Analysis of Perception and Acceptance on Telemedicine in a Third World Country: A Case Study in the Philippines

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Abstract

The current COVID-19 pandemic has shifted the lifestyle of people from education, business, and even the healthcare service. There is a rise in telemedicine utilization among different countries. Third-world countries such as the Philippines have been seen to consider telemedicine, however not as widely applied. The aim of this study was to determine the factors affecting the acceptance and behavioral perception of Filipinos on the adoption and usage of telemedicine in the Philippines. A total of 533 Filipinos answered an online survey that was collected through different social media platforms. Using multiple linear regression, factors under the unified theory of acceptance and use of technology, personal factors, individual factors, and political and environmental factors were considered. With a 96.53% R-square value, the results posit that age, geographic location, data privacy issues, resistance to use, usage behavior, intention to use, effort and performance expectancy, and hedonic motivation were the key factors affecting perceived user adoption. The employment status modeled the regression equation considered in this study. The findings of this study would be advantageous for developing strategies to increase the adoption among Filipinos for telemedicine. The healthcare system in the Philippines may adopt the findings of this study to increase Filipino trust and usage behavior. Lastly, the results and latent of this study could be utilized by other developing countries who want to increase adoption and usage of telemedicine, even evaluate technology usage worldwide.

Keywords

Telemedicine, Perceived user adoption, Healthcare systems, Multiple linear regression

1. Introduction

The COVID-19 pandemic has shifted the way people are living. One of the changes in the education system (Prasetyo et al., 2021), lifestyle, and business (Ong et al., 2021a) include the shifting from face-to-face meetings to online meetings for safety purposes. Everything nowadays has become dependent on the utilization of technology. To which, even the healthcare system in different countries was seen to adopt the new normal. The consideration of using telemedicine (a remote diagnosis and treatment using technology) was seen to be evident that developed countries are trying to amplify and integrate specifications for its special use (Albahri et al., 2021). However, developing countries are still hesitant with its utilization that further development and emphasis on its utilization may leave the citizen outdated. One of the developing countries that has yet to fully adopt telemedicine is the Philippines.

In the Philippines, a large absence in the healthcare system has been observed due to the challenges perceived from and by the government when it comes to implementation (World Health Organization, 2018). Some factors affecting

the implementation of the healthcare system involve the disorganization among governance, finance, and setup development (Dayrit et al., 2018). eHealth (2019) showed that 70% of the people living in rural areas continue to struggle with the access and inadequate quality of in- and out-patient treatment. To which, these became barriers for the continuous development to adopt telemedicine in the Philippines (Leochico et al., 2020). Eddy (2019) highlighted how Filipinos have low awareness regarding telemedicine which also caused a hindrance to its development and adoption. With the continuous rise and effect of COVID-19 in the country, the need to adapt to different off-site services should be explored in order for mitigation to happen.

Healthcare would be considered the most important service needed to be taken into consideration, especially with the COVID-19 pandemic. Kapur (2020) explained how healthcare would allow for maintenance, prevention, reduction, and has the main aim to achieve equity for the citizens. Ona (2010) emphasized how the effectiveness of the healthcare system would be based on the priority given among underprivileged people. The underprivileged people include elderly, sick, disabled, even women and children. Ona (2010) added that it would be effective if three strategies would be taken into consideration such as: risk protection financially – consider enrollment and benefit expansion in the National Health Insurance Program, access to hospitalization and facilities, and the attainment of health-related Millennium Development Goals. Thus, with the achievement of modifying and implementing the healthcare system would lead to providing better services among Filipinos. One way to help with the development is the adoption of telemedicine in the country.

1.1 Objectives

The objective of this study was to identify significant factors affecting the adoption behavior for the utilization of telemedicine in the Philippines, and determine the Filipino users' intention and expectations towards the use of telemedicine and their usage behavior. With the consideration of the Unified Theory of Acceptance and Use of Technology (UTAUT2), factors under the UTAUT2, personal factors, individual factors, and political and environmental factors were considered for the analysis of this study. Employing a stepwise multiple linear regression analysis, this study resulted in only the significant factors affecting usage behavior and adoption of telemedicine in the Philippines.

The findings of this study will be advantageous in developing countries to better the healthcare system available. Adopting from Hoque and Sorwar (2017), determining the key factors influencing the adoption perception for telemedicine would fill the gaps and barriers of how a country can cater and improve the service being provided remotely. The results of this study would provide an opportunity to strategize for technology advancement in healthcare systems, improve accessibility among people, and may be of interest for policymakers, healthcare providers, and entrepreneurs. The framework and latent considered in this study could set as a benchmark in analyzing technology adoption on telemedicine in a developing country, which may be adapted and extended by future researchers. Moreover, the constructs of this study may be considered for other technology adoption worldwide.

2. Literature Review

Telemedicine is defined as the utilization of interactive audiovisual and data communication tools for medical and healthcare services (Albahri et al., 2021). The aim of telemedicine is to reduce the face-to-face interaction among patients and medical professionals, which is beneficial during this COVID-19 pandemic (Quinn et al., 2020; Bokolo, 2020). There is also reduced cost when telemedicine is considered due to frequency of visits, travel expenses, and even smaller consultation fees for some. However, Cousins (2018) explained that when diagnosis would be needed, then the traditional way of consultation should be considered. Since digitalization has been considered highly these days, then the medical field is also taking advantage of it, finding opportunities to practice their specialties in delivering services in the new normal (Esposito, 2020).

Like any new technology, it would be difficult to adopt the system in developing countries (Prasetyo et al., 2021). Thus, the consideration of models in evaluating acceptance, behavior, and adoption should be employed to determine the behavior of the people in the said country. Models such as the UTAUT2 are beneficial for evaluating factors affecting technology acceptance and usage behavior (Venkatesh et al., 2012). Tamilmani et al. (2020) explained how the UTAUT2 model considered a lot more constructs in evaluating technology acceptance, thus could holistically measure a person's adaptive behavior in using it. Hossain et al. (2019) considered the UTAUT model, the first model under the unified theory of acceptance and use of technology for e-health records showing

that medical professionals are knowledgeable when using technology in their services. Thus, employing this model would help in evaluating telemedicine acceptance and usage behavior for adoption of technology.

Other factors such as geographical location (GL) (Kurata et al., 2022), demographic factors (Ong et al., 2021c), and political and environmental factors may contribute to the people's acceptance and adoption to technology. Studies such as that of Bhatia (2021) showed how GL could be a factor that influences users' adoption when it comes to telemedicine. In relation, data privacy issues may be a significant factor affecting why people may or may not adapt with a new technology (Zhang et al., 2018). Moreover, the resistance to use a technology that is health-related may be due to the perception of infectivity among people who do not have any experience (Tsai et al., 2019). Thus, the point of view from the environment and political factors may play a role in the significance of the user's adoption to using telemedicine. To which, people assume the negative connotation before the actual usage. Lastly, for the demographic factors, gender, age, employment status could be a significant factor affecting usage behavior and adoption. Following the study of Kim and Feng (2021), the older generation would resort to having a negative connotation with the use of technology. Older adults were said to have a negative reciprocity with technology related activities. This explanation could also be supported from the findings of Mariano et al. (2021). Their study discussed how older adults have a negative impact on use of technology due to the threat of stereotyping among age groups.

The utilization of telemedicine in the current generation and situation would be beneficial for people, especially in developing countries. According to the report from the World Health Organization, usual high positive patients with COVID-19 are seen from developing countries such as the Philippines. Thus, to mitigate and have an advantageous outcome for the healthcare system is the consideration of telemedicine. However, telemedicine has been seen to be underexplored in said countries. With that, the evaluation of adaptive and usage behavior should be done. Different factors under UTAUT2 may be employed to holistically measure people's usage behavior and adoption. Subsequently, personal, individual, and political and environmental factors may play a significant role among people of different age groups, locations, and beliefs towards telemedicine adoption in developing countries.

3. Methods

3.1. Model Definition

The conceptual framework utilized in this study is presented in Figure 1. From the conceptual framework, personal factors, UTAUT2 factors, political and environmental factors, and individual factors were considered which may have an effect on telemedicine user adoption in the Philippines.

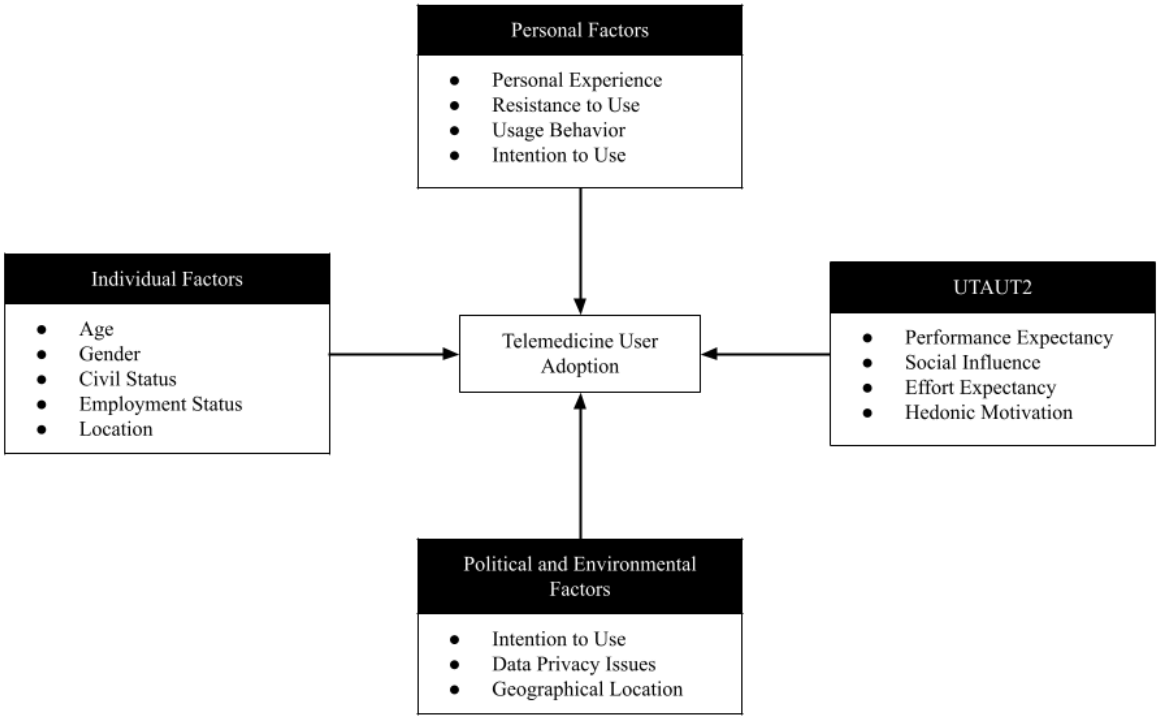

Figure 1. Conceptual Framework

Under personal factors, personal experience, resistance to use, usage behavior, and intention to use were considered. Under the UTAUT2, performance expectancy (PE), social influence (SI), effort expectancy (EE), and hedonic motivation (HM) was considered. For the political and environmental factors, intention to use (IU), data privacy issues (DPI), and geographic location (GL) were taken into account. Lastly, for the individual factors, demographic factors such as age, gender, civil status, employment status, and location were collected.

4. Data Collection

This section covers the methodology employed in this study. A self-administered survey questionnaire was used containing questions—indicators of the constructs—based on supporting literature. It was then distributed online through different social media platforms by convenience sampling. 533 data were collected and the considered respondents were among 18-25 years old since these age groups are the ones active through social media in the Philippines (Ong et al., 2021b). To which, 72% were unemployed, 13.3% had full time jobs, 7.90% were part-time, and 6.80% were self-employed. After conducting a normality test using the Shapiro-Wilks test which resulted in values within the threshold of ±1.96 (Ong et al., 2021c), the 533 gathered data was then analyzed through stepwise multiple linear regression (MLR).

5. Results and Discussion

5.1 Numerical Results

Presented in Table 1 is the coefficient from the multiple regression results. It could be seen that no multicollinearity was present with highest VIF value being 3.34 (below the 10.00 threshold; Ong et al., 2021c). Based on the P-values, the significant factors include age, GL, DPI, RU, UB, IU, EE, PE, HM, and employment status. Running the R-squared coefficient, 96.53% presented a relatively high value with R-squared adjusted value of 96.38% This presents the applicability of the model created (Faisal et al., 2021).

Table 1. Multiple Regression Coefficients

Term	Coef	SE Coef	95% CI	T-Value	P-Value	VIF
Constant	-0.333	0.348	(-1.019, 0.352)	-0.96	0.339	
Age	-0.1747	0.0384	(-0.2503, -0.0992)	-4.55	0.000	2.10
GL	0.2630	0.0666	(0.1318, 0.3942)	3.95	0.000	1.47
DPI	0.0843	0.0362	(0.0131, 0.1555)	2.33	0.021	1.22
RU	0.1400	0.0410	(0.0594, 0.2207)	3.42	0.001	1.38
UB	-0.3004	0.0708	(-0.4399, -0.1610)	-4.24	0.000	2.53
IU	0.9074	0.0756	(0.7584, 1.0564)	12.00	0.000	3.34
EE	0.6254	0.0868	(0.4545, 0.7963)	7.21	0.000	2.81
PE	2.5420	0.0886	(2.3675, 2.7165)	28.69	0.000	3.79
HM	0.1573	0.0614	(0.0365, 0.2782)	2.56	0.011	2.35
Employment_Status	-0.663	0.105	(-0.869, -0.457)	-6.34	0.000	1.99

Table 2 presents the correlation results from the demographic characteristics, while Table 3 presents the correlation results from different factors. To further elaborate the findings, the mathematical model through the equation will be considered to determine the relationship among factors considered with perceived user adoption (PUA) as the dependent variable as seen in equation 1.

Table 2. Correlation Results from Demographic Characteristics

Factors	Age	Gender	Civil_Status	Employment_Status	Location
Gender	0.009				
Civil_Status	0.843	-0.047			
Employment_Status	-0.697	-0.032	-0.537		
Location	0.015	0.033	0.016	-0.096	
GL	0.036	-0.104	0.050	-0.131	-0.004
DPI	0.064	0.053	0.057	-0.065	0.025
RU	0.008	0.053	-0.025	0.084	0.008
PEX	0.123	-0.010	0.102	-0.188	-0.065
UB	0.127	-0.094	0.109	-0.176	-0.039
IU	0.038	-0.140	0.023	-0.137	-0.063
SI	0.018	-0.135	-0.039	-0.024	0.000
EE	-0.158	-0.133	-0.156	0.046	-0.077
PE	-0.052	-0.116	-0.049	-0.044	-0.095
HM	-0.051	-0.108	-0.055	-0.017	-0.107
PUA	-0.068	-0.136	-0.078	-0.097	-0.068

Table 3. Correlation Result of Factors

	GL	DPI	RU	PEX	UB	IU	SI	EE	PE	HM
DPI	-0.119									
RU	-0.221	0.358								
PEX	0.378	-0.192	-0.197							
UB	0.458	-0.129	-0.268	0.641						
IU	0.509	-0.138	-0.329	0.464	0.729					
SI	0.434	-0.095	-0.209	0.462	0.573	0.613				
EE	0.387	-0.073	-0.187	0.426	0.562	0.647	0.568			
PE	0.427	-0.134	-0.317	0.454	0.602	0.738	0.601	0.744		
HM	0.416	-0.087	-0.219	0.357	0.581	0.677	0.570	0.624	0.703	
PUA	0.500	-0.092	-0.282	0.437	0.622	0.822	0.621	0.800	0.939	0.736

Presented in equation (1) is the mathematical model considered in this study for the determination of significant factors and their relationship to PUA. From the equation, it could be deduced that performance expectancy showed the most significant direct relationship to PUA, followed by intention to use, effort expectancy, hedonic motivation, and geographic location. Moreover, low significance was seen from resistance to use and data privacy issues. Lastly, age was seen to have an indirect proportionality with PUA which indicates that as age increases, there is a decrease in PUA.

$$PUA = -0.333 - 0.1747\,Age + 0.2630\,GL + 0.0843\,DPI + 0.1400\,RU - 0.3004\,UB + 0.9074\,IU + 0.6254\,EE + 2.5420\,PE + 0.1573\,HM \quad (1)$$

5.2 Validation

Analysis for validity and reliability of the factors were considered using Cronbach's alpha. Presented in Table 4 are the results which are above the threshold (0.70). This indicates that the constructs considered have internal validity and reliability (Table 4).

Table 4. Validity of the Factors

Factor	Cronbach's α

GL	0.765
RU	0.838
Personal Experience	0.764
EE	0.817
PE	0.890
HM	0.928
UB	0.801
IU	0.846
PUA	0.886

5.3 Discussion

The results showed that PE, EE, IU, GL, and HM showed a direct and high significance to PUA. PE and EE most often show a significant relationship when technology is taken into consideration. The reason for which is the user's perception of benefit, their understanding of using the technology, and overall contribution (Rahi et al., 2020). According to Venkatesh et al. (2012), EE is the level of association among users and technology while PE is the ease of use in using a certain technology. With this, it could be indicated that people find the benefits and ease of use in using telemedicine. This should therefore be taken into consideration for the acceptance of telemedicine among Filipinos. This reflects why IU was seen to be a significant factor affecting PUA.

In addition, GL and HM was seen to be a significant factor influencing PUA. This shows how people from different locations would find telemedicine beneficial. Especially for people living in areas far from healthcare services and facilities, having telemedicine would be seen as beneficial. Consequently, the continuous use of the technology would lead to motivation in continuous utilization. Similar to Baabdulah (2018) and Gao et al. (2015), once people experience enjoyment, satisfaction, and positive experience, then users would highly likely have the intention to adapt with the technology being considered. Thus, gaining a certain level of pleasure when using telemedicine would lead to a positive adoption with usage and behavior.

RU was seen to have a low significant relationship to PUA. Given the general findings of PE, IU, EE, HM, and GL, RU was still seen to be significant. With the low relationship implies that people would be more willing to try and utilize PUA. As explained from the study of Eddy (2019), Filipinos have low awareness of telemedicine. This could result in why there is still a small factor affected by RU. Moreover, DPI was also seen to have a low significant relationship to PUA. Following the report of the National Privacy Commission in the Philippines, Filipinos have great values for their privacy. In this case, the result posits that there may be high security when it comes to telemedicine that is why there would not be any trust issues (Charness et al., 2016).

Lastly, age was seen to have an indirect proportionality with PUA. Similar to the findings from the study of Kim and Feng (2021), older generations would resort to having a negative connotation with the use of technology. From this study, it could deduce that as the age increases, the adoption of technology decreases with the negative 0.1747 value. Older adults were said to have a negative reciprocity with technology related activities. This explanation could also be supported from the findings of Mariano et al. (2021). Their study discussed how older adults have a negative impact on use of technology due to the threat of stereotyping among age groups. Thus, it could be suggested to introduce a more user-friendly and employable understanding of telemedicine for the older generation to increase user adoption.

Overall, it could be concluded that when people see the benefit, purpose, contribution, and overall understanding why telemedicine is being utilized, they would have a positive implication to adapt with the technology. Moreover, with the continuous usage of telemedicine, people would develop a habit and actually experience the positive effects

with health. Thus, they will eventually continue with the utilization of telemedicine. Therefore, it is suggested for government officials and entrepreneurs to highlight a user-friendly telemedicine application and let people understand and know the benefits. This will entail more Filipinos to use and adapt with the development in the healthcare system available.

6. Conclusion

With the continuous rise of the COVID-19 pandemic, it is advisable to consider mitigation by staying at home to reduce risk exposure among people. With the consideration of health-related impacts, people perceived going to hospitals as a challenge due to the lockdown. Recent development in technology has led different countries to consider using telemedicine – an offsite, online, remote way to consult with health-related issues with professionals. This study considered factors such as environmental and political, personal, individual factors, and the UTAUT2 model. Employing a step-wise MLR analysis from a 533 dataset, it was seen that PE, EE, IU, GL, and HM showed a direct and high significance to PUA. Moreover, GL and RU were seen to have low significance in relation to PUA. Lastly, age was seen to have an indirect proportion to PUA. When people see the benefit, contribution, understanding, and purpose of telemedicine, they would have the perception to adapt with the technology. With that, the habit of using telemedicine may be developed and people would eventually consider telemedicine as a new normal with regards to consultation with different healthcare services.

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