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Wearable Technology: Exploring Purchase Intention for Smartwatch.

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Abstract: *Smart Wearable is one the growing industry in India and around the world. Smart watch is one of the most commercially preferred smart wearables. The objective of the study was to identify the factors affecting purchase intention for smart watch and also to find the difference among the chosen demographic factors and factors affecting purchase intention for smartwatch. Technology Acceptance Model (TAM), Innovation Diffusion Theory (IDT) and Unified Theory of Acceptance and Usage Intention (UTAUT) were studied. The study is conducted in Surat and Navsari city and Bardoli town with total of 960 samples. Factor Analysis, Mann Whitney Test and Kruskal Wallis test were used to analyse data. Perceived Compatibility is found major factor that led to have positive attitude towards purchase intention for smart watch. Significant difference was found in Purchase Intention for smartwatch with reference to all demographic variables except Gender. This study may be beneficial for academics as well as to marketing managers to promote and to design engineers for considering specific features of the product.*

Keywords: Attitude, Purchase Intention, Smart watch, Smart wearables, Technology Acceptance.

Introduction:

A smart watch is a wearable computer in the form of a wristwatch. Modern smart watches provide a local touch screen interface for daily use, while an associated smart phone app provides for management and telemetry such as long-term bio monitoring. Smartwatches are generally used to have personal assistance which makes one's life comparatively easy and fast, too. While early models could perform basic tasks such as calculations, digital time telling, translations and game playing. 2010s smart watches have more general functionality closer to smart phones, including mobile apps, a mobile operating system and WiFi/ Bluetooth connectivity. Latest smartwatches are offered by different market giants like Apple, Fossil, Fasttrack and many more. Smartwatches are available in different price range according to its functionalities. Some smart watches function as portable media players with FM radio and playback of digital audio and video files via a Bluetooth Headset. Some models, called 'watch phones', have mobile cellular functionality like making calls. Most of the smartwatches mainly used and admired for its wellness feature as it provides information on blood pressure, heartbeats, steps and many more.

Literature Review:

Purchase Intention is defined as a measure of the strength of one's intention to perform a specific behaviour or make the decision to buy a product or service (What is Purchase Intention. (n.d.). Purchase Intention is the likelihood that a person will purchase a product which is directly associated with attitude. Consumer Attitude direct consumers to draw certain behaviour. Attitude is learned and that is the reason to have direct connection with purchasing behaviour ((Malush Krasniqi, September-December 2014). If consumers have positive attitude, customer may likely to purchase a specific good. Key determinants like perceived value, perceived content regarding hardware and software, design aesthetics may lead to positive attitude that can be converted into purchase intention (K. L. Hsiao & Chen, 2018). Positive relationship between attitude and purchase intention was identified for smart watch (Altuntaş & Akyüz, 2018; Dastan, 2016; K. L. Hsiao & Chen, 2018)

(Jovanov, 2015) studied longitudinal health monitoring over a four months' time. Smart wearables are highly used in healthcare industries because of its technological assistance to patients (Dastan, 2016)e period and found that smart watches have strong prospective for monitoring health status, monitoring physiological condition and analysis of wellness as new generation smart watches are used to measure physiological parameters like heart rate, galvanic skin resistance (GSR). (Nasir & Yurder, 2015) tried to identify the motivations that affect the adoption of mobile health applications. Smart watches also used as one of the wearables which can be used to track daily life activities. (Van Berkel et al., 2016) analyze smart watch application session time and usage. Such daily user-device interaction studies improve the knowledge of how users use these devices, and further led to better understanding of user behavior. (Rawassizadeh et al., 2015) stressed on the potential for smart watches to collect information on human behavior they have identified opportunity in wearable technology market. Smartwatches' usefulness and applications were also studied by (Siddiqui et al., 2017) for real time public transport navigation where the study showed that the smartwatch outperform the smartphone in all user experience metrics. (Chuah et al., 2016; Krey et al., 2016, 2019) focused on the research which included the perspectives of emotional and functional advertisements strategies in influencing consumer adoption of smart watches

where it was identified that perceived usefulness and visibility that drive attitude towards using smart watches, which convert adoption of smart watch into purchase intention.

(Mills et al., 2016) studied the risk factors associated with wearable devices along with its benefits. They focused on physical and informational security of wearable device. (Chang et al., 2016) said that users were not expecting smart watch as device to provide fashion items. There was a question whether some of the people are considering smartwatch as fashion accessories as it is one of the luxury wearables and also been considered as a status symbol. .(Bachmann et al., 2015) studies smartwatch for mood assessment practices where the study had gathered data from smartphone and smartwatch. Sensor measurements were collected from smartphone and physiological data were collected from smartwatch. The study had focused on Android Wear App for mood assessment. Some of the factors taken from TAM (Technology Acceptance Model) and UTAUT are explained below which are used for further research. Some of the factors from earlier research are discussed below which may affect purchase intention for smartwatch.

Relative Advantage: Degree to which an innovation is seen as being superior to its predecessor. Relative advantage is related to purchase intention of a product (K.-L. Hsiao, 2017). The above proposed research model is designed to study factors affecting purchase intention for smart watch. Smart watches are relatively new to mainstream devices such as smartphones used by consumers. It is comparatively new to Indian market may be because of less awareness of this technological product.

Perceived Ease of Use: Davis defined this as "the degree to which a person believes that using a particular system would be free from effort" (Davis 1989). It is one of the constructs of TAM (Davis,1986,1989).

Perceived Usefulness: Perceived usefulness is defined as the user's "subjective probability that using a specific application system will increase his or her job performance within an organizational context" (Davis et al., 1989, p. 985)

When a product or service technology is easy to use and can enhance the performance by providing something additional functionality, consumer would like to purchase and use the product as it is human tendency which needs more every time. Consumers also consider different functions that is being offered by a product. (K.-L. Hsiao, 2017) considered smartwatch tasks as the usefulness or performance related features and complexity which is related to ease of use which is one of the constructs of task technology fit theory. Both Perceived Usefulness and Perceived ease of use are constructs of TAM (Technology Acceptance Model). Both the constructs play crucial role in adopting an innovation after which it leads to positive attitude and intention to purchase and use the technology or innovative product or service with reference to utilitarian perspective (Adapa et al., 2018; Altuntaş & Akyüz, 2018; Nov & Ye, 2008; L. H. Wu et al., 2016) .

Perceived Compatibility: "The degree to which an innovation is perceived as being consistent with the existing values, past experiences and needs of potential adopters." It is studied to strengthen the Model of TAM and IDT (J. H. Wu & Wang, 2005). According to (Kai-ming au & Enderwick, 2000) adoptive experiences which are related to past experiences can also affect the compatibility for a new technological product. If future engagement is found as the earlier one on a positive note, people would like to adopt the new technological product.

Perceived Enjoyment: "The extent to which the activity of using the computer or any technology is perceived to be enjoyable in its own right, apart from any performance consequences that may be anticipated." It is incorporated in model to enhance the understanding of consumer beliefs. It is also defined as the fun or pleasure derived from using a technology" (Venkatesh et al., 2012).

Aesthetic Appeal: It refers to the visual attractiveness of a product. It also refers to the way in which the color, shape, design and appearance of a smart watch provide a certain aesthetic, create a sense of balance, or appeal to the emotions which is a part of visual communication (Juhlin et al., 2016; Kalantari, 2017).

Perceived enjoyment and Aesthetic Appeal together also considered as hedonic motivation includes emotional and non-functional benefits of innovation which user can derive from the same. It is as important as utilitarian perspective which lead towards having positive attitude towards purchase intention (Altuntaş & Akyüz, 2018; Dickinger et al., 2008; Kim, 2016).

Social Influence: The concept of social influence has been assessed by social norm and normative belief in both the theory of reasoned action and theory of planned behavior. Individuals' elaborative thoughts on subjective norms are perceptions on whether they are expected by their friends, family and the society to perform the recommended behavior. The causal relationship of social influence on behavioral intention has been explored in TAM2, UTAUT, and UTAUT2 (Escobar-Rodríguez & Carvajal-Trujillo, 2014; Venkatesh, Morris, et al., n.d.; Venkatesh, science, et al., n.d.).

Brand Image: Brand image is all about how consumer perceive the brand**.** Product attributes, benefits/consequences of using a brand and personality are three key components of brand image**.** Brand personality allow consumers to express themselves with specific/symbolic dimensions of a brand. Brand image and personality are main drivers for purchase or usage decision where consumer like to relate themselves with ideal self- image or other desired groups (Bian & Moutinho, 2011)**.**

Perceived Risk: It is one of the most important aspects associated with purchase decision of smart wearables as perceived risk work as one of the barriers to have purchase intention for smart watches. Physical Risk, Financial Risk , Social Risk, Environmental Risk and most importantly Performance risk is associated with it (Kalantari, 2017). Studying Perceived Risk is more important for potential users than actual users as potential users may be trying the new product for the first time and by assessing all perceived risk, they may go for having positive attitude towards purchase intention.

Research Methodology:

The research study was conducted to identify the factors affecting Purchase Intention for smartwatch. Another objective of the study was to find the significant difference between groups based on different demographic variables (Gender, Marital Status, Age, Income, City, Education and Occupation). Data were collected from 960 samples from Surat (Metro City), Navsari (City) and Bardoli (Town) using Quota and Non-Probability Sampling Method. Quota sampling was used to derive samples from three different place Surat, Navsari and Bardoli. After that Non-Probability Sampling method was used to derive samples from each place. Data were collected in time span of three months. Factor Analysis, Mann Whitney Test and Kruskal Wallis Test were used as research tools for Data Analysis.

Data Analysis:

Factor Analysis

Factor analysis was used to identify the factors affecting Purchase Intention of respondents towards Smart Watch. The result of Bartlett's test of sphericity is significant (p=0.000). In addition, the Kaiser-Meyer-Olkin measure is 0.971 which is greater than 0.6. It is recommended that if the Bartlett's test of sphericity is significant and if the Kaiser-Meyer-Olkin measure is greater than 0.6, then factorability is expected.

Table 1: Total Variance Explained

Component	**Rotation Sums of Squared Loadings**		
	Total	% of Variance	Cumulative %
PC	11.887	17.742	17.742
PEOU	8.682	12.959	30.701
SI	6.445	9.620	40.321
AT	6.130	9.149	49.470
PR	3.615	5.395	54.865
HM	2.188	3.265	58.131
PU	1.949	2.909	61.040
BI	1.899	2.835	63.874
PI	1.108	1.654	65.528

Note: PC- Perceived Compatibility, PEOU-Perceived Ease of Use, SI-Social Influence, AT- Attitude, PR-Perceived Risk, HM-Hedonic Motivation, PU-Perceived Usefulness, BI-Brand Image, PI-Purchase Intention

As shown in Table 1, total nine factors were extracted which are having more than 1 Eigen Value after applying Factor Analysis using SPSS. For Social Sciences, where the information is often less precise, it accounts for 60 percent of total variance explained as satisfactory. The factors are shown below with respective indicator variables and factor loadings for each factor.

Factor 1: Perceived Compatibility (PC)

Components	**Factor Loading**
Using a Smartwatch would be consistent with the current choices and preferences.	0.773
Using a Smartwatch would be consistent with my habits.	0.703
Using a Smartwatch would be consistent with current state of my daily life.	0.627
Using a smartwatch would not match my living experience.	0.539

Factor 2: Perceived Ease of Use (PEOU)

Components	**Factor Loadings**
Smartwatch is easy to operate.	0.764
Smartwatch Technology would not confuse me.	0.758
The functionalities of smartwatch are not too complex to understand.	0.735
Learning to use smartwatch would not be a challenge.	0.755

Clear icons are displayed on the screen for proper understanding.	0.523

Factor 3: Social Influence (SI)

Components	**Factor Loadings**
Opinion regarding smartwatch coming from a superior matter to me.	0.747
My social circle would want me to wear a smartwatch.	0.627
Having a smartwatch would help me to raise my social status.	0.648
Opinion of friends and family is important.	0.614
Smartwatch enhances my personality.	0.580
Wearing a smartwatch would make me different from others.	0.530

Factor 4: Attitude (AT)

Components	**Factor Loadings**
I would be happy to use smartwatch.	0.663
Having a smartwatch would be a positive decision.	0.583
I would like to refer smartwatch to others.	0.555
I would be willing to purchase a smartwatch.	0.539

Factor 5: Perceived Risk (PR)

Components	**Factor Loadings**
I doubt of losing my personal information while using smartwatch.	0.780
Notification vibration can harm my health.	0.797
Smartwatch is much expensive.	0.777
Smartwatch is having very common outer appearance.	0.517
Misuse of data is prime concern for smartwatch.	0.506

Factor 6: Hedonic Motivation (HM)

Components	**Factor Loadings**
Using a smartwatch would make me more relaxed and recreational.	0.718
Size and Shape of Smart watch matters to me while taking a purchase decision.	0.649
Using Smartwatch is entertaining for me.	0.682

Price, Strap material and water resistance is imp set of consideration.	0.670
Apps available for smartwatch are enjoyable.	0.504

Factor 7: Perceived Usefulness (PU)

Components	**Factor Loadings**
Smartwatch would make my daily life easy.	0.678
Smartwatch would provide me personal Assistance.	0.669
Smartwatch would provide me self-tracking facilities for my health.	0.637
Smartwatch is helpful in handling health hazard for elderly people.	0.629
Smartwatch would make my professional and personal task easy.	0.591

Factor 8: Brand Image (BI)

Components	**Factor Loadings**
I would like to use Branded Smartwatch only.	0.590
Branded smartwatch provides better functionalities.	0.662
Branded smartwatch is always a quality product.	0.647
Branded Smartwatch are comparatively safe to use.	0.510

Purchase Intention:

Components	**Factor Loadings**
I would feel happy to purchase a smartwatch.	0.659
Buying a smartwatch would be a good decision.	0.713
I would like to use smartwatch, if I possess one.	0.54

Application of Mann Whitney and Kruskal Wallis Test:

To compare means of different groups, ANOVA test is used for normal data. After applying, Normality test, it was found that data are not normal. As data are not normal, Non-Parametric tests Mann Whitney and Kruskal Wallis Test were run in SPSS.

Ho: Data are normal.

H1: Data are not normal.

Test of Normality

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	Df	Sig.	Statistic	df	Sig.
PI	.204	960	.000	.770	960	.000

From the table, it can be said that the data are not normal as the significance value is 0.000 which is less than 0.05.

For hypothesis testing, the null hypothesis was divided into the following sub-hypothesis:

H0a: There is no significant difference in the Purchase Intention for smartwatch relating to the Gender of the respondent.

H0b: There is no significant difference in the Purchase Intention for smartwatch relating to the Marital Status of the respondent.

H0c: There is no significant difference in the Purchase Intention for smartwatch relating to the Age of the respondent.

H0d: There is no significant difference in the Purchase Intention for smartwatch relating to the Education of the respondent.

H0e: There is no significant difference in the Purchase Intention for smartwatch relating to the city of the respondent.

H0f: There is no significant difference in the Purchase Intention for smartwatch relating to the Monthly Household Income of the respondent.

H0g: There is no significant difference in the Purchase Intention for smartwatch relating to the Occupation of the respondent.

Application of Mann Whitney Test:

Mean Rank score of Purchase Intention for Smartwatch and Demographic Variables				
		N		Mean Rank
Gender	Male	497	488.23	242160.5
	Female	463	472.24	219119.5
	Total	960		
Marital Status	Single	377	420.08	162571
	Married	583	540.93	324020
	Total	960		

Mann Whitney Test Statistics (Grouping Variable: Gender and Marital Status)		
		PI (Purchase Intention)
Gender	Mann Whitney U	111239.5
	Wilcoxon W	219119.5
	Z	-0.893
	P value	0.372
Marital Status	Mann Whitney U	87493
	Wilcoxon W	162571
	Z	-6.507
	P value	0

From the above tables, it can be said that as the p value is 0.372 which is greater than 0.05. So, the null Hypothesis for Purchase Intention regarding Smartwatch based on Gender is accepted. Null Hypothesis is rejected for Purchase Intention for smartwatch based on Marital Status as the p value is 0.000 which is less than 0.05.

Application of Kruskal Wallis Test for different Demographic Factor:

Mean Rank score of Purchase Intention for Smartwatch and Demographic Variables			
		N	Mean Rank
Age	18-27 years	300	399.51
	More than 27-36 years	234	486.46
	More than 36-45 years	192	543.49
	Above 45 years	234	526.23
	Total	960	
City	Surat	480	499.34
	Navsari	288	483.02
	Bardoli	192	429.61
	Total	960	
Education	Under Graduate	147	423.25
	Graduate	348	519.76
	Post Graduate	314	405.98
	Doctorate	151	600.49
	Total	960	
Occupation	Student	128	413.12
	Professional	187	505.39
	Service Personnel	285	509.44
	Self Employed	303	468.83
	Not Working	57	401.08
	Total	960	
Monthly Household Income	Less than 1,00,000	177	335.38
	More than 1,00,000-1,50,000	239	495.63
	More than 1,50,000-2,00,000	232	538.17
	More than 2,00,000-2,50,000	180	590.8
	More than 2,50,000-3,00,000	59	455.76
	More than 3,00,000	73	350.71
	Total	960	

Kruskal Wallis Test Statistics			
		PI (Purchase Intention)	Null Hypothesis
Age	Chi-Square	41.932	Rejected
	df	3	
	Asymp. Sig.	0	
City	Chi-Square	8.716	Rejected
	df	2	
	Asymp. Sig.	0.013	
Education	Chi-Square	64.201	Rejected
	df	3	
	Asymp. Sig.	0	
Occupation	Chi-Square	12.804	Rejected
	df	4	
	Asymp. Sig.	0.002	
Monthly Household Income	Chi-Square	103.959	Rejected
	df	5	
	Asymp. Sig.	0	

Findings:

From the data collected, below finding are listed.

- Perceived Usefulness, Perceived Ease of Use, Social Influence, Perceived Compatibility, Hedonic Motivation, Perceived Risk, Attitude and Brand Image affect purchase intention towards smart watch as these factors build positive or negative attitude towards smart watch.
- Significant difference was not found in Purchase Intention for Smartwatch based on Gender.
- Significant difference was found in Purchase Intention based on Marital Status, Age, Occupation, Education, City (Place of residence) and Monthly Household Income of the respondent.
- Mean Rank suggests that Females are having more intention to Purchase Smartwatch in comparison of Male respondents. In case of Marital Status, Respondents who are not married have more intention to purchase smartwatch in comparison of Married respondents.
- Mean rank also suggests that the respondents who fall in the age group of 18-27 years, respondents having Post Graduation as education, respondents who are not working and need to track their health habits, respondents who fall in the category of income less than Rs. 1 Lac are having more intention to purchase smartwatch in comparison with other respective alternatives.

Implications and Contribution:

This research can be applied to other wearable categories like smart glasses, smart accessories, smart apparels etc. to identify the factors that lead customers towards having purchase intention of the smart wearables. The study will help smart watch manufacturing companies and advertisement agencies to focus on the above identified factors to attract more customers purchase the smart watch. Manufacturers should more focus on usefulness, ease of use, hedonic factors and compatibility to attract customers. Manufacturers should try to consider perceived risk associated with consumer attitude. Smart watches can be advertised in a way including social circle like family, friends and peers which can lead to positive attitude towards acceptance and purchase intention towards Smart Watch.

Conclusion:

The results showed nine factors were successfully constructed using factor analysis and assigned as the factors affecting purchase intention towards smart watch; which are 1) Perceived Usefulness, 2) Perceived Ease of Use 3) Social Influence, 4) Attitude 5) Perceived Risk 6) Hedonic Motivation 7) Perceived Compatibility 8) Brand Image. The identified factors build positive or negative attitude towards Smart Watch. If attitude is positively formed it will lead to purchase intention. Except Gender, Significant difference was found in Purchase Intention for smartwatch with reference to Age, Marital Status, Occupation, City, Education and Monthly Household Income.

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