Determinants of Motivation on Consumer Adoption of Healthcare Applications

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Abstract

With the sudden shift towards the digital era, technology is now incorporated in nearly all aspects of human life. The change in behavior of users is not easy and is generally bound by a lot of motivational factors to influence users to go for a particular product. mHealth is a term recognized by the world health organization and it is a simple term for the incorporation of technology in the world of health care. This study aims at understanding the determinants of motivation behind the adoption of mHealth by a large population of our country. VROOMs expectancy model of motivation was used where respondents were asked about the 3 components of the model that is, expectancy, instrumentality and valence and the factors of motivation were understood. A total of 181 respondents were taken for this study and factors such as easy, fast delivery and 24x7 availability of medical help emerged as the key factors attracting users to choose mHealth or e-pharmacies over offline stores.

Key words: mHealth, VROOM's expectancy model, Motivation, Factors, Factor analysis

Introduction

Technology has bonded the whole world with Mobile devices available to more people in all developing countries just like power grids, road systems, water works, or fiber optic networks.

The advent of mobile telephony has rapidly bridged the gap for communities that were previously marginalized by public agencies and overlooked by private markets. Mobile services now serve as a vital conduit for the public and private sectors to connect with these communities, especially in the field of health. This report provides an overview of the current landscape of mobile health (mHealth), highlights potential obstacles to its development, and sheds light on pertinent issues for donors and governments as the industry continues to evolve.

mHealth

mHealth is the use of mobile technology integrated with healthcare to provide care for patients as well as technical support to healthcare providers. This technology is direct, low cost and is the new tomorrow with many emerging trends. Mobile health is about making the use of mobile and other wireless devices for the provision of providing healthcare. Mobiles are easy and convenient way of performing complex tasts and can provide a better outcome in the filed of healthcare. The features of healthcare range from simple means of sending a notification or a reminder to capturing integral clinical data and interpreting it.

In the context of our country, the population is becoming more and more tech-savy and the need to incorporate technology in an easier as well as a convenient means of access to receiving care has increased.

Scope of mHealth

The use of mHealth for delivering adequate care is increasing and there is a substantial projected growth to be seen in the coming years with respect to this field. The global average of mobile internet traffic as of 2017 is at a total of 50% with India ranking second on the scale having a 78% traffic. The behavioral change of users who are now adapting to the internet and accessing it through their mobile phones is an important factor for mHealth adoption. An average citizen of a country spends three hours on their smart phones and after the pandemic these hours are increasing making it obvious that mobile technology has the potential to have an impact on all aspects of human life including health and wellness.

Significance of mHealth

India has been among the few countries to lack in healthcare services being provided to the vast majority of population. This creates a need for innovative ways being implemented for providing care and compensating for the deficit workforce and infrastructure. The major lapse can be seen in the rural areas where quality healthcare is missing due to low-income levels of the population. In addition, a large part of India lacks the basic healthcare facilities. Thus, it becomes even more important to leverage newer, innovative ways for incorporating quality affordable care available for all.

Purpose of Study

The purpose of the study is to understand motivation of young consumers to use mobile applications in healthcare by generating VROOMs expectancy theory of motivation using grounded theory approach.

Objective

- **Understand the motivation behind adoption of technology in healthcare industry.**
- **Understand the motivation behind usage of healthcare apps by consumers looking for healthcare requirements.**
- **Understand the drive behind the shift towards mHealth.**
- **Application of VROOMs in adoption of mHealth**

Theoretical framework

VROOMs Model

Vroom's expectancy theory, also known as the Expectancy-Valence theory, is a psychological model that explains how people make decisions and engage in behavior based on their expectations of the outcomes and the perceived value of those outcomes. It has significant implications for marketing as it helps businesses understand how consumers evaluate their purchase decisions and what factors influence their buying behavior. Vroom's expectancy theory is based on three key components: Expectancy, Instrumentality, and Valence.

COVID-19 and the impact on mHealth

COVID brought about a great change in everyone's life and the social distancing led to people relying on technology for their health care requirements. The structural change in the healthcare system persisted even after the pandemic ended and the impact is felt by all. Covid was the much-needed push that digital

transformation needed and this helped in the penetration of technology in all aspects of human life. There was a growth in the number of downloads of healthcare apps worldwide and in the graph, we can see that there was second highest growth in India.

Limitations of the study

- **Behavioral outcome:** The studies doen till now have a major focus on the adoption of mobile technology and not on how the outcome of this usage might be. A detailed analysis of behavioral outcome with respect to increased mHealth is missing.
- **Digital divide:** there have been a lot of talk about how the digital transformation is aiding everyday tasks, but in a developing country like India there still exists many locations where the access to internet is limited and the convenience for drug availability is missing.

Literature Review

A shift towards online stores

The preference of stores and purchase decision of a user to opt online or offline store has seen a shift towards online stores. Factors such as touch and feel of a certain product or delivery time from a certain brand impact the decision of a consumer's decision to choose online or offline store. (Kulkarni, 2020) Due to the outbreak of the pandemic, social distancing became the new normal and thus the shift to online stores was seen and this shift was a push die the following factors, anywhere, anytime delivery, saving store time, contactless safe delivery, and larger variety of goods. Before the pandemic the factors of touch and feel of a product were the major influence for any product buying decision but later due to the fear of infection and prioritizing healthcare the shift happened towards preferring products with distancing to safe guard health.

E-Pharmacies in India

The market of e-pharmacies grew exponentially and capitalized on providing convenient healthcare. People who are unable to travel, have chronic diseases or who live alone benefited the most from this boom. E-pharmacies penetrated with competitive prices, providing much more affordable drugs than well known brands. A few factors that led to influencing consumers adoption, usage, and intent behind the pharmaceutical purchase on e-pharmacies are the availability of medicine, shorter delivery time and authenticity. (Aman Agarwal, 2021)

Perception and attitude towards mHealth

Certain studies aim to understand the perception that users have towards mHealth and what is the attitude consumers show towards this. The study revealed that consumer perception had a positive impact on the attributes which builds a confident positive image of miHealth application. Apart from this rating and popularity of the application also plays an important role in creating a positive perception of mHealth. Privacy, inaccurate information, app dependency and risks associated with use of miHealth are some of the factors which cause fear in the respondents' mind and can affect or cause a negative perception or attitude towards the application. (s. Selvabaskar, 2017)

User experience in mHealth

User experience simply means how well an application is made and what experience does it provide to the users. This is generally application to any largely available mobile application. Factors that affect the experience of a user and impact their perception of that particular application are as follows: engagement, functionality and aesthetics. The quality of information available is also a large factor that is responsible for affecting the user experience and mHealth being a part of health care industry, the relevance of information grows drastically thus correct accurate data is a major factor affecting the user experience of any customer. User experience with respect to ease of delivery, payment methods and others also play an important role in this field.

User motivation

The adoption of smart phones in the current world has led to a hope for improvement in health care sector services. Adoption rate still remains low due to various issues amongst which engagement. A study is done to understand the major factors that help in elongating the use of mobile health system where people from various backgrounds were taken and questions related to the use of smartphone with respect to health were asked. (Ashenafi Zebene Woldaregay, 2018) people with a history of disease showed more interest in the use of these applications and factors such as privacy and trust were known to influence the use of mHealth the most.

Research Methodology

Apply VROOM's expectancy model of motivation to understand the desire behind consumers using mobile application for the health care needs.

Research design

The research design in this study is descriptive design as this study aims to understand and describe the factors that are influencing the adoption of mobile applications in the healthcare sector.

Data Collection

Primary data was used for this study and the primary data collection was done by a google form.

Primary data collection

With respect to the primary research, a google form was circulated to understand the level of awareness about medical applications among all age groups. The questionnaire was based on the expectancy, instrumentality and valence aspects of the VROOMs model with respect to mobile application usage.

Sample size: 174

Scale used: Likert scale.

Data Analysis

The responses were collected from all demographic profiles to have an overall understanding of awareness about mHealth among all age group users who are working in various domains but have similar health

requirements. The dominant age group that emerges out is of people from **46-55 years age group working professionals.**

Reliability Test

Cronbach alpha is a test that measures reliability of the data. It is also known for measuring the internal consistency that a particular data set has and is generally used to see if various questions of a Likert scale measured survey are reliable or not. The formula to calculate Cronbach alpha is given below.

$$\alpha = \frac{N \cdot \bar{c}}{\bar{v} + (N-1) \cdot \bar{c}}$$

N represents the number of items of data set

$\bar{c}$ represents the average covariance between item-pairs.

$\bar{v}$ represents the average variance.

The acceptable value of alpha is generally 0.7 or above which shows that the items of the data set are related to each other.

Cronbach alpha test on the primary data

The Cronbach alpha test for the data collected was performed on SPSS and the following results were obtained.

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.862	.866	11

Table 1 Reliability statistics with Cronbach alpha value

The reliability statistics shows the value of alpha 0.86 which shows higher internal consistency and is higher than the acceptable value 0.7 thus indicating that the items in the data collected are corelated and are suitable for statistical analysis.
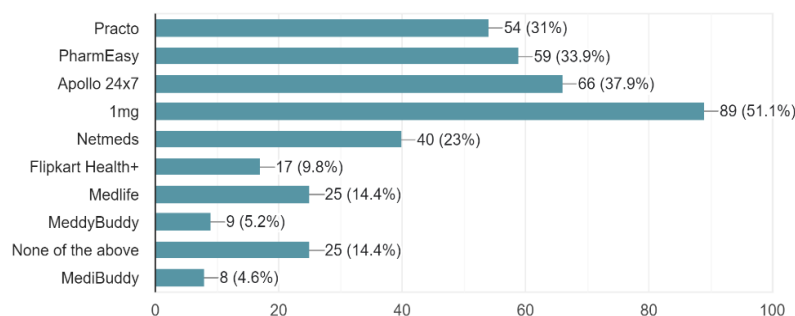
Customer Preference

Figure 4 chart showing the preferred application of a healthcare app user.

When the users were asked about their preferences and which application do the use, **1mg** stood out with the maximum number of users using this application.

VROOMs Analysis

VROOMs expectancy model states that any user is motivated to buy a product or use a service due to 3 components that led to motivation.

Expectancy indicated the factors that a user is looking forward to while using a certain application. It can also be considered as the ease of use of these applications. The factors associated with the choice of application were given to users. The user experience and features of the application are the top two factors associated with the selection of application by user.

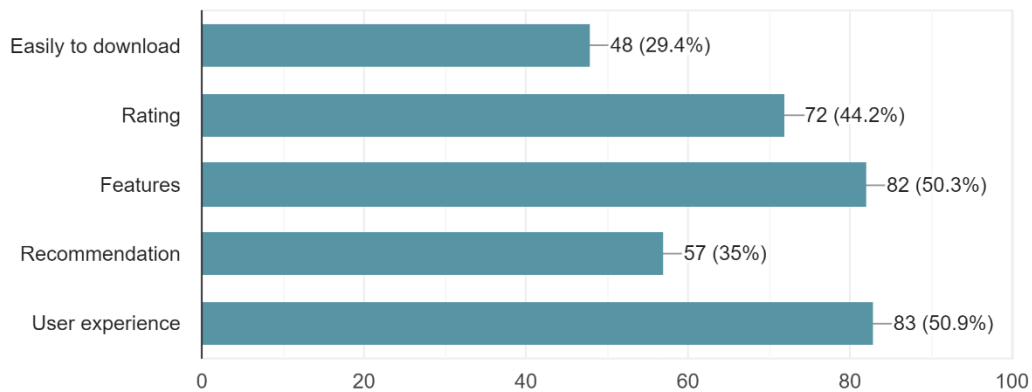What aspects do you look when choosing an app
163 responses

Figure 5 Chart showing the factors preferred by the user with respect to ease of use of the application.
The second part **instrumentality** of the VROOMs model is associated with the competency which simply indicates the perception a user have about whether they will receive the desired outcome. The factors associated with it were given out of which 24x7 availability is the factor that stood out and most users prefer the application to have this feature.

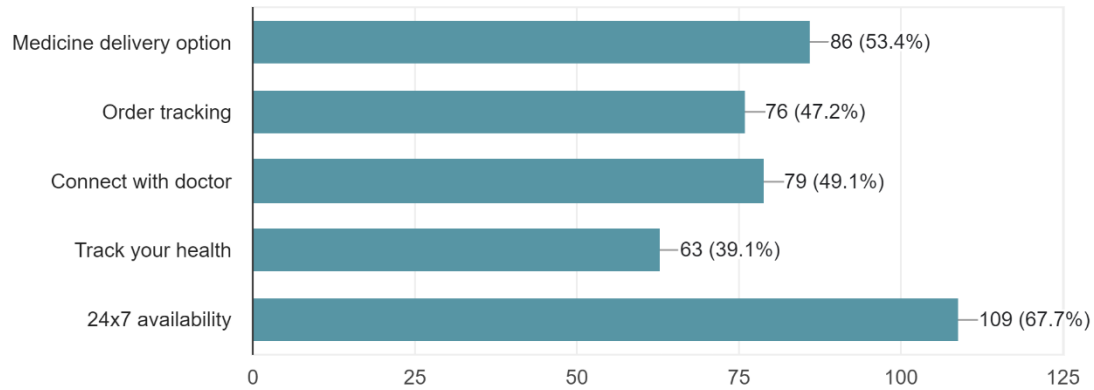What features do you feel an ideal mHealth app should have?
161 responses

Figure 6 Chart showing the factors preferred by the user with respect to preferred features of the application.

The last component of VROOMs model is the **valence**, that is the emotional aspect people have with respect to the outcome. It can also be considered as the satisfaction that user gets while using the application. When we look at the primary data obtained, we find that easy and fast delivery leads to the satisfaction of users.

List a few factors that affect your satisfaction in using such apps
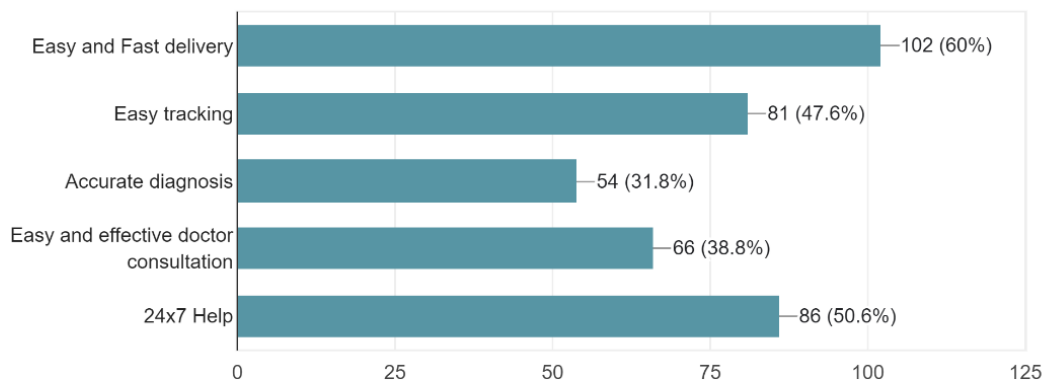170 responses

Figure 7 Chart showing the factors preferred by the user with respect to satisfaction associated with using the application.

Factor Analysis

Factor analysis is a technique used on statistical data for the purpose of data reduction. The large number of factors are reduced to fewer factors. This test extracts maximum number of variance that have similar value and puts them together.

KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.828
Bartlett's Test of Sphericity	Approx. Chi-Square	669.484
	df	55
	Sig.	.000

Table 2 The KMO value associated with the sampling accuracy.

Kaiser-Meyer-Olkin value measures the sampling accuracy, and the value is generally between 0 to 1, the higher the value the better accuracy it has. The acceptable value is 0.6 and above indicates the data is accurate for statistical testing.

Rotated Component Matrix

The rotated factor loadings represent how each factor is corelated with the variable and how each factor is weighted. The values generally range from -1 to +1 and values less than 0.3 are automatically removed for easy interpretation of data.

Rotated Component Matrix[a]

	Component	
	1	2
VAR00001	.495	.513
VAR00002	.223	.858
VAR00003	.136	.869
VAR00004	.007	.830
VAR00005	.552	.471
VAR00006	.773	.103
VAR00007	.575	.256
VAR00008	.724	.039
VAR00009	.706	.121
VAR00010	.796	.050
VAR00011	.636	.357

Extraction Method: Principal Component Analysis.

Rotation Method: Varimax with Kaiser Normalization.

a. Rotation converged in 3 iterations.

Table 3 Rotated component matrix of factor analysis

The values to be considered should be above 0.6 and in the above table of rotated component matrix, we see that the values of component 1 that need to be considered are 6,8,9,10 and now looking at the component 2 table we analyze 2,3,4 values are ideal to be considered.

Data reduction is done, statements are compiled to result into 2 main factors from one of each component. The factors obtained are:

1. **Easy to use application experience.**
2. **All round Efficient monitoring and tracking**

Findings

● Primary research shows 1mg, Pharmeasy and Apollo 24x7 to be the top preferences of customers.
● India ranks amongst the top country to have the greatest number of downloads during the covid times. Also, India tops the list when it comes to the share of users in the healthcare segment.
● Factors with respect to the three components of vrooms analysis were asked from the users through primary data, user experience, easy and fast delivery and 24x7 availability of medical help stood out among the top factors leading to the satisfaction of user.
● Factor analysis was done for data reduction whose accuracy was confirmed by KMO value and 11 factors were reduced to top 2 factors which were ease to use application experience and all-round efficient monitoring and tracking.
● Marketing seems to be a driving force the success and popularity of these apps The top three preferences are doing extremely well in marketing with the involvement of influencers by 1mg, cricket sponsorship and brand awareness by Pharmeasy or content marketing by Apollo 24x7.

Challenges

● **Usability**

This aspect of mHealth simply means how easily can a user understand and browse through your application. Simplicity plays an important role in the usability aspect, how easy the font is to read, how many steps does it takes to reach to important information, the color combinations used and many more. Research suggests that there is a trust factor associated with the ease of use and simplicity of application. Thus making mHealth applications easy to use and simple to understand helps to inculcate a trust in users when dealing with sensitive things such as the medical records of individuals.

● **Data Security and Privacy**

Medical data is one of the most sensitive data and is private to the respective user. A major challenge in this segment is the literacy of users about data protection. Technology and network definitely binds the world but it is also possible for people to steal personal medical records of people or hamper with it, thus protecting data and addressing security while using these apps becomes very important.

● **Reliability**

One of the greatest challenges when considering mHealth is the reliability associated with mobile and non-mobile devices. This simply indicates how easily the application works when a customer wants it to

and how easy the synchronization of these devices are. Network connectivity and availability are important factors of m Health, reliability indicating if it will work or not. The second element of reliability is the use of accurate information while making the application.

5.1 Suggestions

● **Usability**

Users generally prefer applications that are easy to use and can help them build trust in the technology. The makers of medical mobile applications should keep simplicity in mind to help the users understand how to use and access information.

Integrated diversity - India is a country with various cultures and languages; thus the creators of medical app should keep the diversity in mind and inculcate options of various languages for better user experience and understanding.

● **Data privacy**

When considering medical data, privacy plays an important role and the creators need to be very careful of how they ensure patient data protection. The creators can ensure data privacy by integrating biometric authentication of the patient and having data encryption associated with the cloud. Another way of ensuring data privacy by app creators can be by implementing data access points which represent specific access points where data can be retrieved.

● **Reliability**

The data integration implies smooth access of patient data on all devices and this can be done through data storage over a cloud system while including block chain systems to make sure transfer of data on a secure path thus ensuring reliability of the application being used and inculcate a trust. Reliability being one of the major triggers for users to go for any application, incorporating data integration will help businesses perform well and serve customers better.

5.2 Conclusion

The study focused on understanding the factors that influence consumers to opt for online pharmacies over offline ones. Motivation plays an important role in understanding what leads to the consumer adoption of e-pharmacies and to understand this motivation the VROOMs model was incorporated in the study where the three aspects, expectancy, instrumentality and valence was studied. The paper focused on conducting primary research with 181 respondents with an aim to understand the factors associated with three components of VROOMs expectancy model of motivation. A statistical tool of factor analysis was applied to interpret the user data collected and the results show that ease of use and 24x7 availability of medical help are the top factors motivating consumers to adopt mobile health. In conclusion the health care industry is on its path to transformation and the e-pharmacies are playing an important role towards this push.

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