regions as a result of the pandemic. The decrease in CAGR is due to this market's demand and growth, which will return to pre-pandemic levels once the pandemic is over. We went with a descriptive research type because, the objective of research is to explore the characteristics of various aspects, such as the market potential for a product or the demographics and attitudes of consumers who buy the product which will help us better understand the future of the industry. The sampling technique adopted was simple random sampling, which helped gather and analyse 125 certified respondents, which helped us getting to the conclusion that the industry will grow rapidly, given the manufacturers integrate more advanced features and focus towards increasing its accuracy making it more reliable and try to make it more affordable within Rs. 4,000.

Keywords

Smart wearables;

Fitness tracking;

Technology adoption

1. INTRODUCTION

What are smart wearable devices

Smart wearables are electronic devices that can be worn on the body or integrated into clothing, accessories, or even implantable devices. These smart devices are designed in such a manner so that they can collect, analyse, and display data about your health, fitness, activity level, and other related information. Smart wearables can communicate with other devices, such as smartphones, to provide real-time feedback, alerts, and notifications. Examples of smart wearables are smart watches, fitness trackers, smart glasses and smart clothing. A smartwatch is a wrist-worn device that can tell the time, receive calls and messages, and monitor fitness and health data. Fitness trackers are designed to monitor physical activity and vital signs such as heart rate and sleep quality. Smart glasses are glasses with built-in displays that can provide augmented

reality information or show notifications. Smart clothing is equipped with sensors that can track physical activity, monitor vital signs, and provide feedback on posture and shape. The data which is collected by smart wearable devices can be used for a variety of purposes, including: For example, monitoring fitness progress, tracking sleep patterns, and detecting medical conditions. As smart wearable devices are increasingly becoming more popular, the market for these devices is expected to grow in the coming years due to new advancements in technology and applications.

Inception of smart wearable

The beginnings of smart wearable devices can be traced back to when the first portable calculators and digital clocks were developed in the 1970s. These early devices not only performed basic calculations and told time; they paved the way for the development of more advanced wearable technology. The modern era of smart wearables began in the early 2010s with the introduction of fitness trackers like the Nike+ FuelBand and Fitbit. These devices are designed to help track the physical activity and provide its users with feedback on their fitness progress. Apple in 2014, released its first smartwatch, the Apple Watch. This Apple Watch combines fitness tracking with features like messaging, calling, and mobile payments. Other major players in the smart wearables market consist of Samsung, Google and Garmin. As technology advances, so do smart wearables. Today, smart wearables can perform a variety of functions, from monitoring vital signs and providing health and wellness insights to augmented and virtual reality experiences. The future is bright for smart wearable devices, and even more advanced and sophisticated devices are likely to emerge in the future. As technology continues to advance, smart wearables will play an increasingly important role in our daily lives.

Figure 1 - Global market leaders in the smart wearables market.

Market size of smart wearable devices

The global wearable technology market is valued at $61.30 billion by 2022 and is projected to grow at a compound annual growth rate (CAGR) of 14.6% from 2023 to 2030. Increasing consumer adoption of wearable technology products is driving industry growth. These devices help monitor health vitals by monitoring cholesterol levels, calories burned, oxygen levels, etc. through sensors. In addition, several companies, such as Fitbit, Samsung, Noise and Fossil Group, Inc., are introducing wearable technology watches and other similar devices with health monitoring solutions. Such a feature is expected to attract consumers as it helps them check their health, paving the way for the growth of the market. North America leads the global industry by 2022 and accounts for a maximum share of 33.80% of global sales, followed by Asia-Pacific and Europe. The adoption of high technology and the ease of offering new product launches have been the main growth drivers for the regional market. Devices that promote health, facilitate preventive treatments and help manage chronic diseases are increasingly in demand in the region. According to the National Library of Medicine, 30% of Americans use wearable health technology. The Asia-Pacific region is expected to record the fastest growth rates from 2022 to 2030. The consumer electronics application segment dominates the industry in 2022 and holds the highest market share with over 48.95% of total revenue. The increase in the use of wearable technologies, such as fitness bands and AR/VR headsets, can be attributed to the high market share of this segment. Many manufacturers, such as

Garmin Ltd., Omron and Apple Inc., which focus on creating data delivery utilities that combine both clinical and nonclinical information.

Countries manufacturing

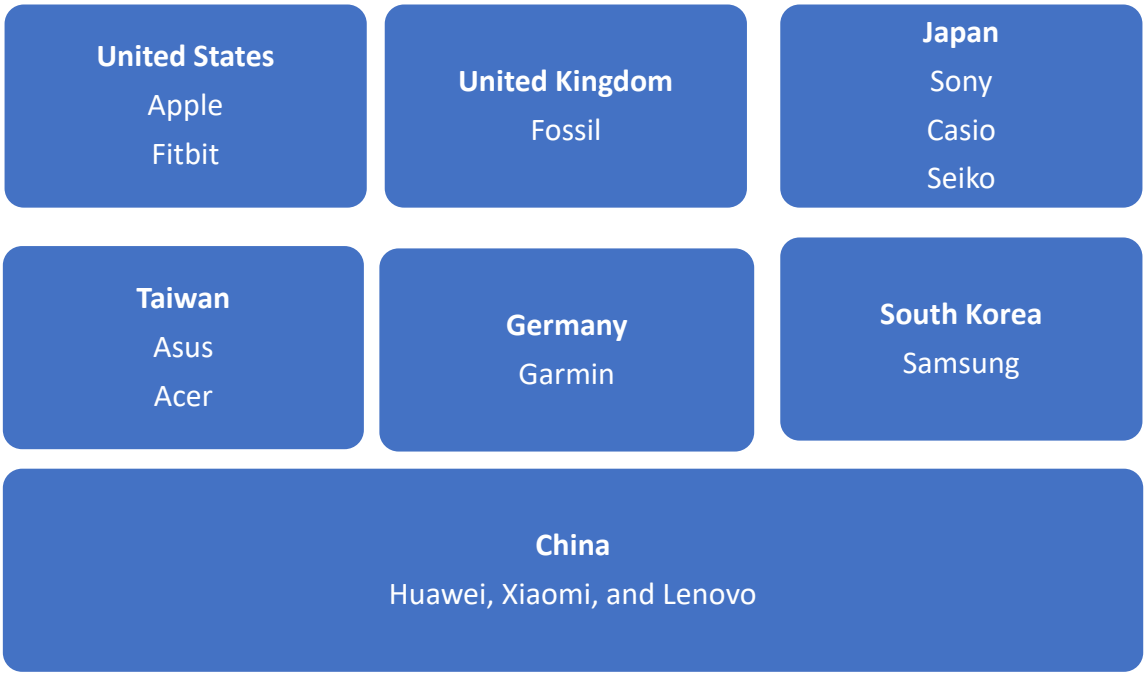

Figure 2 - Country-wise top manufacturers.

Countries with highest sale

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Medicine, 30% of Americans use wearable health technology. The Asia-Pacific region is expected to record the fastest growth rates from 2022 to 2030. The consumer electronics application segment dominates the industry in 2022 and holds the highest market share with more than 48.95% of the overall market. The following countries have the highest sales of smart clothing:

United States: The United States has always been one of the main markets for smart clothing due to its large population of tech-savvy people and demand. high for consumer goods. The United States has seen strong sales of smartwatches, fitness trackers, and other wearables thanks to brands like Apple, Fitbit, and Garmin.

China: As one of the world's leading manufacturers of consumer electronics, China has seen a sharp increase in sales of smart wearables. China has a large and growing market for smartwatches and fitness trackers, and local manufacturers like Huawei, Xiaomi and Lenovo are particularly well known there.

Japan: This country has seen significant smart wearable sales due to its tech-savvy population and strong interest in wearables. Japan-based companies such as Sony and Casio are making a variety of smartwatches and fitness trackers.

Korea: With a strong focus on technology and innovation, South Korea is also a major player in the smart wearables market. The country has a large market for wearable technology, with manufacturers like Samsung and LG producing a wide range of smartwatches and fitness trackers.

UK: With consumers favouring brands like Fossil and Fitbit, the UK also saw strong sales in the wearables sector. People in the country are technology-conscious and interest in wearable technology is growing.

events. The increase in the use of wearable technologies, such as fitness bracelets and AR/VR headsets, can be attributed to the high market share of this segment. Many manufacturers, such as Garmin Ltd., Omron, Apple Inc. and Nemaura, which focus on creating data delivery utilities that combine both clinical and nonclinical information. For example, Nemaura's sugarBEAT wearable technology eliminates the routine of daily finger calibration by enabling frequent blood glucose monitoring in diabetics.

Trend of sale in emerging economies

Smart wearables are becoming increasingly popular in emerging economies due to their functionality, convenience, and affordable prices. These devices can monitor health and fitness, provide notifications, and perform many other tasks.

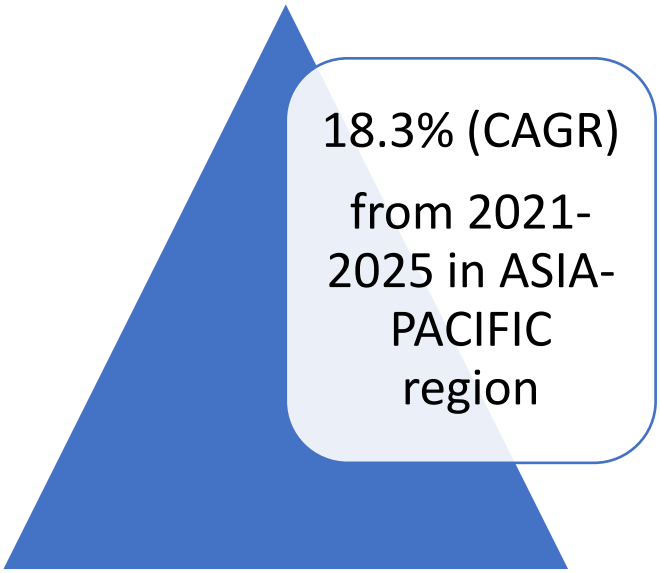

Figure 3 - Growth of smart wearables in Asia-Pacific region.

As a result, their adoption rates are increasing in these markets. Smartwatches are the most popular type of smart wearable in emerging economies, followed by fitness trackers. In India, for example, the smartwatch market has grown significantly in recent years, fueled by growing health awareness and the popularity of wearable technology. According to a report by Counterpoint Research, the Indian smartwatch market grew by 139% year-on-year in the first quarter of 2021.

Similarly, in China, the smart clothing market is expected to reach a value of $12.6 billion by 2025, with smartwatches accounting for the majority of sales. In Southeast Asia, smart wearables are also gaining popularity, with countries like Indonesia and Vietnam seeing a spike in demand for these devices.

Overall, the trend of smart wearable sales in emerging economies is expected to continue to grow in the coming years as these devices become more affordable and offer more advanced features.

Data pre and post pandemic of sale

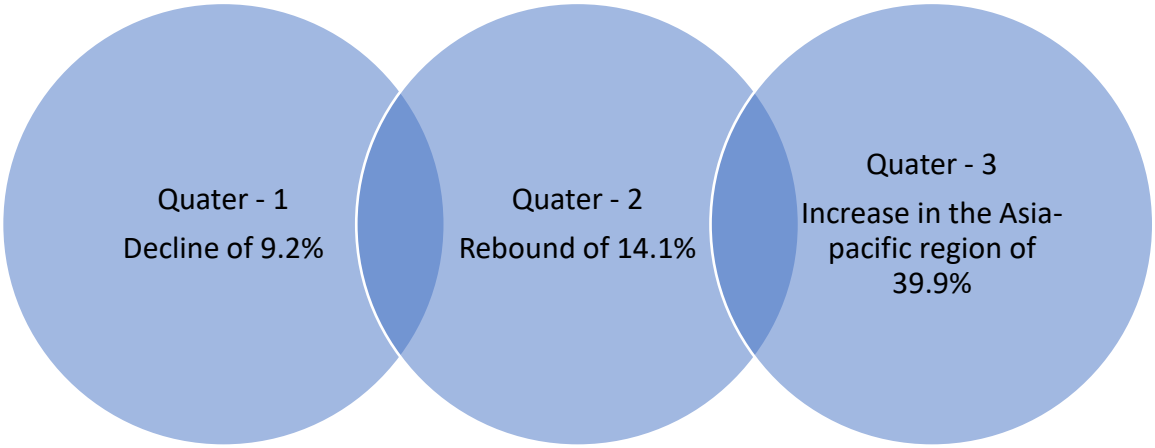

Figure 4 - Market trend during covid.

The COVID-19 pandemic has had a significant impact on sales of smart wearables. Initially, the pandemic negatively impacted the market, with supply chain disruptions and reduced consumer spending. However, as the pandemic continues, people are increasingly focusing on health and fitness, leading to an increase in demand for smart wearables.

According to a report by International Data Corporation (IDC), global wearable device shipments in the first quarter of 2020 decreased by 9.2% compared to the same period in 2019. However, by the second quarter of 2020, the market has declined. witnessed a strong recovery, with an annual growth rate of 14.1%. In terms of specific types of smart wearables, the pandemic has had different impacts. Sales of smartwatches, which offer features like health monitoring and remote communication, have seen a surge in demand during the pandemic. In contrast, sales of basic fitness trackers, which offer fewer features than smartwatches, have seen demand drop.

In terms of regional trends, the Asia-Pacific region experienced the strongest growth in smart apparel sales during the pandemic. According to IDC, the region saw a 39.9% year-on-year increase in smart clothing shipments in Q3 2020. Overall, although the pandemic initially had a negative impact on the sales of smart wearables, the market recovered strongly as people became more and more focused on health and fitness.

In particular, smartwatches are in increased demand, while basic fitness trackers are in decline. The Asia-Pacific region has seen the strongest growth in smart clothing sales during the pandemic.

Smart wearable features that are popular

Smart wearables are devices that are worn by the person and are equipped with a variety of sensors and wireless connections that allow them to interact with other devices and the Internet. Some popular smart wearable device features include:

1. Health monitoring:
   This is one of the most popular features of smart wearables, allowing users to track physical activity, steps taken, calories burned, and fitness and other health related metrics.
2. Heart rate monitor:
   Smart wearables can also monitor a user's heart rate, allowing them to monitor their heart health and fitness level.
3. Sleep tracking:
   Many smart wearables can track a user's sleep patterns, including the amount and quality of sleep, and provide insights on how to improve sleep patterns.
4. Notifications and alerts:
   Smart wearables can receive notifications and alerts from the user's smartphone, such as incoming calls, messages, and social media notifications.
5. GPS and navigation:
   Some smart wearables, such as smartwatches, can provide GPS positioning and positioning capabilities, allowing the user to get directions and navigate their surroundings without using the phone. smart.
6. Voice assistant integration:
   Many smart wearables have built-in voice assistants, such as Amazon's Alexa, Google Assistant, or Apple's Siri, allowing users to use their voice to control various functions and tasks.
7. Mobile payment:
   Some smart wearables, such as smartwatches, support mobile payments, allowing users to pay for items with the wearable instead of their smartphone or credit card.
8. Waterproof:
   Many smart wearables, especially fitness trackers, are water resistant, making them suitable for use while swimming or other water activities.

9. Music playback:

   Wearables can also play music, allowing users to listen to their favourite songs and playlists on the go without having to carry a smartphone.

10. Personal safety features:

    Some smart wearables, such as smartwatches or smart jewellery, have personal safety features, such as an emergency SOS button or automatic fall detection, that can send Notify emergency services or designated emergency contacts.

Why smart wearable

There are several compelling reasons why someone might want to buy a smart wearable:

1) Health and fitness tracking:

   Many smart wearables, such as fitness trackers and smartwatches, have built-in sensors that allow them to track various health metrics like heart rate, steps taken, and calories. calories are burned. This information can help users stay motivated and make informed decisions about their health and fitness.

2) Convenience:

   Wearables are designed to be worn on the body, making them easy to access and convenient for checking notifications, making calls, or tracking fitness data. They can also free up your hands, allowing you to multitask while staying connected.

3) Personal safety:

   Some smart wearables come with personal safety features like an emergency SOS button or automatic fall detection, which can provide peace of mind and grant quick access to help in an emergency.

4) Productivity:

   Smart wearables can help you stay organized and productive by providing quick access to notifications, calendars, and other important information. This can be especially useful for professionals who need to stay connected on the go.

5) Entertainment:

   Smart wearables can also provide users with entertainment options such as music streaming, allowing them to listen to their favourite songs and playlists on the go.

6) Fashion and style:

   Smart wearables come in a variety of styles and designs, allowing users to express their personal style while enjoying the benefits of wearable technology.

All in all, smart wearables offer a host of features and benefits that can make them a valuable addition to anyone's life, whether you want to track your fitness goals. yourself, stay connected on the go or simply add a little convenience and style to your daily routine.

2. REVIEW OF LITERATURE

Impact and advancement in healthcare industry

The consumption of smart wearable devices has been rising all across the world and with respect to this there have been multiple studies conducted to analyse the rising trade of these products and its antecedents. Dondzila, C and Garner, D (2016) compared that the accuracy of pedometers and wristband headset sensor technology is one of the significant reasons that makes the smart wearable a perfect choice for people in opting for it as their daily wear in their study "Comparative accuracy of fitness tracking modalities in quantifying energy expenditure".

Smart wearable technology devices have enabled digital tracking and management of health and fitness parameters. Gopinath, K., Selvam, G., & Narayanamurthy, G. (2022) conducted a series of meta-analyses using the theoretical framework of the Technology Adoption Model (TAM), a unified theory of adoption and technology use. Did. A conceptual model integrated with (UTAUT). This study, "Determinants of Adoption of Wearable Devices for Health and Fitness," also demonstrates the similarity of effect sizes for similarly meaningful constituents derived in the literature.

The new wave of wireless technology, fitness trackers and body sensing devices can have a huge impact on our healthcare system and quality of life. However, there are not enough studies proving the accuracy and precision of these trackers. The purpose of this study was to evaluate the accuracy, accuracy, and overall performance of 17 currently available wearable devices compared to direct observation of steps and heart rate monitoring. El-Amrawy, F. & Nounou, M.I. (2015) used three accelerometers simultaneously in this study, running three corresponding applications of each tracker simultaneously on Android or iOS devices. Heart rate was measured by all trackers supporting heart rate monitoring (if applicable) and compared to a positive control, the Onyx Vantage 9590 Professional Clinical Pulse Oximeter. "Are the currently available wearable activity tracking and heart rate monitoring devices accurate, accurate, and medically useful?" we asked. You can view the levels, so you can view the average energy consumption

Remote health monitoring is recommended to monitor patient health outside the clinic zone. These smart wearable devices are now integrated with mobile his apps, effectively functioning as telemedicine and telemedicine, and integrated into the medical Internet of Things. In this chapter, The Role of Smart Wearables in Healthcare: "Wearable Internet of Medical Things" introduces the Wearable Internet of Medical Things (WIoMT) and reviews the scientific terminology and commercial issues of smart wearable health devices. The Internet of Medical Things covers sophisticated backgrounds, wearable computing, wearable technology, cloud frameworks, architecture design, necessary hardware and software, body sensors, smartphones, smart medical applications, medical site analyzers for data storage, and finally represented by a diagnosis. Shafi, J. & Waheed, A. (2019) Wearable devices are tested by closely observing fitness, vital signs, and intelligent environments. Wearables are now used for a wide range of healthcare monitoring.

Although the usage of wearable self-tracking gadgets to improve health and wellbeing is growing, there is no scientific proof of these devices' real advantages. The theoretical foundations (such as social cognitive theory, cognitive dissonance, conditioning, and observer effects) are outlined in the paper by Stiglbauer, B., Weber, S., & Batinic, B. (2019), "Does your health really benefit from using a self-tracking device?", in order to examine how wearable technology could have a positive impact on health and wellbeing outcomes. The effects of wearing a fitness tracker for two weeks were investigated in a longitudinal randomised control research with a pre-post measurement design. As dependent variables, we used measures of psychological well-being, physical health, and health consciousness. According to the findings, users' perceptions of their physical health and sense of accomplishment were significantly improved by wearing the fitness tracker (compared to the waiting control group), and their level of health consciousness increased.

Future trends in the smart wearable industry

Wearable devices are a popular class of wearable ubiquitous technology. These devices come in many forms, from smart glasses to smart rings. Because smart wearable devices are worn on the body, they are particularly well suited to be integrated into people's daily lives. Rani, N. & Chu, S.L. (2022) research shows that wearable devices have untapped potential for learning in everyday life, with different form factors perceived as different functions and used for different purposes.

Information and communication technology (ICT) is changing life as we know it. There is a constant push by companies to innovate in various technologies, and activity tracking wristbands are no exception. These smart devices are primarily designed to continuously monitor physical activity, sleep trends, and health information. Designed. However, the functionality of these devices is not limited to fitness and health tracking. Since there are multiple criteria for adoption of these devices, it is important to understand how people view and evaluate

each criterion. This is lacking in the existing literature. Shaygan, A., Özdemir-Güngör, D., Kutgun, H., Williams, A., Daneshi, A., and Daim, T.U. (2020) in "Evaluation of Smart Activity Tracking Bracelets Adapted from College Student Reviews". The importance levels of these criteria and their subcriteria for college students using a hierarchical decision model (HDM).

Portable fitness equipment is growing in popularity among fitness-minded consumers. This study uses the theory of planned behaviour, expectation - confirmation theory and regulation of motivation to explore the factors governing the intention to continue using wearable fitness tracker (WFT) among its users. Jain, K., Sharma, I., & Singh, G. (2018) proposes to explore the effect of health ology and gadget love which were both found to have a positive influence on attitude towards WFTs. "An empirical study of factors determining wearable fitness tracker continuance among actual users", results do not suggest any significant influence of subjective norms, implying that usage continuance can be a self-determined behaviour.

Wearable trackers can help motivate you during workouts and provide information about your daily routine or fitness in combination with your smartphone without requiring potentially disruptive manual calculations or records. "A comparison of wearable fitness devices" summarizes and compares wearable fitness devices, also called "fitness trackers" or "activity trackers." These devices are becoming increasingly popular in personal healthcare, motivating people to exercise more throughout the day without the need for lifestyle changes. The choice in the wearable device market is growing as customers look for products that best suit their needs. In a study by Kaewkannate, K. and Kim, S. (2016), subjective and objective data used to compare the accuracy of four wearable devices and the usability and satisfaction of seven real users of her experimental results are presented. Additionally, the study compares the opinions of website reviewers and subjects who used the device.

The main research objective is "a comprehensive overview of smart wearables: Literature on State-of-the-Art, Current Advances, and Future Challenges" aims to review the literature on smart wearables, current progress, and future challenges. Therefore, a systematic literature review was conducted to examine smart wearables by reviewing previous studies from 2010 to 2019. To cover all relevant work during these years, we followed an integrated validation protocol consisting of automated and manual phases. 244 papers were identified that address the issues and challenges of smart wearables. Niknejad, N., Ismail, W. B., Mardani, A., Liao, H., & Ghani, I. (2020) The results show that research on smart wearables has increased dramatically in recent years. Furthermore, the results show that the current research covers various research topics related to smart wearable spaces, especially user behavior, technology orientation, safety and privacy, design, and social acceptance. Furthermore, based on the results of weighted analysis methods, perceived usefulness, attitudes towards

technology, social impact, and privacy concerns have been identified as the best predictors of smart wearable adoption.

Technological innovations, especially smart fitness wearables, will play a key role in the future of fitness and general well-being. Existing research has explored the adoption of smart fitness wearables, but little attention has been paid to their continuing intentions. Study “Social comparison and inventory intent of smart fitness wearables: Extended Expectation Confirmation Theory Perspective” combines Expectation Confirmation Theory and Social Comparison Theory to attempt to examine users' ongoing intentions when using smart fitness wearables. Specifically, in this article, we extend the expectation confirmation model by adding biases to perceived health outcomes and social comparisons to understand the continuation intentions of smart fitness variables. The model explained 72.8% of the continuation intentions, and the results show that users' perceived health outcomes and satisfaction predict continuation intentions, which in turn lead to recommendation intentions. Furthermore, the results of Gupta, A., Dhiman, N., Yousaf, A., and Arora, N. (2021) demonstrate positive trends in social comparisons to perceived health outcomes and user satisfaction. confirming the impact of User satisfaction is influenced by perceived usefulness, validation, perceived health outcomes, and social comparison biases. Our research confirms that perceived benefits after adoption do not warrant continued intention unless perceived health outcomes are met.

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3. Research Methodology

3.1 Research method

The research method used in the study is descriptive research. This methodology focuses on answering questions about the "what" of the research subject rather than the "why." Instead of focusing on the "why," the primary goal of this research is to simply describe the nature of the demographics understudy. The information gathered from the survey in descriptive research will only focus on the demographics of the population. It will reveal information about people's perceptions of smart fitness wearables, potential market growth, and identifying emerging trends.

3.2 Sampling technique

Simple random sampling

The sampling technique chosen is simple random sampling. The data was collected from 125 respondents, pan India, upon which the further analysis is performed. The ere was no specific target category of respondents because smart wearables is a product which is used by everyone. A survey was conducted under the period of 4 months. The questionnaires were circulated to 170-180 respondents out of which only 125 were fond to be perfectly certified respondents.

3.3 Hypothesis Testing

Descriptive Statistics

Table 1 – Descriptive Statistics

Parameters	REL	BEN	POP	REP-GYM	ADV	REVOL
Mean	3.192	3.256	3.864	2.592	3.512	3.488
Standard Error	0.103297878	0.104049616	0.115476013	0.092349966	0.107533041	0.105105784
Median	3	3	4	3	4	4
Mode	4	4	5	3	4	4
Standard Deviation	1.154905386	1.163310072	1.291061079	1.032504003	1.202255944	1.175118388
Sample Variance	1.333806452	1.353290323	1.66683871	1.066064516	1.445419355	1.380903226
Kurtosis	-0.490036233	-0.462780588	0.278592761	-0.061501962	-0.248365677	-0.445379654
Skewness	-0.511558929	-0.546483735	-1.159113464	0.396803487	-0.764390585	-0.576825066
Range	4	4	4	4	4	4
Minimum	1	1	1	1	1	1
Maximum	5	5	5	5	5	5
Sum	399	407	483	324	439	436
Count	125	125	125	125	125	125

Parameters	AFRD	INNOV	FUTURE	MOREVERSE	COMP	SHARE
Mean	3.296	3.464	3.608	3.4	3.616	2.88
Standard Error	0.106573615	0.109864433	0.100255158	0.099676897	0.087829747	0.11672963
Median	4	3	4	3	4	3
Mode	4	3	4	3	4	4
Standard Deviation	1.191529242	1.228321698	1.120886746	1.114421592	0.981966427	1.305076935
Sample Variance	1.419741935	1.508774194	1.256387097	1.241935484	0.964258065	1.703225806
Kurtosis	-0.560202366	-0.748979219	-0.088760868	-0.126818694	0.914116421	-1.153952159
Skewness	-0.593829608	-0.340134235	-0.71150689	-0.525832747	-0.875763842	-0.128131136
Range	4	4	4	4	4	4
Minimum	1	1	1	1	1	1
Maximum	5	5	5	5	5	5
Sum	412	433	451	425	452	360
Count	125	125	`	125	125	125

Parameters	INF	FAM	NGEN-DEV	JUST
Mean	3.656	3.768	3.208	3.056
Standard Error	0.119733036	0.112528706	0.083701466	0.098573045
Median	4	4	3	3
Mode	5	4	3	3
Standard Deviation	1.338656042	1.25810918	0.935810844	1.102080145
Sample Variance	1.792	1.58283871	0.875741935	1.214580645
Kurtosis	-0.648438466	0.053196814	0.603772598	-0.685522144
Skewness	-0.678484479	-0.982933182	-0.668891977	-0.112193124
Range	4	4	4	4
Minimum	1	1	1	1
Maximum	5	5	5	5
Sum	457	471	401	382
Count	125	125	125	125

After interpreting the data gathered from 125 respondents which participated in the survey and is found from descriptive analysis, it is quite evident that the respondents have “greatly agreed” with the majority of the questions that were asked in the survey. The second most prevalent response of the survey is a “neutral stance” to the questions. The “Increase in the popularity of the smart wearables in the upcoming years” is the factor which has got the highest mean value of “3.864”. This tells us that the responders have majorly agreed that smart fitness wearables will gain popularity in the upcoming years. The factor which as got the least agreeability from the respondent is “The wearable fitness devices will eventually replace traditional gym memberships”, which tells us that it is really unlikely that if people start wearing fitness wearable devices, then the gyms will go out of business and will soon be replaced by smart wearables.

Correlation Analysis

Hypothesis-1

There exists a strong relationship between sharing your activities with others and whether anyone in the family uses a smart wearable.

Hypothesis-2

The Reliability for tracking daily activities is greatly linked to factors like smart wearable being beneficial for overall health, smart devices will play a significant role in the fitness industry in the coming years and the willingness to try out a new, innovative wearable fitness device.

Hypothesis-3

Through the analysis it is found that comparing your past performance, a person is likely to change or increase the goals in some way indicated by the fitness tracker which is related significant role of smart wearables in the fitness industry in coming years.

Hypothesis – 4

The prospect that the cost of wearable fitness devices will become more affordable in the future is significantly related to the belief that fitness devices will become more popular in future.

Hypothesis – 5

There is a positive relation found which entails that by incorporating more advanced features in wearable devices, the willingness to try new innovative fitness device increases.

Hypothesis – 6

There is no significant relationship between smart wearables and its emergence in Indian Periphery.

Two-Factor ANOVA testing for survey items' reliability testing.

Table 3 – Cronbach Alpha

Anova: Two-Factor Without Replication

SUMMARY	*Count*	*Sum*	*Average*	*Variance*		
Row 1	16	63	3.9375	0.8625		
Row 2	16	71	4.4375	0.395833		
Row 3	16	54	3.375	0.783333		
Row 4	16	53	3.3125	1.1625		
Row 5	16	61	3.8125	0.429167		
Row 6	16	63	3.9375	0.329167		
Row 7	16	62	3.875	0.383333		
Row 8	16	73	4.5625	0.529167		
Row 9	16	61	3.8125	0.695833		
Row 10	16	58	3.625	1.05		
Column 1	10	39	3.9	0.988889		
Column 2	10	38	3.8	0.622222		
Column 3	10	46	4.6	0.266667		
Column 4	10	27	2.7	0.455556		
Column 5	10	39	3.9	0.544444		
Column 6	10	39	3.9	0.766667		
Column 7	10	36	3.6	1.155556		
Column 8	10	40	4	1.555556		
Column 9	10	39	3.9	0.544444		
Column 10	10	39	3.9	0.544444		
Column 11	10	38	3.8	0.622222		
Column 12	10	41	4.1	0.544444		
Column 13	10	41	4.1	0.322222		
Column 14	10	47	4.7	0.233333		
Column 15	10	35	3.5	0.5		

Column 16	10	35	3.5	0.5		
ANOVA						
Source of Variation	*SS*	*df*	*MS*	*F*	*P-value*	*F crit*
Rows	22.93125	9	2.547917	5.016407	7.83E-06	1.94988
Columns	30.74375	15	2.049583	4.035275	5E-06	1.741066
Error	68.56875	135	0.507917			
Total	122.2438	159				
Cronbach Alpha			0.800654		0.8	Acceptable

The Cronbach's alpha test is usually applied to test the consistency and stability of the questionnaires which measure latent variables. Through the analysis of the questionnaire and by following the Anova- two factor without replication method, we got the Cronbach Alpha of 0.8 what signifies that the study which is performed has good internal consistency and has a very good level of reliability.

Table 4 - Factors affecting the future trends of smart fitness wearables

Statement	Mean
Relying on a wearable fitness device to track daily activities.	3.192
Wearable fitness devices are beneficial for overall health.	3.256
Willingness to try out a new, innovative wearable fitness device.	3.464
Wearable fitness devices will continue to play a significant role in the fitness industry in the coming years.	3.608
More versatility to try out a new, innovative wearable fitness device introduced in the market	3.4
Anyone in the family uses a smart wearable	3.768
Overall Mean	3.448
Notes: 1= Strongly Disagree; 6= Strongly Agree; Alpha= 0.800654129	

4. Data Analysis & Interpretation

The main goal of conducting this research was to give clarity in respect to the relationship between the demography and factors such as reliability, affordability, popularity and many more which are discussed in the earlier. For conducting the survey, we used Likert scale. The Likert scale provides five possible responses to a statement or question allowing respondents to indicate their level of agreement or how positive or negative they are with the question or statement.

This approach is similar to the one used in the research paper "Users' experiences of wearable activity trackers: a cross-sectional study" (Carol Maher et al., 2017).

Method- An online cross-sectional survey was developed and conducted of Australian adults who are currently or previously using activity tracking devices. Results were analysed descriptively, with differences between current and former users as well as wearable brands explored using independent sample t tests, Mann-Whitney test and chi-squared test.

Results- Participants included 200 current and 37 former activity trackers (total N=237) with a mean age of 33.1 years (SD 12.4, range 18-74) year old). Fitbit (67.5%) and Garmin (16.5%) devices reported most frequently. Participants typically use their tracker for long periods of time (5-7 months) and most intend to continue using it. Participants said they improved physical activity (51-81%) more often than with diet (14-40%) or sleep (11-24%) and more participants bit said they value real-time feedback (89%) more than long-term. follow-up time (78%). Most users (70%) reported that their device encountered functional issues, often related to battery life and technical issues.

4.1 Factors with highest numbers

The factors with high Mean value represent that the respondents were in favour of the factors. The average mean of all the considered factors comes to "3.366". Among these the highest ones are,

- Wearable fitness devices will become more popular in the future. (3.864)
- Someone in the family uses a smart wearable (3.768)
- Influence by someone's opinion on the choice of wearables (3.656)
- When comparing past data, a person is likely to change or increase your goals in some way indicated by your fitness tracker device (3.616)
- Wearable fitness devices will continue to play a significant role in the fitness industry in the coming years. (3.608)

4.2 Demographic perceptions

- Relying on a wearable fitness device to track daily activities – 36% responded with a neutral stance, which means that these people don't use a fitness tracker while 26% agreed to this.
- Believe wearable fitness devices are beneficial for overall health – The majority (36%) agree with this statement and 25% of them tend to take a neutral stance.
- The wearable fitness devices will become more popular in the future – About 67% of them greatly agree with the rising popularity of the smart wearables. This high number reflects that people are aware of the wearable industry.
- The wearable fitness devices will eventually replace traditional gym memberships – A major chunk of the respondents (50%) greatly disagree to this statement. This tends to show that the gyms won't be replaced by these wearables.
- The future of wearable fitness devices lies in incorporating more advanced features, such as tracking mental health and sleep – Close to 59% respondents greatly agree with this statement and this reflects that the people want to rely on smart wearables for not only tracking physical aspect but also the mental health and sleep metrics.
- Wearable fitness devices have the potential to revolutionize the healthcare industry – The respondents who highly agree with the statement round up to 55%, whilst 26% of them tend to take a neutral stance.
- The cost of wearable fitness devices will become more affordable in the future – Around 52% agree with the statement, this tells us that people are expecting that soon the smart wearables will become relatively cheaper.
- Willing to try out a new, innovative wearable fitness device – Exactly half (50%) of the respondent are willing to try a new device. 25% tend to take neutral stance.
- Wearable fitness devices will continue to play a significant role in the fitness industry in the coming years – Close to 68% agree to the belief that these wearables will play a significant role in the coming years, while only a minor portion (8%) think that will not play a significant role.
- Would be willing to try out a new, innovative wearable fitness device introduced in the market to that of my present one that they use - 49.9% of the respondents will be willing to switch to a new device provided that it is more innovative to the one which they currently are using.
- We're you likely to change or increase your goals in some way indicated by your fitness tracker device when comparing past performance data – The people who agree that they tend to shift their target goals after comparing past performance is about 59%. And 1/4th of them tend to take a neutral stance.
- Connected your device with others to share your activities – The majority (43.4%) don't share their activities with anyone and 36.8% have agreed that they do share their activities with others.
- Influenced by someone's opinion on the choice of wearables – Out of all, around 40% have accepted to be influenced by someone's opinion on the choice of smart wearables.

- Anyone in the family uses a smart wearable – 54.5% say that someone in their family uses a smart wearable, while 1/4th of them disagree.
- The new generation devices are really accurate in terms of measuring vitals – 40% are of the opinion that the new age devices really are able to record vitals with much more accuracy.
- These smart wearables seem to justify their price – The majority (37.7%) have taken a neutral stance, which tells that majority don't find the price either on the higher nor on the lower side.

5. Findings and discussions

From analysing the data collected from 125 respondents it is quite evident that a lot of these factors seem to have a strong positive relation. Majority questions had an answering range – Strongly Agree, Agree, Neutral, Disagree and Strongly Disagree. The male responders amounted to about 72% of the total responders and female responders were 1/4th of the total responders (refer to Figure no. 1). The age demography which participated in the highest volume in the survey belong to the age group of 19-30 years (refer to Figure no. 2). Out of he total responder around 67% are singles (refer to Figure no. 3). Exactly 45% of the people voted that wish to spend in the range of Rs. 0-4,000 to purchase a smart fitness wearable. 30% of the total responders voted to spend within the bracket of Rs.4000-8000 on the purchase of the fitness devices (refer to Figure no. 4). The majority, around 58% of the responders, are of the opinion that the smartwatches is the device among the list of smart wearables which will see the highest growth in the next few years (refer to Figure no. 5). The major motivation for people to buy a fitness wearable is to track their fitness vitals. According to the respondents, smartwatches will witness the highest growth in the next few years. Factors like Technological Advancements, increasing health awareness, Integration with other IoT devices will equally will drive the growth of the wearable fitness devices market in the future.

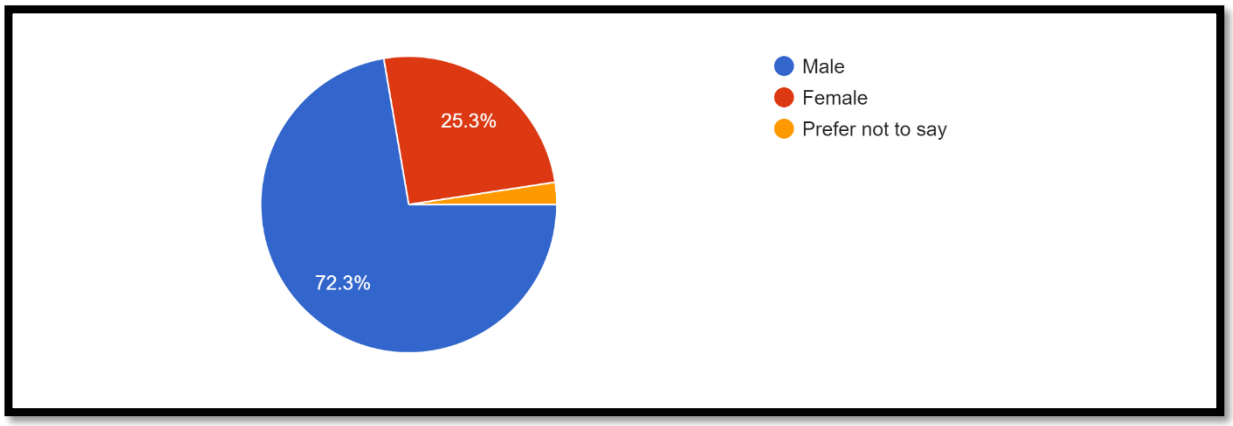

Figure 5 – GENDER - The survey consists of a majority of male responders. Female responder amounted only about 1/4th of the whole demography.

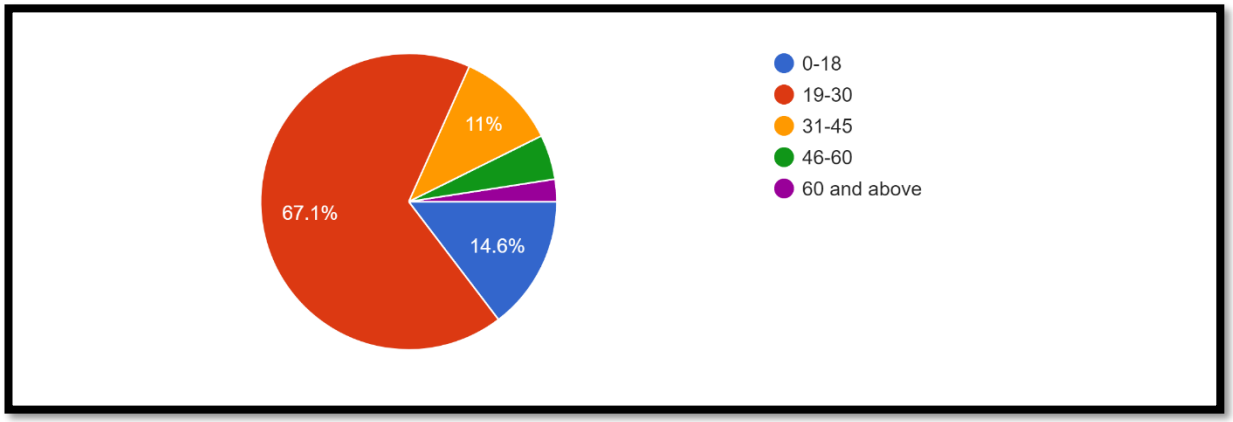

Figure 6 – AGE - The mojaority of responders belonged to the age group of 19-30 years of age, followed by those who fall in the age bracket of 0-18 years of age.

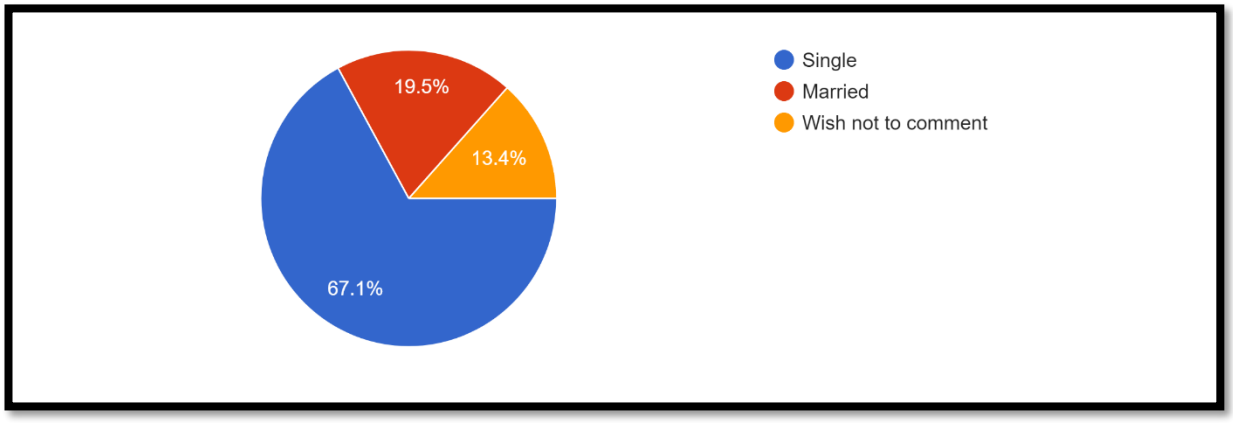

Figure 7- MARITAL STATUS - The majority of the responders belonged to category of singles.

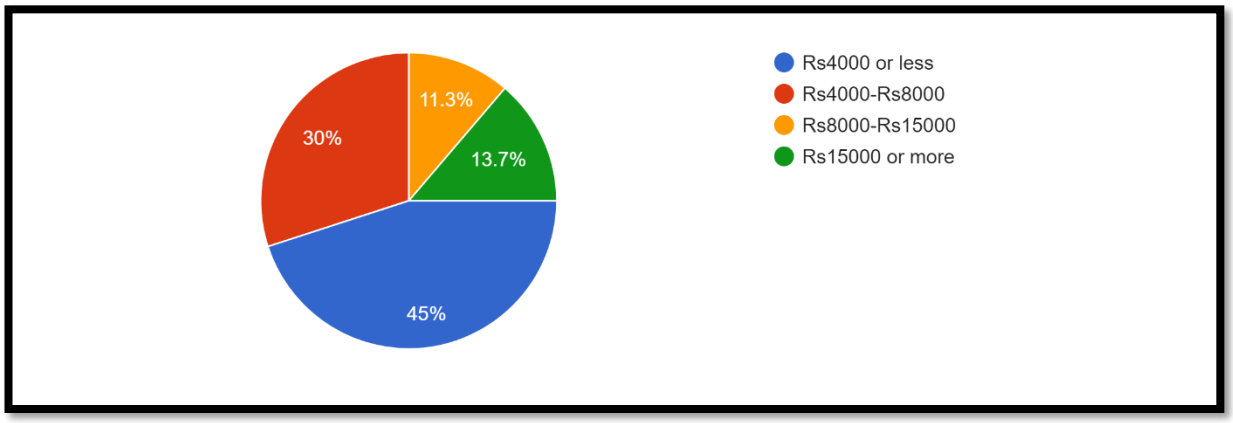

Figure 8 – PRICE PEOPLE ARE WILLING TO PAY -Most of the voters voted to pay Rs.4000 or less for the fitness device. 30% of the total responders voted to spend within the bracket of Rs.4000-8000 on the purchase of the fitness devices.

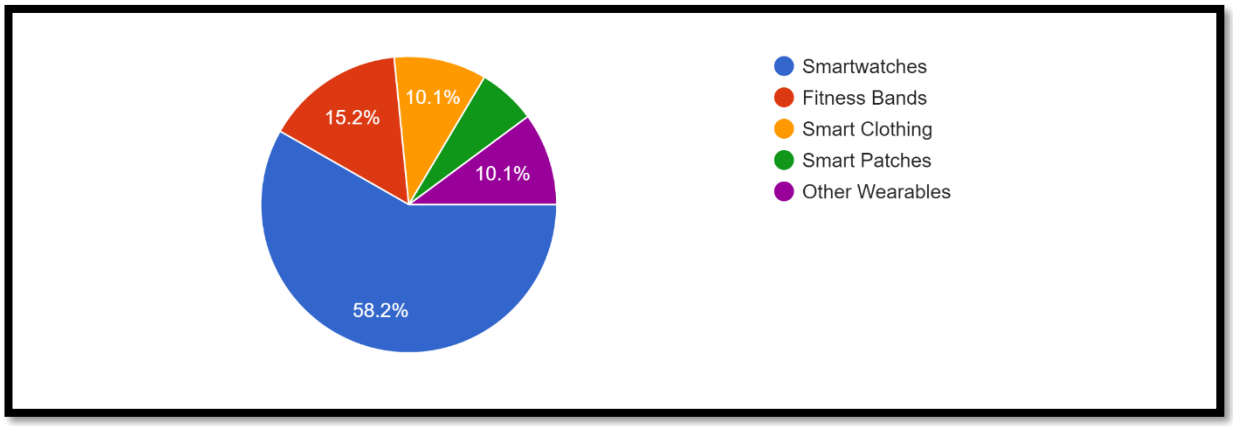

Figure 9 – TYPE OF SMART WEARABLE THAT WILL THE HIGHEST GROWTH IN THE NEXT FEW YEARS- The majority are of the opinion that the smartwatches is the device among the list of smart wearables which will see the highest growth in the next few years.

There exists a strong relationship between sharing your activities with others and whether anyone in the family uses a smart wearable.

Both the factors seem to have a high relatability as it has got a high mean value of around 0.499 (refer to table no. 3). Sharing your activities with others and the use of smart wearables in the family are two factors that are closely related. The rise of smart wearable technology has made it easier for people to track and share their activities with others.

Smart wearables are devices that can be worn on the body, such as smartwatches or fitness trackers. They can track various aspects of a person's activity, such as their steps taken, heart rate, and calories burned. Many

smart wearables also have the ability to sync with other devices, such as smartphones or tablets, allowing users to track their progress over time.

Sharing activity data with others has become increasingly popular as people strive to lead healthier lifestyles. By sharing their progress with friends and family, people can receive encouragement and motivation to keep going. They can also join online communities or groups that share similar goals, creating a sense of camaraderie and support.

In families where multiple members use smart wearables, there is the potential for even greater support and motivation. Family members can compare their progress, compete with each other, and encourage each other to reach their goals. Parents can also use smart wearables to track the activity levels of their children and encourage them to be more active (Radhika Garg & Christopher Moreno, 2019).

In conclusion, sharing activity data with others and the use of smart wearables in families are closely related factors. By tracking and sharing their progress with others, people can receive the support and motivation they need to lead healthier, more active lifestyles.

The Reliability for tracking daily activities is greatly linked to factors like smart wearable being beneficial for overall health, smart devices will play a significant role in the fitness industry in the coming years and the willingness to try out a new, innovative wearable fitness device.

These factors seem to have a high relatability as it has got a high mean value of around 0.545 with BEN, mean of 0.476 with FUTURE and mean of 0.573 with MOREVERSE (refer to table no. 3). Tracking daily activities can be beneficial for overall health, as it allows individuals to monitor their habits and make informed decisions about their lifestyle choices. However, the reliability of the tracking method used is crucial for accurate data collection.

There are various methods for tracking daily activities, including mobile apps, wearable devices, and manual tracking in a journal. But in today's world wearable device is the best method. Additionally, the accuracy and reliability of the tracking method should be considered. For example, a wearable device that tracks steps may be more reliable than manually counting steps in a journal.

Overall, reliable tracking of daily activities can help individuals identify patterns and areas for improvement, leading to positive changes in their health behaviours. By tracking exercise, sleep, nutrition, and other habits, individuals can make informed decisions about their health and well-being (Barbara Stiglbauer et al., 2019).

Smart devices are already playing a significant role in the fitness industry, and their impact is expected to continue growing in the coming years. With the rise of wearable devices and fitness apps, individuals are able to track their activity levels, monitor their progress, and receive personalized coaching and feedback.

Smart devices can also provide real-time data and insights, allowing individuals to make informed decisions about their fitness and health. For example, wearable heart rate monitors can help individuals optimize their workouts for maximum benefit. Additionally, smart devices can enable remote coaching and virtual workouts, providing greater accessibility to fitness programs.

As technology continues to advance, it's likely that smart devices will become even more integrated into the fitness industry, offering new opportunities for personalization, motivation, and engagement (Ruby Dwivedi et at, 2022).

The willingness to try out a new, innovative wearable fitness device can vary depending on several factors, including the perceived benefits of the device, the cost, and the user's previous experience with similar devices.

In general, individuals who are passionate about fitness and health are more likely to be interested in trying out new wearable devices. They may also be more open to investing in expensive devices that promise advanced features and benefits.

However, other factors such as ease of use, comfort, and design can also play a significant role in an individual's willingness to try out a new wearable fitness device. Additionally, word-of-mouth recommendations and positive reviews can also influence an individual's decision to try out a new device (Sang Yup Lee & Keeheon Lee, 2019) .

Overall, the willingness to try out a new wearable fitness device is likely to increase as technology advances and devices become more innovative, personalized, and effective at improving health and fitness outcomes.

Through the analysis it is found that comparing your past performance, a person is likely to change or increase the goals in some way indicated by the fitness tracker which is related significant role of smart wearables in the fitness industry in coming years.

Both the factors seem to have a high relatability as it has got a high mean value of around 0.500 (refer to table no. 3). Fitness trackers and applications provide a summary of statistics such as heart rate, walking pace, and burned calories. By tracking users' progress, fitness trackers encourage people to step outside their comfort zone and reach their fitness goals. This notion was confirmed by a Harvard study that emphasised that fitness wearables motivate inactive individuals to increase their activity levels. In addition, AI-enhanced fitness applications were the best substitute for the lack of a personal trainer. The AI provided appropriate workout regimens tailored to people's fitness goals by just collecting body measurements, age, and other variables.

Furthermore, AI has evolved to the point where fitness apps' AI can now monitor workout posture and improve forms. As a result, fitness trackers and other AI-assisted technology fitness applications had a record-breaking 84 per cent surge in downloads between 2019 and 2020. In addition to helping individuals burn calories, these devices also offer features like sleep monitoring and water consumption tracking to help users live healthier lives. The ever-evolving technology has benefitted mankind regardless of the realm. Be it e-learning, healthcare, or finance, the integration of wearable technology in the fitness industry has been like the Touch of Midas. Scalability & tracking the progress of a fitness schedule has now become easier for everyone.

Having said that, the future of wearable technology in the fitness industry is bright. It will not only simplify health results but will give deeper insights into an individual’s health metrics. Sooner or later, it will become beneficial as technology advances (Ruby Dwivedi et at, 2022).

The prospect that the cost of wearable fitness devices will become more affordable in the future is significantly related to the belief that fitness devices will become more popular in future.

Both the factors seem to have a high relatability as it has got a high mean value of around 0.551 (refer to table no. 3). It is anticipated that the wearable fitness device market will continue to expand in the years to come. The growing accessibility of these devices is one of the main drivers of this growth. Consumers can purchase wearable devices at lower prices as the cost of manufacturing them decreases as a result of more streamlined production processes and more advanced technology.

Additionally, as the demand for these devices grows, producers will be able to produce them in greater quantities, which will also help to lower their cost. They will become more widely available as a result, further boosting their popularity.

The demand for these gadgets is also being driven by the growing recognition of the value of physical fitness and healthy living. As people's awareness of their health increases, they search for tools to track their progress

toward fitness goals and track their activity levels. This is why wearable fitness devices are gaining popularity because they offer a practical and simple way to do it (Ki Joon Kim & Dong-Hee Shin, 2015) .

In conclusion, wearable fitness technology will probably become more affordable in the future, which will boost demand for it. Manufacturers will be able to produce these devices at a lower price as consumers become more health conscious and demand for them rises, making them more affordable and available to more customers.

There is a positive relation found which entails that by incorporating more advanced features in wearable devices, the willingness to try new innovative fitness device increases.

Both the factors seem to have a high relatability as it has got a high mean value of around 0.488 (refer to table no. 3). The demand for more sophisticated features to be added to wearable fitness technology is growing as it develops. With the help of these new features, which range from cutting-edge sensors to sophisticated analytics, users will now have access to more precise and thorough information about their fitness and health. Customers are also open to testing out cutting-edge fitness equipment.

Growing demand for personalized fitness and health solutions is one factor influencing this trend toward more sophisticated features. Wearable technologies that provide more individualized data and insights are growing in popularity as more people seek to improve their fitness and health. These gadgets can offer users a more complete picture of their health and fitness by incorporating cutting-edge features like heart rate monitors, sleep tracking, and diet monitoring.

The development of more sophisticated wearable technology features is also encouraged by consumers' openness to experimenting with cutting-edge fitness technology. Customers are more willing to test out new gadgets with cutting-edge features as they become more tech-savvy and accustomed to using technology to track their fitness. The development of cutting-edge wearable fitness technology with cutting-edge sensors, analytics, and other features has increased as a result.

In summary, the trend toward the addition of more sophisticated functionalities in wearable fitness devices is being fuelled by consumers' growing desire for tailored fitness solutions and their willingness to try out cutting-edge technology. Wearable fitness equipment with even more cutting-edge features and capabilities may become more common as technology develops and new gadgets are created.

6. Conclusion and Recommendations

The topic has made an important contribution to the research community, as wearable devices attract the attention of World Population. The study explores the important factors affecting research results, suggesting its role in awareness and experience, and focus on the consumer technology acceptance. Through our research it has been made crystal clear that the smart fitness wearables are about to bring an upcoming revolution in the way we view our health and how we record, evaluate and focus on our body vitals. Reliable monitoring of daily activities can help individuals identify trends and areas for improvement, leading to positive changes in their health behaviour. By tracking exercise, sleep, nutrition, and other habits, individuals can make informed decisions about their health and well-being. Smart devices can also provide real-time data and insights, allowing individuals to make informed decisions about their fitness and health. For example, a wearable heart rate monitor can help individuals optimize their workouts for maximum benefit. Additionally, smart devices can enable remote coaching and virtual workouts, providing greater accessibility to fitness programs. Willingness to try new, innovative wearable fitness devices can vary based on a number of factors, including perceived benefits of the device, cost, and previous user experience with the devices. Similar device. Overall, health and fitness enthusiasts are more likely to be interested in trying out new wearables. They may also be willing to invest in expensive devices that promise premium features and benefits. Sharing activity data with others is becoming increasingly common as people strive towards healthier lives. By sharing their progress with friends and family, people can be encouraged and motivated to keep going. They can also join online communities or groups that share a common goal, creating a sense of camaraderie and support. In families with multiple members using wearable devices, the potential for even greater support and motivation is great. Family members can compare their progress, compete with each other and encourage each other to achieve their goals. Parents can also use smart wearables to monitor their children's activity levels and encourage them to be more active. Wearable exercise equipment motivates inactive people to increase their activity levels. Also, AI-enhanced fitness apps are the best alternative to the lack of a personal trainer. AI provides tailored workout programs tailored to everyone's fitness goals by collecting body measurements, age, and other variables. AI has evolved to the point where AI in fitness apps can now track workout posture and improve form. As a result, fitness trackers and other AI-powered fitness apps saw a record 84% increase in downloads between 2019 and 2020. The increasing accessibility of these devices is one of the key drivers of this growth. Consumers can buy wearables at lower prices due to reduced production costs thanks to more streamlined manufacturing processes and more advanced technology. In addition, as demand for these devices increases, manufacturers will be able to produce them in larger quantities, which will also help reduce their costs. As a result, they will become more widely available, further boosting their popularity. The demand for these gadgets

is also driven by the growing recognition of the value of being physically fit and a healthy lifestyle. As people become health-conscious, they are looking for tools to track progress toward fitness goals and track their activity levels. The need for more sophisticated features added to wearable fitness technology is increasing as it evolves. With these new features, which range from the most advanced sensors to sophisticated analytics, users will now have access to more accurate and comprehensive information about their fitness and health. Guests can also try the modern fitness equipment. The people are willing to try out a new device or technology if it is able to record the vitals with a higher degree of accuracy. Though the relation between the factors is not as prominent as it is found between other factors, but it has seemed to be projecting a somewhat positive relationship. As people start becoming more aware about the benefits of wearable fitness devices towards overall health, the industry will simultaneously gain more popularity and relevance.

As for providing with recommendations based on our research, we would like to recommend the researchers who chose to study this topic to about exploring more into the relationship of factors-

- Sharing your activities with others and whether anyone in the family uses a smart wearable.
- The Reliability for tracking daily activities is greatly linked to factors like smart wearable being beneficial for overall health
- The Reliability for tracking daily activities is greatly linked to factors like smart devices will play a significant role in the fitness industry in the coming years and the willingness to try out a new
- The Reliability for tracking daily activities is greatly linked to factors like innovative wearable fitness device.
- Comparing your past performance, a person is likely to change or increase the goals in some way indicated by the fitness tracker which is related significant role of smart wearables in the fitness industry in coming years.
- the cost of wearable fitness devices will become more affordable in the future is significantly related to the belief that fitness devices will become more popular in future.
- That by incorporating more advanced features in wearable devices, the willingness to try new innovative fitness device increases.

The research which is conducted by us is limited only to a single country, which makes it a feasible opportunity for other researchers to study the subject on an international level. Also, the number of respondents in our study were 125, which is quite less and is somewhat lacking in the covering the wide expanse of people. Thus, it is recommended that when any future research is conducted on this subject, it should aim at covering a wide array of respondents from

7. Limitations and Future Scope

This study makes a significant contribution to the theory and practice of payments using wearable technology, but there are some limitations associated with this study. First, this study collects and analyses data from consumers of wearable technology in India. The findings cannot be generalized globally due to unequal favourable conditions in different countries. Therefore, future research can be carried out in several countries, which will expand the scope of research on the perception of intelligent connected objects. Second, this study used a sample of 125 respondents. A relatively larger sample is recommended for more robust results and generality of results. There are many factors which we aimed to explore but didn't give us much results. These are the ones which got a lower mean value and also failed to establish any major relationship with any of the factors.

The decision to purchase a smart device can be significantly influenced by someone's opinion. For instance, if a friend or family member has had good luck with a particular brand or model of smart device, they might suggest it to someone who is considering buying one. The fact that the person making the recommendation is someone the potential buyer respects and trusts means that it may have some weight. The same is true for online reviews and ratings, which can have a big impact on someone's decision to buy a smart device. Positive reviews can inspire confidence in the company and its products, whereas negative reviews can serve as a warning to potential customers. Wearable technology has the potential to completely transform the healthcare sector by providing real-time health data and improving patient outcomes. Wearable medical technology enables remote patient monitoring, reducing the need for hospital visits and assisting in the prevention of readmissions. Better health outcomes may result from clinicians' increased ability to diagnose and treat patients more quickly and correctly. Wearable technology can help lower healthcare costs by enabling early diagnosis of health conditions and avoiding the need for more expensive treatments. It can also help increase the efficiency of healthcare services by automating some tasks and reducing the workload for healthcare personnel. Smart wearables frequently include features not found in traditional watches or fitness trackers. Sensors, processors, and displays are used in the construction of smart wearables. This technology necessitates research and development, which can raise production costs. Furthermore, smart wearables frequently include a warranty and customer support, which raises the overall cost. The utility and convenience of smart wearables cannot be overstated. Users can use them to track their fitness goals, receive notifications, and even make payments without having to take out their phone. This level of convenience and functionality can be considered valuable, particularly by those who lead hectic lives. Finally, because of their advanced features, use of cutting-edge technology, and convenience and utility, smart wearables in India are able to justify their prices. While

they may appear to be expensive at first, they provide a distinct set of advantages that make them a worthwhile investment for many consumers.

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