Awareness and Acceptance of Telehealth among Filipinos in the National Capital Region+

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Abstract — *Telehealth has gained interest as the rise of the COVID-19 pandemic threatened the safety of every individual, causing the services' expansion worldwide to minimize the spread of the virus. This study explored Filipinos' awareness, perceptions, and acceptance of Telehealth services and examined the correlation between the variables. Quantitative research design with Descriptive Statistics, Pearson R Correlation, and Multiple Regression were utilized to analyze the data gathered from an online survey questionnaire via Google Forms administered to three hundred eighty-five (385) respondents residing in the National Capital Region+ of the Philippines. Results showed that Filipinos agree about being aware of Telehealth services. The subjects also indicated agreement about having positive usefulness and accessibility perceptions about the service, as well as their agreement to accept Telehealth services. Moreover, results showed a significant positive relationship between awareness and the usefulness and accessibility perceptions of Telehealth. The same is true between the usefulness and accessibility perceptions and acceptance of the service. In conclusion, the research results affirm the awareness, perceptions, and acceptance of Filipinos regarding Telehealth services and highlighted the importance of promoting the usefulness and accessibility of Telehealth services since the two perception variables ultimately affect consumers' acceptance to use the service.*

Keywords — *Telehealth, Technology Acceptance Model, Philippines*

I. INTRODUCTION

The World Health Organization (2021) defined E-Health as the valuable utilization of Information and Communications Technology (ICT) aiding in health-related endeavors, which facilitates Telehealth in general. Additionally, according to Solari-Twadell et al. (2021), as cited in Health IT, the Health Resources and Services Administration (HRSA) stated that Telehealth is an inclusive healthcare service that utilizes electronic information and telecommunications such as the internet, videophone, asynchronous imaging, media streaming, and wireless systems in facilitating long-distance clinical care, medical education, and health administration, while Telemedicine is a healthcare service exclusive to clinical care.

The study aims to explore the attitudes of Filipinos about Telehealth, specifically with regard to their Awareness, Perceptions, and Acceptance of the said service, and to identify the relationship between the said variables. Considering the shift of many industries to digital and virtual means of communication during the coronavirus pandemic, Telehealth usage across the world increased due to several factors, such as social distancing and strict health protocols, as mentioned by Galiero et al. (2020). Relative to the Philippine setting, the study of Macariola et al. (2021) finds that Telehealth is still underdeveloped and is recently introduced to the masses due to quarantines. The stated study also finds that despite Telehealth's introduction in the Philippines due to the country's heightened accessibility to ICT, there is still a growing need for the local government to promote public awareness of Telehealth and provide training programs about the same for healthcare providers.

II. LITERATURE REVIEW

In order to fight the ongoing pandemic, healthcare institutions across the globe use Telehealth services to prevent the spread of the virus (Merrell et al., 2020). Telehealth, as a preventive measure, ensures the safety of both healthcare professionals and patients (Bokolo, 2021). According to Segal et al. (2020), Telehealth requires

supplemental technology to execute its services. While this is a giant leap for the industry, many challenges call for resolutions. Moreover, the study of Bhalerao & Deshmukh (2017) finds that the healthcare industry can utilize Telehealth services with exemplary business practices and marketing strategies to achieve patient satisfaction. This move would subject Telehealth to the Service Marketing Mix: product, price, place, promotion, people, physical evidence, and process. The study of Thomas et al. (2020) finds that the effective integration of the services into the healthcare industry system is an essential factor for the sustainability of Telehealth. Thus, creating a strategy that can fulfill the requirements, especially financial resources, is vital for the progressive implementation of Telehealth services.

A study conducted in United States by Kong et al. (2020) states that as medical students gather more insights and information about Telehealth, it could lead to awareness and interest. On the other hand, according to the study of Malhotra et al. (2020) in India, a phenomenon was proven where medical students from private institutions prefer to skip the whole process and directly accept and adopt the service despite having the proper knowledge and awareness of it. As healthcare is growing dependent on modern technology, this could be a significant factor to include sufficient training and education to let the students gain knowledge about the service, creating a better future for the healthcare industry services. According to Thomas et al. (2020), Consumer needs are essential in the healthcare industry, where many consider Telehealth only for minor health needs. Consumer insights like the previously mentioned could benefit the service and require more focus. A study conducted in Indonesia by Nuruunisha and Dalimunthe (2018) was entitled the awareness and acceptance of MSME owners and operators towards E-Commerce. The stated study focused on perceived usefulness and perceived ease of use with E-Commerce for entrepreneurs, wherein the study concluded that there is a behavioral intention to use the service and the number of benefits contributed to perceived usefulness, creating a significant effect on the acceptance of E-Commerce. In the Netherlands, a medical study by Barsom (2020) states that familiarization with technology and the hesitation of proper assessments were two deciding factors that influenced the preferences of patients.

The development of business models for Telehealth could create more services that would potentially improve the overall experience of the consumers along with its sustainability. Telehealth providers can use perceptions such as consumers viewing Telehealth only as a vital option for minor healthcare needs. However, consumers are open to the use of Telehealth for more severe concerns (Bestsenny et al., 2021). In relation to the previous finding, according to West (2019), Telehealth's services can be improved by addressing barriers, with few studies addressing consumer satisfaction with the service; however, it does not delve into their perceptions, making it challenging to create a feasible plan for the service to encourage the consumers.

Telehealth gained interest as cases of the virus increased. However, to have a successful outcome, the service requires support, including its business model. Moreover, the established business models and roles of medical professionals in the healthcare industry call for modification for the application of Telehealth (Hall Dykgraaf et al., 2021). In relation to the previous statement, a study in Nigeria by Adenuga (2020) finds that social and human factors are connected with the technological aspects which influence the implementation of Telemedicine. The study claims social influence would lead to the utilization or rejection of the service. Kayyali et al. (2017) stated that the spread of accurate information is crucial to engaging consumers with Telehealth services. Experienced consumers with Telehealth should be guaranteed the functionality of the service. The absence of an initiative to confront issues of Telehealth can negatively impact patients and potential consumers to engage with the service.

A study by Kamal et al. (2020) stated that the first Technology Acceptance Model of Davis in 1989 was commonly utilized as a primary theoretical framework and basis of proposed studies of researchers in the ICT field model focuses on measuring perceived usefulness, perceived ease of use, and user acceptance of information technology. The study stated that the model by Davis lacked variables that can help technological advancements within the field of medicine and healthcare. The researchers aimed to integrate internal and external factors towards technology, which led to the modification of TAM. In relation, Purwanto and Budiman (2020) utilized TAM as a logical guide for the exploration of introducing technological advancements to an individual. The study stated factors that potentially influence the acceptance of new technology.

III. METHOD

A. Conceptual Framework

The conceptual framework based on the research objectives adapted the model used in the study of Nurunnisha and Dalimunthe (2018) in Indonesia.
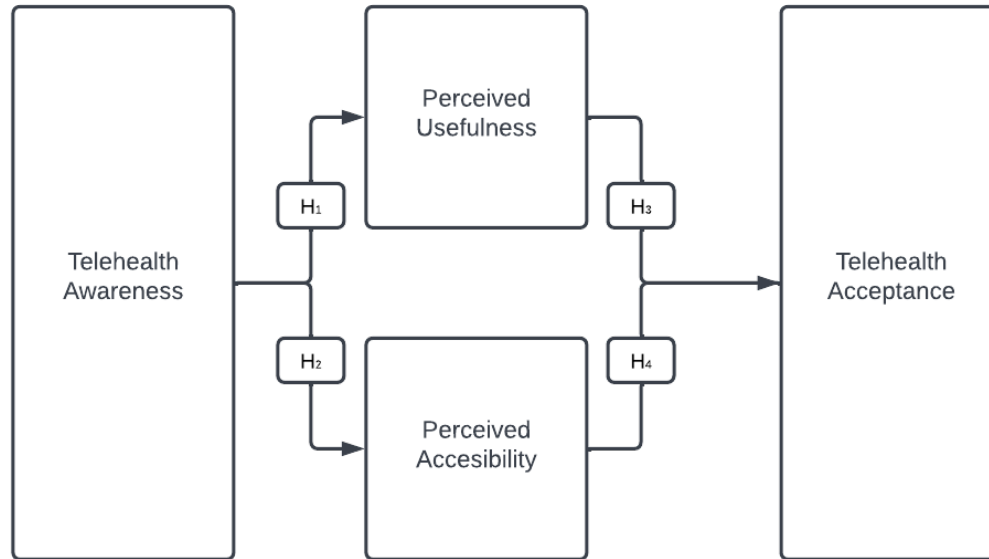

Fig 1: Telehealth Awareness and Acceptance of Filipinos

The presented conceptual framework displays the connection of variables used in this study, as well as the label for each hypothesis. Lines with an arrowhead indicate direct connections from independent variables to dependent variables.

In the case of Hypothesis 1 (H1), the figure shows the connection between the respondents' Awareness of Telehealth (Independent Variable) and the respondents' Perceived Usefulness of the service (Dependent Variable). The same is true for Hypothesis 2 (H2), which connects the Awareness of Telehealth (Independent Variable) to the respondents' Perceived Accessibility of the service (Dependent Variable). Pearson R Correlation was used to verify the relationship between the independent and dependent variables of Hypotheses 1 and 2.

Meanwhile, for Hypothesis 3 (H3), the figure shows the connection between the respondents' Perceived Usefulness of Telehealth (Independent Variable) and Acceptance of the service (Dependent Variable). The same is true for Hypothesis 4 (H4), which connects the respondents' Perceived Accessibility of Telehealth (Independent Variable) and their Acceptance of the service (Dependent Variable). Multiple Regression Analysis was used to verify the relationship between the independent and dependent variables of Hypotheses 3 and 4.

B. Research Design

A quantitative research design was employed in this study. According to Molina-Azorin (2016), the relevance and progress of advanced business research rely on insights and empirical data to generate valuable solutions to address the defined problems. As a study that focuses on Telehealth, a service introduced by the modern healthcare industry, the quantitative design provides security and enhances the validity of results with definite measures to strengthen the foundation of the study (Awaisu et al., 2019).

C. Subjects and Study Sites

The geographical coverage of the study is limited to NCR+, which Malasig (2021) defined as the Greater Manila Area that consists of the National Capital Region of the Philippines and the surrounding provinces of

Bulacan, Rizal, Cavite, and Laguna. According to the Philippine Statistics Authority (2021), the total population of the National Capital Region + as of 2020 is 28,250,517 individuals. The researchers subjected the stated total population of the region to the Raosoft Sample Size Calculator and generated a sample size of 385 respondents. The stated sample size was subjected to a predetermined set of criteria that verified the age, citizenship, and residence of the individuals to confirm their eligibility as respondents to the survey.

D. Data Gathering Procedure

The study conducted amidst the pandemic led the researchers to utilize technological tools to make data gathering virtually possible. The online survey questionnaire entitled Awareness and Acceptance of Telehealth in NCR+ was divided into four sections. In particular, Awareness, Perceived Usefulness, Perceived Accessibility, and Acceptance. Adapting the survey method of Hajesmaeel and Bahaadinbeigy (2021), the respondents were tasked to answer a remodeled survey questionnaire to gauge their awareness, perceptions, and acceptance of Telehealth. The questions were remodeled with the extended TAM in the appropriation of the objectives because of insufficient coverage of the pioneer model (Kamal et al., 2020). Incorporating the method of Abdool et al. (2021), the survey was developed to match the bilingual skills of the respondents answerable in English and Tagalog and was distributed to the general public, including healthcare professionals.

The subjects of the study were selected with a simple random sampling method. The individual subjects qualified as respondents after being subjected to a survey inclusion criteria. The criteria are limited to the sample, residence, age, sex, and language. The criteria include 385 Filipino respondents residing in the Philippines, particularly the NCR+ area, for at least one year and are of legal age (18 years old) and above based on Philippine laws. The criteria also include male or female and require the respondent to be communicable in either English or Tagalog.

In consideration of the better evaluation of results as conveyed in the study of Hajesmaeel and Bahaadinbeigy (2021), the researchers employed the format of a specifically designed questionnaire. A new questionnaire was created with more comprehensiveness in terms of the issues studied, albeit having more questions as opposed to the proven better evaluation with few questions. The researchers added a section to gather data on respondent demographics that comply with the survey inclusions criteria. Thus, the survey questionnaire was drafted with four sections to add to the crucial variables patterned from the study of Nurunnisha and Dalimunthe (2018), in particular, Awareness, Perceived Usefulness, Perceived Accessibility, and Acceptance. The researchers were able to pursue the formulation of the research instrument based on the questionnaire of Nurunnisha and Dalimunthe (2018). The researchers formulated 40 itemized questions that were equally distributed across the four variables of the study. As opposed to the 7-point Likert scale, the researchers limited the questionnaire to a 4-point Likert scale while adding several questions in each section. The numerical value of 1 has the strongest value for disagreement with the statement, and 4 has the strongest value for agreement. The respondents sought the professional expertise of a doctor, a pharmacist, a professional in the academe, and an experienced marketing professional under the pharmaceutical industry to validate the questionnaire. After the results from the experts proved the questions valid, an online survey questionnaire was created via Google Forms that are automated to reject multiple responses from one respondent and reject any response that exceeds the limit of the assigned number of responses. The reliability of the online survey questionnaire constructed for bilingual respondents with English and Tagalog language was tested by an expert statistician commissioned by the researchers with Cronbach's Alpha. A pilot test was conducted on 30 randomly selected participants that qualified for the study. After the validity and reliability test showed a positive result and proved no further need to redesign the questionnaire, the stated research instrument was distributed across social media platforms (e.g., Facebook, Instagram, Twitter, TikTok, and LinkedIn) with a visual publication material and a Quick Response (QR) Code. In addition, the stated online survey questionnaire was developed with a limit of 385 non-repetitive responses that will be accepted from eligible participants. As a resolution to the limitations of the negative impact of the pandemic, the researchers employed an online raffle draw system to engage the participants to become respondents of the study with cash prizes. The winners were randomly selected from a roster of the retrieved emails from the Google Form database with an automated Random Number Generator of Google and were acknowledged via email. The results obtained from 385 respondents were all translated into English using the English version of the survey questionnaire for uniformity of data before it was reviewed and analyzed by a professional statistician.

E. Data Validity and Reliability

The questionnaire entitled Awareness and Acceptance of Telehealth in NCR+ was validated by four experts in the field of Medicine, Pharmacy, Academe, and Marketing. Afterward, it was tested for reliability using the data gathered from a pilot test administered to 30 individuals by an expert statistician commissioned by the researchers. The reliability score of the Cronbach's Alpha was interpreted according to the Cronbach's Alpha Criteria provided by the commissioned statistician. With a score of 0.866355, the research material was classified as having Good internal consistency, thus fit for use in data gathering.

F. Data Analysis

The study utilized the Statistica software in the extraction of results for review and analysis. First, the researchers interpreted the data gathered from the survey with a 4-point Likert Scale based on the statistical limit, range, and its respective verbal interpretation shown on Table 1, which are critical in analyzing the values with the use of Descriptive Statistics.

TABLE I
NUMERICAL SCALE, STATISTICAL LIMIT, AND VERBAL INTERPRETATION FOR AWARENESS AND ACCEPTANCE OF TELEHEALTH IN NCR+

Numerical Scale	Statistical Limit	Range	Verbal Interpretation
1	1.00 – 1.75	Strongly Disagree	The respondent completely disagrees with the statement
2	1.76 – 2.50	Disagree	The respondent partially disagrees with the statement.
3	2.51 – 3.25	Agree	The respondent partially agrees with the statement.
4	3.26 – 4.00	Strong Agree	The respondent completely agrees with the statement.

According to the study of Kaur et al. (2018), descriptive statistics as a statistical tool encompasses the measures of frequency, central tendency, dispersion or variation, and position. However, the researchers limited the analysis of the data obtained in this study to the measures of the frequency with percentage, measures of central tendency with mean, and measures of variation with standard deviation. According to Boone Jr. and Boone (2012), as cited in the study of Ofori (2019) that also employed the TAM, the suggested data analysis procedure that the researchers observed in this study with mean and mode as measures of central tendency, frequency, and standard deviation as measures of variability, and Pearson R Correlation as measures of association are appropriate for Likert-type data with demographics and Likert-scale data with the series of questions itemized in the online survey questionnaire.

The results were then analyzed using the p-value to gauge the significance level relative to the analysis of the hypotheses (H1, H2, H3, and H4). According to Shrestha (2019), the p-value significance level may vary from values between 0 to 1, wherein the threshold is preserved to 0.05. Additionally, it was stated that if the p-value is greater than the threshold, the result is insignificant, while if the p-value is less than the threshold, then the result is significant.

In order to find if there is a positive relationship between Filipinos' awareness and perceived usefulness of Telehealth services (H1) and if there is a positive relationship between Filipinos' awareness and perceived accessibility of Telehealth services (H2), the study utilized the Pearson R Correlation in critical consideration to the study of Schober, Boer, and Schwarte (2018). Wherein, it was stated that Pearson R Correlation Coefficient perceives data in a monotonic relationship between two variables, such that the two variables may

simultaneously increase in one direction with a perfect positive relationship (+1) or simultaneously increase with direct proportionality or decrease in opposite directions with inverse proportionality with a perfect negative relationship (-1) such that the coefficient cannot be zero (0), and as the values grow closer to the -1 or +1 mark, the straighter the line becomes in the scatter plot. Additionally, the Pearson R Correlation Coefficient consists of two variables, particularly x and y. If the interval, r, reflects a -1, then the x and y have a perfect negative correlation, while if the interval, r, reflects a +1, then the x and y have a perfect positive correlation (Xu & Deng, 2018).

The limited function of Pearson R Correlation in defining the relationship between two variables led the researchers to employ another statistical tool for the association, which is the Multiple Regression Analysis. According to Kim and Oh (2021), this traditional statistical method is utilized in studies that aim to prove the correlation of two or more predictor variables and one response variable. The study of Baek & Chung (2020) further defined Multiple Regression Analysis as a tool for identifying the influence of two independent variables in a dependent variable while proving that two variables are related to each other once a significant change of a dependent variable occurs in accordance with the independent variable. The said tool was used to determine the collective relationship between the independent variables, Perceived Usefulness and Perceived Accessibility, and the dependent variable, Acceptance, as well as the discrete relationship between Perceived Usefulness and Acceptance (H3), and Perceived Accessibility and Acceptance (H4), similar to the study of Yadav & Gupta (2020). Wherein, the mentioned authors used Multiple Regression Analysis to their revised Technology Acceptance Model in analyzing the impact of Perceived Usefulness, Perceived Ease of Use, Computer Self-Efficacy, and Gender to the Behavioral Intention to adopt Massive Open Online Courses. In relation to this, the researchers of this study analyzed the Correlation Coefficient (R) and Standardized Coefficient (b*) to verify the collective and discrete relationship of the set of variables respectively.

IV. RESULT AND DISCUSSION

TABLE III
DESCRIPTIVE STATISTICS

Variable	Composite Mean	Standard Deviation	Interpretation
Awareness	2.8628572	1.073741	Agree
Perceived Usefulness	3.2618181	0.835384	Strongly Agree
Perceived Accessibility	3.1981819	0.941217	Agree
Acceptance	3.1649351	0.862345	Agree

Table 2 shows the result of the Descriptive Statistics. Wherein, the Awareness variable yielded a composite mean of 2.86 and a standard deviation of 1.07, which translates to the agreement of the respondents. According to Thomas et al., (2020), the awareness of consumers regarding Telehealth has increased at the beginning of the pandemic in 2020. Meanwhile, the Perceived Usefulness variable yielded a composite mean of 3.26 with a standard deviation of 0.84, the result translates to the strong agreement of the respondents. For the Perceived Accessibility variable, it yielded a composite mean of 3.20 and a standard deviation of 0.94. Lastly, the Acceptance variable yielded a composite mean of 3.16 and a standard deviation of 0.86, which translates to the agreement of the respondents.

TABLE IIIII

HYPOTHESES TEST

Hypothesis	Variable	Standardized Coefficient (b*)	Significance (p-value)	Conclusion
H_1	Awareness → Perceived Usefulness	0.366154	0.000000	Accepted
H_2	Awareness → Perceived Accessibility	0.425973	0.000000	Accepted
H_3	Perceived Usefulness → Acceptance	0.516577	0.000000	Accepted
H_4	Perceived Accessibility → Acceptance	0.308955	0.000000	Accepted

Table 3 shows the hypotheses testing done for each set of dependent and independent variables. Wherein, Pearson R Correlation was used to validate the relationship between Awareness and Perceived Usefulness (H1) which yielded a Standardized Coefficient (b*) of 0.366154, denoting a positive correlation, and a Significance (p-value) of 0.000000, denoting a significant relationship. Therefore, the hypothesis that there is a significant positive relationship between Filipinos' awareness and perceived usefulness of Telehealth services is accepted. Pearson R Correlation was also used to validate the relationship between Awareness and Perceived Accessibility (H2) which yielded a Standardized Coefficient (b*) of 0.425973, denoting a positive correlation, and a Significance (p-value) of 0.000000, denoting a significant relationship. Therefore, the hypothesis that there is a significant positive relationship between Filipinos' awareness and perceived accessibility of Telehealth services is accepted.

Meanwhile, Multiple Regression Analysis was used to validate the relationship between Perceived Usefulness and Acceptance (H3) which yielded a Standardized Coefficient (b*) of 0.516577, denoting a positive correlation, and a Significance (p-value) of 0.000000, denoting a significant relationship. Therefore, the hypothesis that there is a significant positive relationship between Filipinos' perceived usefulness and acceptance of Telehealth services is accepted. Multiple Regression Analysis was also used to validate the relationship between Perceived Accessibility and Acceptance (H4) which yielded a Standardized Coefficient (b*) of 0.308955, denoting a positive correlation, and a Significance (p-value) of 0.000000, denoting a significant relationship. Therefore, the hypothesis that there is a significant positive relationship between Filipinos' perceived accessibility and acceptance of Telehealth services is accepted.

Hypotheses Testing using the data gathered as validated by Pearson R Correlation and Multiple Regression Analysis showed that all four sets of variables have a significant positive relationship, therefore all four hypotheses were accepted. Wherein, result shows that Awareness of Telehealth services is more correlated to Perceived Accessibility as compared Perceived Usefulness, leading the researchers to believe that this is due to the respondents' already agreement to the perception that Telehealth services is already useful, thereby lessening the effect of one's awareness to their Perceived Usefulness of the service. Meanwhile, result also shows that to Acceptance of Telehealth is more correlated to Perceived Usefulness as compared to Perceived Accessibility, leading the researchers to conclude that in order for Filipinos to accept the use of Telehealth services, businesses and agencies should capitalize on promoting the service as usefulness more than accessible.

V. CONCLUSION

This research entitled, Awareness and Acceptance of Telehealth among Filipinos in the National Capital Region+, aimed to examine the relationship between the awareness, perceptions, and acceptance of Telehealth services. Through the adaptation of the Technology Acceptance Model used by Nurunnisha and Dalimunthe (2018) in their E-Commerce study in Indonesia, the researchers were able to identify the gap in previous studies and apply new methods in the accomplishment of study.

The process of analyzing the gathered data using Descriptive Statistics enabled the researchers to explore and obtain a deeper understanding of the respondents' general perspective about Telehealth services in the local setting. In addition to the aforementioned statistical treatment, this research also applied the Pearson R Correlation and Multiple Regression Analysis to examine the relationship between four sets of variables: a) Awareness and Perceived Usefulness; b) Awareness and Perceived Accessibility; c) Perceived Usefulness and Acceptance; d) Perceived Accessibility and Acceptance. Results gathered from this study suggest that Awareness of Telehealth services plays an important role in influencing the consumers' Usefulness and Accessibility Perceptions and, ultimately, the Acceptance of Telehealth services. However, although the respondents collectively agree about being aware of Telehealth services, results of the descriptive analysis show that the composite mean for the Awareness variable is lower than the Acceptance variable, hinting at the possibility that there is a significant number of respondents who are not familiar with Telehealth or with the services that come along with it prior to answering the online survey questionnaire. Another important point to consider is that Perceived Usefulness scored highest among all composite means for descriptive statistics, leading the researchers to conclude that although Awareness has a stronger association with Perceived Accessibility than to Perceived Usefulness, it makes no substantial difference since respondents' already have a higher positive perception of Telehealth's usefulness. Lastly, the correlation coefficient of the multiple regression analysis between Perceived Usefulness, Perceived Accessibility, and Acceptance constitutes the idea that the combination of both usefulness and accessibility perceptions could persuade consumers to accept the use of Telehealth services, however when compared, Perceived Usefulness is a stronger predictor of Telehealth Acceptance as compared to Perceived Accessibility.

Considering the findings of this study, the researchers recommend that the Philippine government strengthen the promotion, use, and regulation of Telehealth services to maximize the adoption levels of consumers and providers even after the COVID-19 pandemic. Additionally, the researchers recommend pharmacies and other healthcare businesses, especially the ones with immense brand equity in the country, to start promoting and implementing Telehealth services as a new service offering. Furthermore, capitalizing on the consumers' perceived usefulness and perceived accessibility of Telehealth services shall be employed to maximize the market's acceptance of the service. For future research, the proponents of this study advocate for a similar study about the awareness and acceptance of Filipinos regarding Telehealth in remote and far-flung areas of the country. The researchers also recommend further study on the factors affecting the awareness and acceptance of Telehealth among Filipinos. Most importantly, the proponents of this research deem it necessary for future researchers to study the level and rate of Telehealth adoption among Filipino healthcare consumers and providers.

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