Analysing Healthcare App Satisfaction: Predictive Analytics Using Stepwise Regression to Identify Key Factors

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Keywords: Healthcare App, Customer Satisfaction, COVID-19 Pandemic.

Abstract: Healthcare applications have become essential tools for individuals seeking diverse health-related services. These applications span from tracking fitness and reminding users to take medication to provide telemedicine services. Their importance has been highlighted, particularly during the COVID-19 pandemic, where these apps played a vital role in improving user satisfaction with public health management. A contented user is more inclined to consistently interact with the app, follow prescribed treatment plans, and promote its use among their circle of friends and family. The researcher considered 297 healthcare app users to conduct the study survey and know the different factors that determine Customers' Satisfaction with Healthcare Apps usage and the impact of different factors determining healthcare app usage on customers' satisfaction. The study concludes that providing intuitive guidance, Value for money, saving time, user-friendly interfaces, and Privacy protection have a significant impact on customers' satisfaction with healthcare apps usage.

1 INTRODUCTION

Healthcare apps have become indispensable tools for users seeking various health-related services, with applications ranging from fitness tracking and medication reminders to telemedicine services. Their significance has been further underscored during the COVID-19 pandemic, where these apps played a crucial role in enhancing users' contentment with public health governance (Cao et al., 2022). However, not all healthcare apps are equally successful in attracting and retaining users. A satisfied customer is more likely to engage with the app consistently, adhere to prescribed treatment plans, and advocate for its use among friends and family. Therefore, exploring the multifaceted elements that contribute to customer satisfaction is essential for healthcare providers, app developers, and policymakers alike.

In understanding the determinants of customer satisfaction for healthcare app usage, the importance of functionality and intended health effectiveness emerges as a central theme (Alnsour et al., 2017). When healthcare apps effectively fulfil their intended purpose while maintaining simplicity and appeal, they tend to garner positive evaluations from users. At the same time, overly complex functionalities that are not seamlessly integrated can lead to negative evaluations. Striking the right balance between adding functionalities and preserving user appeal is crucial for long-term user engagement and satisfaction.

The proliferation of mobile health applications (mHealth apps) in the healthcare landscape highlights the critical factors influencing user satisfaction. Usability, scientific validation, and ethical considerations play pivotal roles in shaping user satisfaction. Usability factors such as user-friendly interfaces and reliable data recording are vital, as is the assurance that information provided is scientifically validated (Pires et al., 2020). Adherence to ethical principles, like privacy protection and trustworthiness, is also important in fostering user confidence and satisfaction. Features such as plans or orders, export of data, usability, and Value for money affect user ratings. Users highly value apps that save time, provide intuitive guidance for condition management, and allow data sharing with designated individuals. Interestingly, the tracker feature, while negatively correlated, is positively linked with the export of data and usability features, suggesting that an efficient tracking process and meaningful output display are essential for users' evaluation (Mendiola et al., 2015).

By exploring the role of mHealth apps during critical public health concerns like the COVID-19 pandemic, assessing functionality and appeal, examining usability, scientific validation, and ethical considerations, and delving into specific app features, this paper aims to provide valuable insights for healthcare app development and marketing. Understanding and enhancing these elements is pivotal for fostering customer satisfaction and loyalty in the ever-evolving landscape of healthcare apps.

2 LITERATURE REVIEW

The study by Wu et al. (2022) reveals that perceived reliability and online reviews significantly impact users' intention to continue using healthcare apps, particularly mobile health applications (mHealth apps). These factors positively influence users' e-satisfaction, with e-satisfaction playing a mediating role. Habit formation is identified as crucial in sustaining mHealth app usage, emphasizing the importance of fostering user habits for app success. A strong habit reinforces the connection between e-satisfaction and the willingness to continue using these healthcare apps. Online reviews and perceived reliability are key elements influencing continued app usage due to the availability of reliable health information.

Health apps have the potential to contribute to senior health promotion, yet they often struggle with low user retention rates. To enhance continued usage of health apps among them it is important to foster health technology self-efficacy and self-evaluative outcome expectations. Knowledge about technology and better usage of it can enable older adults to get better accessible healthcare and promoting senior friendly app design for health apps can improve long term health behaviours in this demographic (Kim & Han, 2021).

Anderson et al. (2016) investigated the factors of consumer engagement with healthcare apps, emphasizing the factors shaping customer satisfaction, and found that key elements influencing user behaviour and satisfaction are app usage patterns, engagement themes, gamification, medical-purpose apps, device convenience, perceived self-management benefits, and integration with healthcare professionals. With a growing demand for self-care, especially among the elderly managing chronic conditions, it's crucial to understand how users interact with these electronic self-monitoring tools.

In a study by Pal et al. (2023), the focus was on user experiences and satisfaction with mobile health (mHealth) platforms, which gained prominence during the COVID-19 pandemic. They identified key

factors influencing user experiences, including time, cost, convenience, responsiveness, and availability. These factors were categorised into two dimensions: strategic adoption and motivational association. They also highlighted the significance of review sentiment in shaping brand perception and enjoyable motivation, especially in aspects like online booking and video consultations.

User satisfaction with healthcare apps, particularly during public health crises like COVID-19, relies on factors such as functionality, performance, and meeting expectations, with a specific focus on features like vaccination. This satisfaction significantly impacts app usage. App developers and policymakers must prioritise improving aspects like functionality, information, performance, security, design, and overall quality to ensure user satisfaction and effective app utilization, especially during such critical times (Samsuri et al., 2022).

Users share their app experiences through various types of reviews, including bug reports, feature requests, performance evaluations, and user interface feedback. It is important to identify categories like bugs, usability, and performance, which are key factors in determining user satisfaction with healthcare apps as by improving these aspects based on user feedback, app developers can enhance customer satisfaction (Al Kilani et al., 2019).

Yu & Huang (2020) studies how to enhance user experiences and satisfaction in yoga apps, particularly the Daily Yoga app and identified sense, feel, think, act, and relate as key factors that influences user satisfaction. This highlights the significance of an attractive interface, data record, and yoga classes in improving user satisfaction.

Reddy et al. (2022) examined factors impacting consumer satisfaction with healthcare apps in the context of telemedicine during the COVID-19 pandemic in India and found high user satisfaction but also the need for app interface improvements. Critical factors influencing consumer attitudes include reliability, proximity to health services, and overall user experience, with age, education, and income influencing perceptions. These apps have reduced patient exposure and enabled remote care, emphasizing their importance.

Fu et al. (2023) explored the complex landscape of user satisfaction and continued usage intention of m-health management apps, an area that is increasingly vital in the context of modern health assistance programs and found that the factors driving m-health app success and customer loyalty mostly depends on aligning app features with genuine user desires. Ultimately, these insights have significant practical implications for businesses and researchers, guiding them in making informed decisions to

enhance app functionality and better meet user needs, thereby ensuring long-term business success in the ever-evolving m-health landscape.

As people become more health-conscious, healthcare apps have become popular and it has become important to consider social factors like subjective norms and personal factors such as how users feel while using the app, their awareness of health, and strategies for changing behaviour while analysing user response to these apps. The extent to which users find the apps useful and easy to use directly influences their experience using them, and the behaviour-changing techniques all affect whether they'll keep using the app. Satisfaction plays a role in this too. How health-conscious someone is can affect how useful and easy they find the app, and how satisfied they are with it (Yan et al., 2021).

The perception of vulnerability positively affects users' belief in their abilities and the effectiveness of protective actions, shaping their attitudes and continued app usage. The presence of network externalities, both direct and indirect also plays a vital role in determining user attitudes, which, in turn, impact ongoing app use. Direct network externalities indirectly affect usage behaviour through attitudes that serve as a key mediator between psychological factors and continued usage, although other mediators may exist. Demographic factors such as age and education level also influence users, with older and more educated individuals exhibiting higher self-efficacy, response efficacy, and a stronger intention to keep using m-health apps (Luo et al., 2021).

3 OBJECTIVES

- To explore the factors determining customer satisfaction for healthcare app usage.
- To ascertain the impact factors determining healthcare app usage on customers' satisfaction.

4 METHODOLOGY

The researcher considered 297 healthcare app users to conduct the study survey and know the different factors that determine Customers' Satisfaction with Healthcare app usage and the impact of different factors determining healthcare app usage on customers' satisfaction.

5 DATA ANALYSIS

Table 1: Factors determining customers' satisfaction.

S. No	Factors determining customers' satisfaction
1.	Fitness tracking
2.	Reliable data recording
3.	User-friendly interfaces
4.	Scientifically validated information
5.	Privacy protection
6.	Trustworthiness
7.	Value for money
8.	Save time
9.	Provide intuitive guidance
10.	Allow data sharing with designated individuals

Table 2: Model Summary.

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.723[a]	.522	.520	.57752
2	.747[b]	.558	.555	.55664
3	.758[c]	.575	.571	.54645
4	.764[d]	.584	.579	.54140
5	.769[e]	.591	.584	.53791

To evaluate the necessity of dimensions of different factors in predicting customer satisfaction, stepwise multiple regression was applied. Table 2 shows multiple linear regression model summaries and overall fit statistics for the dependent variable customer's satisfaction with healthcare app usage. The multiple correlation coefficient of model 1 is .723, indicating approximately 52% of the variance of customer satisfaction could be accounted for Provide intuitive guidance. The multiple correlation coefficient of model 2 is .747, indicating approximately 55% of the variance in customer satisfaction could be accounted for by providing intuitive guidance and Value for money. The multiple correlation coefficient of model 3 is .758, indicating approximately 57% of the variance in customer satisfaction could be accounted for by providing intuitive guidance, value for money, and Saving time. The multiple correlation coefficient of model 4 is .764, indicating approximately 58% of the variance in customer satisfaction could be accounted for by providing intuitive guidance, Value for money, Saving time, and User-friendly interfaces. The multiple correlation coefficient of model 5 is .769, indicating approximately 59% of the variance of customer satisfaction could be accounted for by

providing intuitive guidance, Value for money, saving time, User-friendly interfaces, and Privacy protection.

The results of ANOVA indicate that the dependent variable (customer satisfaction) is statistically and significantly predicted by the independent variables (Providing intuitive guidance, Value for money, saving time, User-friendly interfaces, and Privacy protection) across all the models.

Table 3: Coefficients.

Model	Unst. Coeff.		St. Coeff.	t	Sig.
	B	Std. Error	Beta		
(Constant)	.221	.198		1.116	.265
Provide intuitive guidance	.280	.080	.282	3.507	.001
Value for money	.190	.068	.182	2.794	.006
Save time	.271	.082	.264	3.305	.001
User-friendly interfaces	.083	.037	.092	2.246	.025
Privacy protection	.097	.044	.092	2.191	.029
DV: Customer Satisfaction					

Table 3 shows that there is a significant impact of Provide intuitive guidance, Value for money, saving time, User-friendly interfaces, and Privacy protection on customers' satisfaction with healthcare app usage.
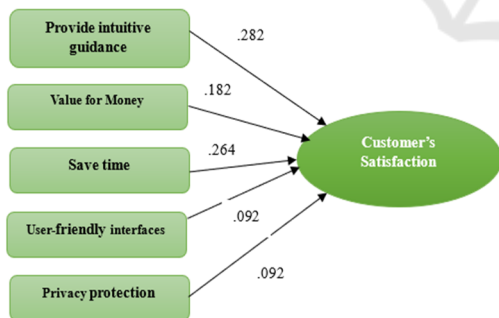

Figure 1: Impact of different factors determining Customers' satisfaction for healthcare apps usage.

Figure 1 shows the unstandardized beta values for each independent variable with its relationship to the dependent variable. It may be interpreted from the values that Provide Intuitive Guidance as the most important variable with a beta value of .282 followed by Save Time with (.264), Value for Money (.192), User-Friendly Interface (.092) and Privacy Protection (.092).

6 CONCLUSION

Healthcare apps have evolved into indispensable tools for individuals seeking a range of health-related services. From monitoring fitness and sending medication reminders to offering telemedicine services, these applications play a crucial role. Their significance became even more pronounced during the pandemic, where they played a vital role in enhancing user satisfaction with public health management. A satisfied user is more likely to engage consistently with the app, adhere to prescribed treatment plans, and advocate for its use in their network. The study was conducted to know the impact of different factors determining healthcare app usage on customers' satisfaction. It is found that factors like Providing intuitive guidance, Value for money, saving time, User-friendly interfaces, and Privacy protection have a significant impact on customers' satisfaction with healthcare app usage.

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