

# MOBILE HEALTH APP ADOPTION IN INDIA: A COMPARATIVE STUDY

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**Abstract:** Internet penetration and technological innovation helped India to reach more than 300 million smartphone users. There are innumerable mobile applications available for one or the other services. Health and wellness industry is not an exception. This paper primarily focused on how people are adopting and is there any difference among males and females in the adoption. Data is collected using non-list based online probability sampling using social media, email, WhatsApp etc. Five important parameters PU (potential usefulness), PEOU (perceived ease of use), favourable attitude, usage intention and trust considered to understand the difference between male and female and among different age groups. Results clearly show that females are adopting technology faster than their male counterparts. Users, who are Generation X, adopt mobile health app technology especially female, and to understand the significant difference between different group z-test is used. There are various research papers available regarding technology adoption, comparative study on mobile app adoption but related to health app very few are there. No study, focus on health app study particularly from age and gender wise. This study focuses and addresses this research gap.

**Keywords:** Mobile Health App, TAM, Digital Health, Gender, Generations.

## I. INTRODUCTION:

Mobile phone is a fastest growing industry, and it has got a huge impact on our life. Once it was a luxury, now moved to the most essential product category in our life. We can understand the market growth with several studies done recently. As per a new study conducted by an US agency China will have highest number of smartphone users, 1.3 billion, in 2018, followed by India with 530 million users. At present more than 300-400 million people are using smartphones. As per Internet and Mobile Association of India (IAMAI) and market research firm IMRB International, the smartphone users in India will reach to 450-465 million (**The Indian Express, 2017**). Based on several research it is evident that people tend to use mobile phone for internet access compared to other device. One study by US agency zenith says that mobile devices will account for 73 per cent of time spent using the internet in 2018 – up from 70 per cent in 2017. This number will increase yearly with a rapid rate (**The Indian Express, 2017**).

India is a sweet spot for smartphone user growth. After Jio launched its 4G services in September, 2016 price war started in the country even high-speed data plans are available for as low as 149 rupees a month. A report titled Counterpoint Research, 2017 by Google and KPMG says 78% use internet via mobile device (Iyengar, 2017). These developments have given opportunity to many service providers use mobile application as an effective contact point and customer engagement. Yahoo flurry analytics reported that India's app usage grew six per cent in 2017 as users continued to spend more than five hours a day on their smartphones. Though compared to 2016 growth rate which was 11%, it is less and clearly shows an app's need to build daily usage habits in order to remain in users' mobile phone (Economic Times, 2018).

If we look at various generations using internet and smartphones then millennials and generation Y are leading. But, Ericsson Mobility Report revealed that the percentage of people from 30 plus age group using mobile data has witnessed sharp surge between 2013 and 2015 (Vora, 2016).

India is going through healthcare transformation phase. 2000-10 has been earmarked upon this journey through structural reforms and re-emphasizing the vision of minimum set of services for all. It is expected that growth in this decade and next depends on reforms and digital advancements. In this segment there are several government initiatives like Mother Child Tracking System (MCTS), Mother Child Tracking Facilitation Centre (MCTFC) etc. are quite promising. Electronic Medical record, Mobile Healthcare, Hospital Information System and Electronic Health Record few important things to note. Few start-ups like Practo, Lybrate, Ziffy and MedAngels which is also called mobile health and wellness apps (Mishra, 2017). In May, 2017, India tabled a resolution for m-Health, which was supported by 30 nations. So, India is clearly becoming global leader in digital health (Economic Times, 2017). National Health Portal of government of India on records 50 mobile apps, 23 websites and 1 mobile site in healthcare (National Health Portal, 2017)

This study investigates the adoption of mobile health app adoption in India. Primary focus of the study is to understand the differences among male and females and how millennial, Gen X, Gen Y and older people differs in terms of adoption. Following are the objectives of the study:

- To understand the adoption of mobile health app and its usage in India
- To understand how male and female differs in mobile health adoption
- To explore the difference of adoption among below 30 and 30 plus people

## II. THEORETICAL BACKGROUND: A BRIEF PERSPECTIVE:

The theory of reasoned action (Ajzen I. &, 1969) is among first few models which helped to understand technology adoption. This theory explains that individuals are making systematic use of the information which is available to them. Originally, conceptualization of this theory, belief, attitudes, behavioural intentions and behaviour were considered as the determinant variables to explain relationships between attitude and behaviour. This model helps in predicting the intention to perform a behaviour based on an individual's attitudinal and normative beliefs. This model extended later, Ajzen accommodated changes and as a result this was renamed as theory of planned action (Ajzen, 1991).

Author selected TAM (Davis, 1989) as a theoretical foundation because it has extensive empirical support for various technology and service related technology (Morosan, 2014). Moreover, TAM can easily be used to capture specific technology and business contexts (Lee, 2003), such as adoption mobile application in various services including healthcare. Various reviews of mobile marketing literatures (Okazaki & Barwise, 2011), shows that TAM is widely applied theory in recent studies by various experts.

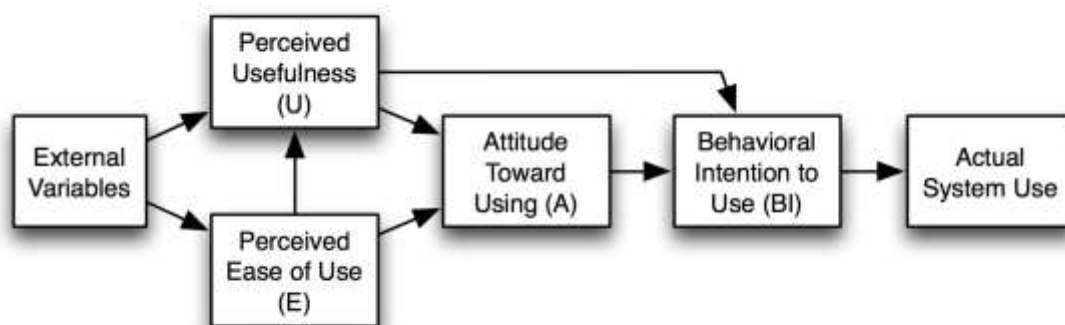


Figure1: Technology Acceptance Model (Davis, Bagozzi, & Warshaw, 1989)

In this study, the core of TAM (PU, PEOU, ATU and BI) were adapted from existing studies by experts like Davis, 1989; Wu W.W. (Wu, 2011); (Igbaria, Zinatelli, Cragg, & Cavaye, 1997); (Venkatesh, Morris, Davis, & Davis., 2003). One study by Birkhäuer J, et al., shows that there is a high correlation between trust and customer satisfaction (Birkhäuer, Gaab, Kossowsky, Hasler,

Krummenacher, & Werner, 2017). Author used seven point Likert 7 point scale from 1 being strongly disagree and 7 being strongly agree. Following questions were used to collect data.

To understand Potential Usefulness following questions have been asked:

It is defined as a prospective user's subjective probability that using a specific technology or system will increase the user's performance.

I believe mobile health app saves time to find doctors in the locality  
 I believe it is useful to find good doctors  
 I believe mobile health app recommendation score is useful  
 I believe mobile health app appointment score is useful

To understand PEOU following questions have been asked:

This is defined as the degree to which a prospective user expects a specific technology or system to be free of effort.

I believe mobile health app make getting doctor's appointment easy  
 I believe mobile health app is easy to use.  
 I find its features simple and understandable.  
 I believe use of mobile health app is trouble free.

To understand attitude towards health apps following questions have been asked:

Attitude is user's favourable or unfavourable feelings toward using a specific technology or system.

I have favourable attitude toward using mobile health app  
 I believe that the use of mobile health app is beneficial.  
 I like the idea of booking appointment through mobile health app.

To explore the usage intention (BI) toward health app following questions have been asked

Behavioural intention is the direct determinant of a prospective user's technology or system usage, a necessary precursor to the actual behaviour.  
 I will certainly use mobile health app to book doctor's appointment  
 If I were asked about my opinion on mobile health app, I would say something favourable.  
 I intend to use mobile health app as and when medical services required

Trust has been measured using the following questions:

In this study trust is very important factor. It is defined users' confidence and confidentiality of personal information he shares.

Mobile health app is a trustworthy service provider  
 I can count on mobile health app to find quality doctor  
 I can count on mobile health app to maintain privacy of my medical history  
 Mobile health app can be relied on to keep its promises.

In India there is no dearth of mobile apps in health sector. Government of India National Health portal last updated on Jul 28, 2017 enlisted 50 mobile health app catering different needs (National Health Portal, 2017). This study tried exploring how male and female, different generation differs in terms of mobile health app adoption. The study is unique of its own kind because all studies focus more on just how apps are adopted. But how do different consumer segment differ has not been addressed till date particularly for mobile health app. Many studies previously conducted how people adopt technology, for example one study by Darian found that female with children and single males below 40 years are most likely to use self-service technologies in home shopping (Darian & Jean, 1987).

According to the study of statista.com, the majority of the internet user base in India will be male in 2020 at around 60 percent (Statista.com, 2018). A study found that the age and gender play a big role in the amount and type of phone and app usage (Andone, et al., 2017). Moreover, another study reports that women install 40% more app compared to male, purchase 17% more paid app and pay astoundingly 87% more for those mobile application (Koetsier, 2013).

The next important factor in the study is the generation in India and their way of using mobile in particular. There are different studies to understand generation based on the cohort. But experts opine, in case of India, the world's cohort of classifying generation is irrelevant (Kapoor, 2012). Ankita Sharma, classified based on various studies and opinions. They are, Generation Silver: born after independence, age 40 and above, Generation X: born in the 1970s, age 30-40, generation Y: born in 1980s, age 20-30, and Generation Z: born after 1995, age 17+ (Sharma, 2017). Another study classifies India generation in three major cohorts as Traditional : born between 1948-1968, Non-Traditional born between 1969-1980 and Generation Y: born after 1981 (Hole, Zhong, & Schwartz, 2010) .

### III. OBJECTIVE OF THE STUDY:

- (i) To understand the adoption of mobile health app and its usage in India
- (ii) To understand how male and female differs in mobile health adoption
- (iii) To explore the difference of adoption among below 30 and 30 plus people
- (iv) To understand the usage intention affected by potential usefulness, perceived ease of use and trust.

### IV. RESEARCH METHODOLOGY:

In this research paper internet based non list based random sampling is used. Non-list-based random sampling methods helpful in the selection of a probability-based sample without enumerate a sampling frame. In traditional method, random digit dialling (RDD) is a non-list-based random sampling method that is used mainly for telephone surveys. (Fricker, 2008). Total 225 responses are collected. One qualifying question is being asked before participating in this survey whether they have used mobile health app or not. Only those who have ever used considered for further questions.

Data is collected using online platforms like Facebook, emailing, WhatsApp, Google+ etc. The research is descriptive one with cross section design.

**V. HYPOTHESIS:** Based on the literature review and

H<sub>1</sub>: Males PU is significantly differs from Female

H<sub>2</sub>: Males PEOU is significantly differs from Female

H<sub>3</sub>: Females significant differs with male in terms of Usage Intention

H<sub>4</sub>: Males and female differs in terms of favourable attitude

H<sub>5</sub>: Males and females significantly differs in terms of trusting health apps

H<sub>6</sub>: Generation Y PU is significantly differs from Generation X

H<sub>7</sub>: Generation Y users PEOU is significantly differs from Generation X users

H<sub>8</sub>: Generation Y users significant differs with Generation X in terms of Usage Intention

H<sub>9</sub>: Generation Y users and Generation X differs in terms of favourable attitude

H<sub>10</sub>: Generation Y and Generation X significantly differs in terms of trusting health apps

**RESULTS AND DISCUSSIONS:**

From table 1, it is clearly visible that females find mobile health app more useful than males. Since such mobile apps are not prominent in market therefore results are not very favourable. All the parameters show males are lags behind females in terms of Potential usefulness, Perceived Ease of Use, Favourable attitude towards health app, Usage Intention (BI) or even trust.

**Table 1: Male-Female Adoption of Mobile Health App**

(significance level at 5% {critical value at 95% i.e.  $-1.645 < Z < +1.645$ }).

Criteria	Female		Male		Z-Score
	average	stdev	average	stdev	
PU	4.45	1.86857	3.82	1.87108	2.382987
PEOU	4.94	2.125234	3.865	1.959881	3.669366
Attitude	4.6	1.977349	3.833333	1.999161	2.731546
BI	4.653333	2.076206	3.78	1.928951	3.044605
Trust	4.38	1.96135	3.63	1.747414	2.801937
No. of Respondents	75		150		

The significance level is kept at 5% {critical value at 95% i.e.  $-1.645 < Z < +1.645$ ). Based on results first alternate hypotheses are accepted because values are beyond the critical region. Therefore, we may say:  $H_1$  : Males PU is significantly differs from Female. It is evident that females are finding it more useful compared to male counterpart.

The second hypothesis was about perceived ease of use that degree to which a prospective user expects a mobile health to be free of effort. Since the Z value is beyond critical region. Hence, alternative hypothesis is accepted i.e.  $H_2$  : Males PEOU is significantly differs from Female. It is very clear that females are finding it more easy to use compared to male counterpart.

Third hypothesis was about usage intention. Based on result alternate hypothesis is accepted because values are beyond the critical region i.e.  $H_3$ : Females significant differs with male in terms of Usage Intention.

Fourth hypothesis was about favourable attitude. Based on result alternate hypothesis is accepted because values are beyond the critical region i.e.  $H_4$ : Males and female differs in terms of favourable attitude.

Fifth hypothesis was about trust. Based on results first alternate hypothesis is accepted because values are beyond the critical region i.e.  $H_5$ : Males and females significantly differs in terms of trusting health app.

In table 2, looking at the z value in each parameter, we may conclude that young (18-30) female and male are not significantly different on PU and attitude. But on parameter like PEOU, Usage Intention (BI) and Trust they differ significantly. So we may conclude that young males and females in general don't need medical services frequently, therefore, perception of PU and favourable attitude male and female are same.

**Table 2: (18-30) Male-Female Adoption of Mobile Health App (significance level at 5% {critical value at 95% i.e.  $-1.645 < Z < +1.645$ }).**

Criteria	18-30 Female		18-30 Male		Z-Score
	average	stdev	average	stdev	
PU	4.140625	2.141849	3.574074	1.743938	1.552804
PEOU	4.46875	2.449286	3.583333	1.913358	2.14634
Attitude	4.166667	2.250295	3.617284	1.978433	1.400776

<b>BI</b>	4.479167	2.426125	3.703704	2.029641	1.861793
<b>Trust</b>	4.34375	2.323919	3.685185	1.870736	1.668895
<b>No. of Respondents</b>	<b>48</b>		<b>81</b>		

Based on the result it has been found that females are more inclined towards mobile health app compared to male.

**Table 3: (18-30) to 30+ Adoption of Mobile Health App (significance level at 5% {critical value at 95% i.e.  $-1.645 < Z < +1.645$ }).**

Criteria	18-30		30+		Z-Score
	Average	stdev		stdev	
<b>PU</b>	3.784884	1.913343	4.359375	1.815435	-2.29411
<b>PEOU</b>	3.912791	2.162277	4.640625	1.882682	-2.69079
<b>Attitude</b>	3.821705	2.092084	4.447917	1.870565	-2.36051
<b>BI</b>	3.992248	2.208516	4.177083	1.733032	-0.70317
<b>Trust</b>	3.930233	2.066988	3.8125	1.522204	0.492023
<b>No. of Respondents</b>	<b>129</b>		<b>96</b>		

In Table 3, Generation X (30+ age) people find mobile health app more useful, easy to use and have favourable attitude. But usage intention and trust has to be improved by the marketers and score is relatively less on those parameters.

Author observed that Generation X (30+ age) people have responsibility of family and frequently use medical services for themselves or significant others. Therefore, scores are higher compared to young age people but as far usage and trust are concerned there is no difference between the generations. This will help them to increase more usage instead of focussing youth Generation Y. It is evident that females are finding it more useful compared to male counterpart.

The significance level is kept at 5% {critical value at 95% i.e.  $-1.645 < Z < +1.645$ ). Based on results sixth alternate hypothesis is accepted because values are beyond the critical region. Therefore, we may conclude that:  $H_6$ : Generation Y PU is significantly differing from Generation X. Generation X find mobile health app more useful compared to generation Y.

The seventh hypothesis was about perceived ease of use that degree to which a prospective user expects a mobile health to be free of effort. Since the Z value is beyond critical region. Hence, alternative hypothesis is accepted i.e.  $H_7$ : Generation Y users PEOU is significantly differs from Generation X users. Result shows that females are finding it more easy to use compared to male counterpart.

Eighth hypothesis was about usage intention. Based on result null hypothesis is accepted because Z-score is within critical region i.e.  $H_{8\text{Null}}$ : Generation Y users do not significant differs with Generation X in terms of Usage Intention.

The ninth hypothesis was about favourable attitude. Based on result alternative hypothesis is accepted, because Z-core is beyond critical region i.e. Generation Y users and Generation X differs in terms of favourable attitude. We can see generation X are having more favourable attitude compared generation Y.

Last hypothesis which talks about the trust differences between generation X and generation Y. Based on result, we may conclude that there is no significant difference between generation X and Y i.e.  $H_{10\text{(null)}}$ : Generation Y and Generation X do not significantly differ in terms of trusting health apps.

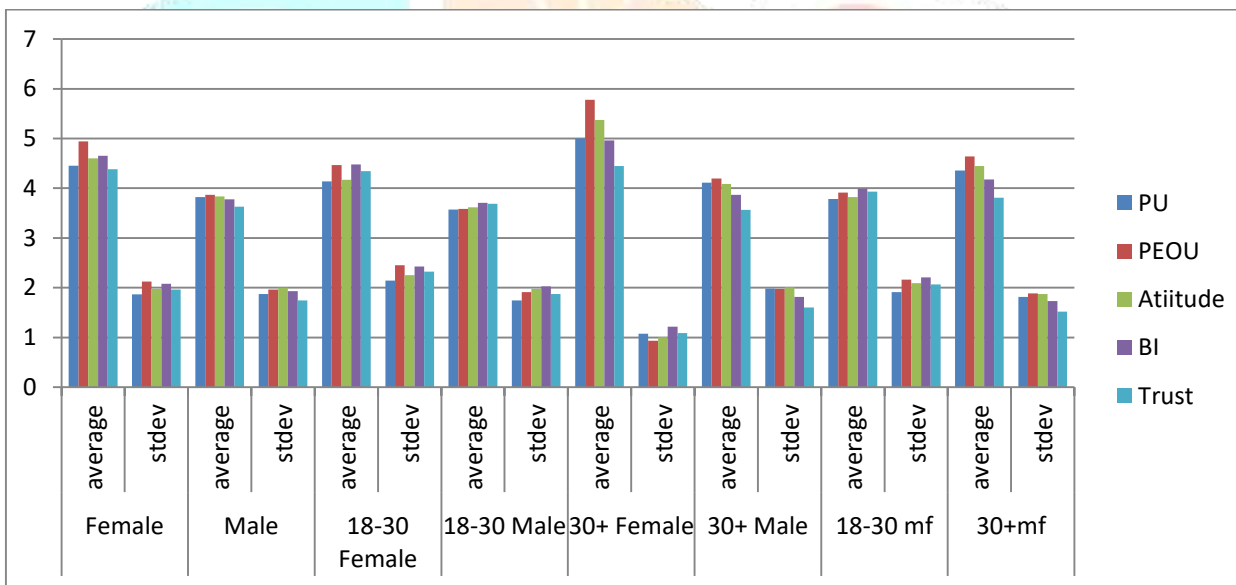
The most interesting observation in this study is comparison of male female of generation X, which are the main target customers by most of the mobile health app providers. In table 4, it is very clear that on all parameters females are more inclined towards mobile health app compared to males.

**Table 4: (30+) Male-Female Adoption of Mobile Health App (significance level at 5% {critical value at 95% i.e. - 1.645<Z<+1.645}).**

Criteria	30+ Female		30+ Male		Z Score
	average	stdev	average	stdev	
PU	5	1.074172	4.108696	1.984072	2.855263
PEOU	5.777778	0.9337	4.195652	1.975898	5.366703
Attitude	5.37037	1.005682	4.086957	2.00787	4.1924
BI	4.962963	1.213645	3.869565	1.814266	3.464092
Trust	4.444444	1.086042	3.565217	1.601729	3.132612
No. of Respondents	28		70		

This is the most important segment in the market. There are various studies show that in terms of technology adoption females are behind their male counterparts. But in this study it is very clear that Generation x female are finding it more useful, easy to use, have favourable attitude along with higher trust level and more interested to use the app in future or currently. Marketers need to focus this while promoting their mobile health app.

**Graph1: Mean and Standard deviation of PU, PEOU, Attitude, BI, Trust**



**VI. CONCLUSIONS:**

One study reports that women install 40% more app compared to male, purchase 17% more paid app and pay astoundingly 87% more for those mobile application (Koetsier, 2013). In this study author observed that compared to generation Y, generation X scores higher on PU, PEOU and favourable attitude. But on two parameters i.e. trust and usage intention (BI) there is no difference. Across all age groups or generations females find mobile health app more useful, easy to use, have favourable attitude. Since, generation X is a major decision maker for health related services. All health app developer should focus them while positioning their product. To increase the usage rate among generation Y not just health but wellness should also be included. This study has not included wellness in the study though many mobile apps in this industry offer this feature in their apps. This could probable future research scope. This research suggest marketer to give priority to female particularly generation X because they will help them to improve their trust score in the market. Unlike other mobile apps in the market, health apps may use females as their opinion leaders.

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