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Article

# Factors influencing telehealth adoption among consumers in Malaysia

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**Abstract:** This study investigates the factors influencing the adoption of telehealth among consumers in Malaysia, aiming to understand the impact of effort expectancy, performance expectancy, computer self-efficacy, and trust on the intention to use telehealth, building on the Unified Theory of Acceptance and Use of Technology (UTAUT). A quantitative descriptive methodology was used, collecting data from 390 Malaysian consumers via an online survey. The data were analyzed using IBM SPSS software to evaluate the relationships between the variables. The analysis revealed significant positive relationships between all examined factors and the adoption of telehealth. Performance expectancy was the most influential factor, followed by trust, effort expectancy, and computer self-efficacy. The multiple regression model indicated that these variables collectively explain 82.1% of the variance in telehealth adoption intention. The findings provide valuable insights for providers and marketers, suggesting that telehealth platforms should focus on performance expectancy, trust, and ease of use. Additionally, the study emphasizes the need for supportive policies from the Malaysian government to enhance telehealth adoption. The results contribute to the literature on healthcare technology adoption, offering practical implications for improving telehealth implementation in Malaysia.

**Keywords:** telehealth; consumer behavior; effort expectancy; performance expectancy; computer self-efficacy; trust

## 1. Introduction

Gauthier (2021) emphasizes that health query levels remain at their highest during the pandemic. Consumers are moving away from COVID-19 inquiries online to focus more on treating other conditions. They also do not differentiate between online and offline pharmacies in their searches. What does it mean for consumers globally? An updated consumer behavior study shows three attributes of the new normal. Firstly, health is more holistic than ever. Secondly, digital touchpoints will remain strategic post-COVID for the Path-to-Purchase, and lastly, building trust in the online arena of a brand is key. In 2021, respondents answered a more holistic understanding of health encompassing physical, emotional, and mental health as well as healthy lifestyle, prevention, and the importance of nutrition. Thus, health is multifaceted and goes beyond treating the disease or condition when sick. After COVID-19, 83% of those surveyed commented that they would continue to search online from just as often to almost exclusively online. This confirms that convenience and ease of comparing information research online are key drivers to consumers buying online. This could be the paradigm shift of going digital in everything we do.

The World Health Organization (WHO) and the United Nations Sustainable Development Goals have prioritized ensuring that people in developing countries have equal and adequate access to healthcare services (UNSD). This might be done by utilizing telemedicine services, a notion that developed countries have widely adopted. Instead of being a distinct medical field, telemedicine is a network of connected services that healthcare providers employ to extend the reach of established medical practices beyond the confines of conventional medical jurisdiction.

A visual representation of telemedicine services using cloud computing is shown in **Figure 1**. The WHO defines telemedicine as providing medical care through information and communication technology. The paradigm is realized by helping medical professionals with normal duties and functions (including diagnosis, consultations, treatment, and patient suggestions). Additionally, it aids in research, education, and health surveillance. Typically, this involves sending data files, sharing photos, videos, and audio, and remotely monitoring patients (Kissi et al., 2020). Omboni et al. (2022) opine that during the COVID-19 pandemic, telehealth has become a critical tool for improving patient surveillance, preventing disease spread, facilitating timely identification and management of sick people, and, most importantly, ensuring the continuity of care for frail patients with multiple chronic diseases. Although telehealth has flourished during COVID-19 and has accelerated its acceptance in many nations, there are still significant gaps. The following are major challenges that must be addressed in order for telehealth to be more widelyadopted: (1) Enacting suitable regulations to regulate telehealth, protect patients' privacy and so on; (2) develop and distribute practical recommendation for the routine use of telehealth; (3) raising the level of telehealth integration with traditional healthcare services; (4) improving awareness and knowledge and willingness of healthcare providers and patients to use telehealth; (5) addressing technical gaps between countries and demographics segments including infrastructure and economic barriers.

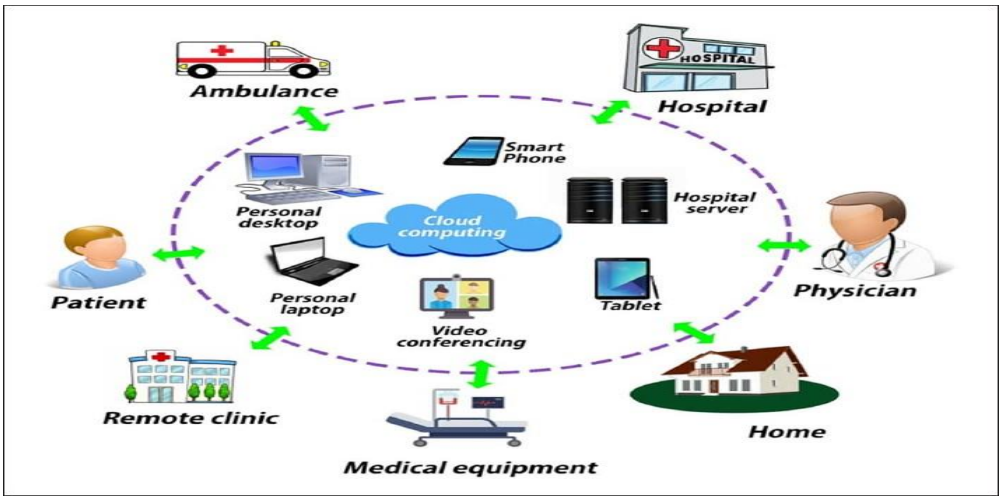


**Figure 1.** Telemedicine services using cloud computing.
Source: Kissi et al. (2020).

In Southeast Asia, including Malaysia, the uptake of telehealth has not been remarkable. Omboni et al. (2022) only picked up Western Asia in this scoping systematic review of telehealth usage. Furthermore, Malaysia is a reimbursed or self-

pay market for private healthcare. This could be one of the main barriers to the adoption of telehealth in Malaysia. Due to COVID-19, telehealth adoption is an interesting and challenging issue to delve deeper into to uncover why Malaysians are not adopting telehealth as much as other developed countries. Lee (2020) opines that the Covid-19 pandemic has provided fresh growth chances for Malaysia's telemedicine sector, which has previously struggled to become widely accepted. Before the Covid-19 pandemic rocked Malaysia, the telehealth sector was slowly expanding. While some hospitals only recently started offering teleconsultation services, other telehealth businesses struggled for months or even years to get the digital health industry started in this country.

With a Telemedicine Blueprint published in 1997, Malaysia was one of the first nations in Asia to forge this road. It highlights technology's role in the government's vision for Malaysian healthcare and acts as a road map for its execution. This idea has not materialized due to the lack of telemedicine providers in general. The pandemic has given it new life right now. The healthcare ecosystem must urgently rethink its design for the post-pandemic future. Only then will telemedicine be able to provide its biggest value, which is improved access to medical care for all Malaysians while maximizing resources (Ho, 2020). Based on a scoping review by Sabrina and Defi (2021) on telemedicine guidelines in Southeast Asia, there is no one-size-fits-all for telemedicine guidelines. Most medical council regulations in Malaysia, Indonesia, Singapore, and Vietnam tend to control healthcare practitioners rather than the platforms, technology, or types of telemedicine services.

Healthcare reforms are required due to rising healthcare costs, the introduction of costly medical technology, and increased consumer demand. The general goals of healthcare reforms are to increase the number of people covered by public or private insurance programs, broaden the pool of healthcare providers available to consumers, facilitate better access to medical specialists, raise the standard of care, and ultimately lower healthcare costs (Manchikantiet al., 2017). There is a concurrent anticipation that innovations in e-health technology development would decrease overall health spending and increase efficiency (Sanyal et al., 2018). Furthermore, new developments in technology and applications brought about by the successful innovation of electronic health boards will facilitate clinical decision-making, enhance the standard and effectiveness of care, involve patients in clinical decision-making, and encourage the adoption of healthy behaviors (Mey and Ogasawara, 2024). Furthermore, by providing overwhelmingly positive patient benefits, the potential for cost savings, and the chance to develop culturally appropriate services that are more attentive to the needs of special populations, telehealth demonstrates the enormous potential for increased productivity from health system redesign. Thus, telemedicine is becoming a crucial part of the response to the healthcare crisis (Mey and Ogasawara, 2024).The findings of this research will contribute to the growing body of literature on healthcare technology adoption, particularly in the domain of telehealth. By identifying the critical factors influencing consumers' decisions to adopt or resist telehealth services, this study can offer valuable insights to healthcare providers, policymakers, and technology developers seeking to enhance telehealth implementation and maximize its benefits in Malaysia. The objective of this paper is to determine the factors Malaysians consider in intent to use Telehealth in Malaysia.

Background of the study is shown to illustrate Telehealth market and outlook in Malaysia. Next, three problem statements are discussed to showcase the current issues and barriers of adoption in Malaysia. Next, research questions are established to further delve into this subject matter.

There is very little research and statistics on telehealth adoption available in Malaysia. Accordingto Lee et al.(2020) state that in Malaysia, only 20% of 4504 people were familiar with the health-related app with millennials (those aged 39 years and under) being more aware of the word and more willing to utilize m-health as a tool. M-health is an abbreviation of mobile health, the use of mobile devices for the practice of medicine and healthcare. Adherence and lifestyle advice were the most prevalent applications. Individuals with a greater level of education and took several medications were also connected with higher levels of usage.

This study is to investigate how adoption of telehealth can be improved in Malaysia. Based mostly on the technology acceptance model, this study is examining Malaysians' telehealth adoption and intention to use telehealth based on the Unified Theory of Acceptance and Use of Technology (UTAUT). The study's goals are to investigate the relationship between intention to use telehealth and various constructs namely Effort Expectancy, Performance Expectancy, Computer Self-efficacy and Trust. This will provide telehealth providers as well as the government for better implementation of telehealth usage vis-à-vis adoption in Malaysia. The research objectives are:

Objective 1: To examine the influence of effort expectancy (EFEX) on telehealth adoption in Malaysia.

Objective 2: To examine the influence of performance expectancy (PEEX) on telehealth adoption in Malaysia.

Objective 3: To examine the influence of computer self-efficacy (CSEF) on telehealth adoption in Malaysia.

Objective 4: To examine the influence of trust on telehealth adoption in Malaysia.

## 2. Literature review

### 2.1. Theoretical exposition

In Southeast Asia including Malaysia, the uptake of telehealth has not been remarkable. In this scoping systematic review of telehealth usage, Omboni et al. (2022) only picked up Western Asia of low implementation level based on **Table 1**. Further to that, Malaysia is a reimbursed or self-pay market for private healthcare. This could be one of the main barriers to adoption of telehealth in Malaysia. **Table 1** shows the summary of the level and characteristics of telemedicine adoption in major continents and nations around the world.

**Table 1.** Summary of the level and characteristics of telemedicine adoption.

| Continent/Country | Implementation Level | Main barriers to implementation | Main services (in order of importance) | Insurance reimbursement | Specific telehealth policies at a national level |
|---|---|---|---|---|---|
| Africa | Low | • Cost<br>• Infrastructure<br>• Connectivivity<br>• Interoperability<br>• General and digital iliteracy | • Telephone<br>• Social (chat)<br>• E-mail | No | No |
| Canada | Medium | • Infrastructure<br>• Connectivivity<br>• Interoperability<br>• Reimbursement<br>• Regulatory restrictions | • Video<br>• Telephone<br>• RPM | Yes (partial) | No |
| United States or America | Medium/ High | • Cost<br>• Infrastructure<br>• Digital iliteracy | • Video<br>• E-mail<br>• RPM | Yes (partial) | yes (partial) |
| Latina America | Low | • Infrastructure<br>• Privacy<br>• Regulations | • Video<br>• Telephone | No | Yes(partial) |
| Western Asia | Low/Medium | • Cost<br>• Infrastructure<br>• General and digital iliteracy | • Telephone<br>• Video | No | No |
| China | High | • General and digital iliteracy | • Telephone<br>• Video | No | No |
| Japan | Medium | • Cost<br>• Interoperability | • Telephone<br>• Video<br>• RPM | No | Yes(partial) |
| Australia | Medium | • Infrastructure<br>• Digital iliteracy | • Telephone<br>• Video | Yes(partial) | Yes(partial) |
| Germany | Medium | • Infrastructure<br>• Education | • Telephone<br>• Video | Yes(partial) | Yes |
| Hungary | Low | • Infrastructure<br>• Digital iliteracy | • Telephone<br>• E-mail | Yes(partial) | No |
| Italy | Low/medium | • Infrastructure<br>• Interconectivity<br>• Reimbursement | • Telephone<br>• Video<br>• RPM | No | Yes(partial) |
| Russia | Low | • Infrastructure | • Video<br>• RPM | No | No |
| Switzerland | Medium/High | • Interoperability<br>• Security | • Video<br>• RPM | Yes(partial) | No |
| United Kingdom | Medium | • Infrastructure<br>• Digital iliteracy | • Telephone<br>• Video | No | No |

Adapted from Omboni et al. (2022).

Due to COVID-19, telehealth adoption is both an interesting and challenging issue to delve deeperto uncover why Malaysians are not adopting telehealth as high as other developed countries.

Rahi et al. (2020) mentioned that the Unified Theory of Acceptance and Use of Technology (UTAUT) model established by Venkatesh et al. (2003) had been used by several researchers to investigate user behavior toward the adoption of e-health

services. According to the UTAUT theoretical model, behavioral intention governs technology use. The direct impact of four main constructs, including performance expectancy, effort expectancy, social influence, and facilitating factors, determines the anticipated likelihood of adopting the technology, as shown in **Figure 2**. Age, gender, experience, and willingness to utilize influence how predictors affect outcomes (Venkatesh et al., 2003).

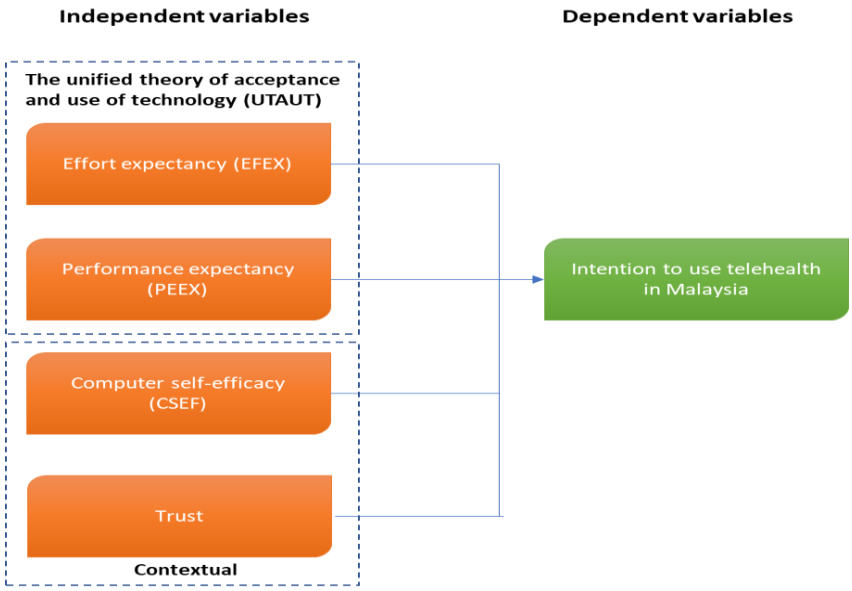


**Figure 2.** Conceptual framework.

AlQudah et al. (2021) mention that technology acceptance in healthcare notes that the most prevalent models for describing what influences how diverse user groups and situations accept different healthcare technologies and countries are Technology Acceptance Model (TAM) and UTAUT, according to major findings. The findings indicated that, besides the basic dimensions of TAM and UTAUT, the most significant influences on various healthcare technologies include anxiety, computer self-efficacy, innovativeness, and trust. Yeo (2019) also discovered that Malaysian patients have favorable attitudes about their intention to utilize telecardiology by concentrating on consumer healthcare technology. The investigation is only partially related to the research because they concentrated on perceived usefulness and intention to utilize such technology but have yet to investigate computer self-efficacy.

Advances in digital technology have broadened the scope of mobile health (mHealth) applications, which now include anything from providing health care in remote communities to instances where face-to-face counseling is neither safe nor practicable. As the world's fastest-growing market for the digital economy, the use of mobile health in Southeast Asia (SEA) has expanded tremendously in the recent decade. The COVID-19 pandemic has accelerated the expansion of telemedicine, which now encompasses a wide range of ICT applications and telephone consultations. During the COVID-19 pandemic, a reputable health system in New York reported a considerable rise in the number of urgent care cases using telemedicine, from 369 to 867 per day (an increase of 135%). General practitioners in

the UK have reported 12,000 video consultations daily, a huge increase from the prior 300 consultations per month. (Thong et al., 2021).

## 2.2. Malaysian perspective on intent to use telehealth

In Malaysia, the Multimedia Super Corridor project's first Telemedicine Blueprint was introduced in 1997 and included by the government in 1 of 7 flagship applications. The government ultimately launched four key pilot programs to address the absence of specialized treatment in rural areas, including teleconsultation between physicians from various specialties and healthcare facilities. To increase access to health services and ease congestion at these clinics, Malaysia's Ministry of Health (MOH) began testing teleconsultation based on video consultation technologies in September 2019 at five public primary care clinics. The primary platform currently used by MOH Malaysia for teleconsultation services is Bookdoc. In response to the pandemic, numerous additional clinics not part of the government project also proactively started teleconsultation. The majority of the clinics provided consultation via telephone consultation (60%). Most financing for the clinics offering video consultation services came from MOH. The research indicated that most teleconsult clinics were in cities, namely Selangor and Johor. This could be attributed by the availability of teleconsultation between urban and rural residents, known as the "digital divide".

### 2.2.1. Telehealth providers in Malaysia

A group of medical professionals and entrepreneurs in Malaysia want to forward the vision of the Telemedicine Blueprint launched by the government in 1997. They started hosting an annual telemedicine conference in 2015. They established the Telemedicine Development Group in 2017. To better represent the extent of their activities, they changed their name to Digital Health Malaysia (DHM) in 2018. To name a few of the start-ups, DOC2US was founded by Dr. Raymond Choy, who began his journey after his father was diagnosed with leukemia. At the time, he was a physician at the Raffles Medical Group in Singapore and wanted to develop a platform to make it easy for everyone to find a healthcare provider. In 2015, he and his co-founder, Jack Lee, founded DOC2US. However, they discovered that Malaysians hesitated to pay for online consultation services, so they changed their business model to focus on corporate clients, clinics, and drugstore partners. DOC2US was the first company in Malaysia to introduce an electronic prescription system driven by a digital signature. The start-up links community pharmacists, who serve as the dispensers in the controlled ecosystem, with prescribers (doctors) (Tan, 2019).

### 2.2.2. Effort expectancy (EFEX)

This study explains effort expectancy as 'the degree of ease of the extent wherein user-perceived ease during telemedicine health services. Previous studies conducted by (Hadji and Degoulet, 2016; Maillet et al., 2015; Wang et al., 2015) have confirmed a significant relationship between effort expectancy and user intention to adopt telemedicine-based health services. An Indonesia study extending the UTAUT model studied doctors' opinions and computer anxiety to scrutinize telehealth usage behavior, especially during the COVID-19 pandemic. The results show that effort expectancy, performance expectancy, and facilitating conditions significantly affect

behavior intention to use telehealth (Napitupulu et al., 2021). The social influence did not significantly influence behavioral intention. However, effort expectancy is strongly influenced by computer anxiety.

H1: Effort expectancy (EFEX) significantly influences the intention to use telehealth in Malaysia

### 2.2.3. Performance expectancy (PEEX)

Performance expectancy is based on concepts from the Technology Acceptance Model (TAM), TAM2, Combined TAM and the Theory of Planned Behavior (CTAMTPB), Motivational Model (MM), the Model of PC Usage (MPCU), Innovation Diffusion Theory (IDT), and Social Cognitive Theory (SCT) (i.e., perceived usefulness, extrinsic motivation, job-fit, relative advantage and outcome expectations). Because it is the best indicator of usage intention, it is significant in both voluntary and required settings (Marikyan, 2021). In the context of this study, performance expectancy is defined as the 'degree to which patient believes that the use of telemedicine health services will increase his/her task patient believes that the use of the telemedicine health services will increase his/her task performance' (Venkatesh et al., 2003). If users feel that current technology offers benefits and is more useful daily, they are more likely to adopt it. Consumers' expectations of technology in a problem-solving environment can be shown in PEEX in Telehealth. PEEX is the user's subjective opinion of how much using telehealth will enhance their health. Additionally, PEEX is significantly affected by doctors' opinions (Napitupulu et al., 2021).

H2: Performance expectancy (PEEX) significantly influences Malaysia's intention to use telehealth

### 2.2.4. Computer self-efficacy (CSEF)

Rahi et al. (2020) posit that the role of computer self-efficacy is influential in investigating user behavior toward adopting telemedicine health services. Computer self-efficacy refers to a patient's perception of his/her ability to complete a task using a computer. Self-efficacy is a patient belief in the set of skills to perform a task using technology. Prior research suggested that patients with high self-efficacy had shown positive intention to adopt telemedicine applications, which help them manage their disease efficiently. A key mediator of how anxiety affects EFEX is Computer Self-efficacy. One will feel more comfortable using the computer as one becomes accustomed to it. In addition to having a major impact on computer anxiety, computer self-efficacy also reduces the strength and relevancy on EFEX. Computer anxiety, also known as technostress, affects perceived ease of use (Achim and Kassim, 2015; Compeau and Higgins, 1995).

H3: Computer self-efficacy (CSEF) significantly influences intention to use telehealth in Malaysia.

### 2.2.5. Trust (TRU)

As for trust, in virtual environments, people cannot communicate face-to-face; therefore, trust becomes more important. When patients are provided with accurate, timely, understandable and useful information, they will likely believe doctors can provide high-quality services. Likewise, Internet technologies can facilitate

communication between patients and doctors, provide more medical information to patients, reduce the sense of distance between patients and doctors, and help patients and doctors communicate better. When patients recognize this advantage, they may trust and use telemedicine more. The Chinese government actively introduced legislation to foster telemedicine growth in 2010 and urged all regions to investigate telemedicine services. Even then, different regions have different progress in telemedicine services. An important factor to consider is that public health mainly provides telemedicine in China. In China, patients have a high faith in public healthcare facilities. As a result, they are ready to trust in and use telemedicine services (Wu et al., 2021). Finally, the phenomenon of this study dives into the behavioral intention to use telehealth. The four constructs discussed above can have a significant impact on this intent. The behavioral intention in question in this study is the users' desire to use telehealth now and in the future.

H4: Trust (TRU) significantly influences intention to use telehealth in Malaysia.

The UTAUT framework is criticized for its inability to explain the behavioral purpose in many contexts (Marikyan and Papagiannidis 2021). This study attempts to expand the UTAUT model by including computer self-efficacy and trust as contextual constructs, as depicted by **Figure 2**.

## 3. Methods

### Research method

This study used quantitative research, sending survey questions electronically and physically to participants. The key data-gathering sources are observed in this investigation, and process disturbance is kept to a minimum. A structured survey questionnaire is used to gather data and test hypotheses to analyze the relationship between the variables. The absence of environmental influences and any manipulation of the environment or variables makes the research environment non-contrived. Since survey data are collected only once at a certain period from respondents from different backgrounds, this study has a cross-sectional temporal horizon. The unit of analysis is individuals. The survey objects are representative of the Malaysian population to be researched because the study is focused on the phenomena of telehealth adoption in Malaysia. The survey is given to individual respondents, meaning they are end users of telehealth providers. The sampling design for this research is non-probability sampling. The estimated number of Malaysian telehealth users is 2.5 million monthly (Kanagaraj, 2021). Hence, the minimum sample size of this study is 384 based on the Krejcie and Morgan table below (1970). The study is a positivism approach using questionnaire to measure the natural setting. The independent variable questionnaire were adapted from Rahi et. al (2020) and the dependent variable was adapted from Napitupulu et al. (2021); Lee et al. (2020).

As the questionnaires are mainly distributed through online means, a total of 420 questionnaires are to be sent out with the assumption of 10% non-response rate and to increase the probability of receiving sufficient data. The information was gathered utilizing a questionnaire instrument that included questions and answers on the indicators found throughout the study variables and consent that was acknowledged for research purposes only. In a private session with no time limit, respondents were

asked to rate each item for the DV and IVs questions using a five-point Likert scale ranging from a score 1 (strongly disagree) to 5 (strongly agree).

## 4. Analysis

### 4.1. Participants

Most of those who participated in the research were between 31 to 40 years old, representing 34% of the total sample. The second majority was 51 and above, with 27% representation. Followed by age 41−50 years old with 25% representation. Those aged 21−30 had a lesser representation of 14%. The different age groups showed the possible interactions with telehealth in providing an informed opinion on this subject. The gender of the individuals was the second demographic factor studied. **Table 2** shows that 55% of participants were women, while 45% were men. However, given the minimal impact gender has on telehealth utilization, the gender component was irrelevant to this investigation. However, the inclusion of gender confirmed that both sexes engage in telehealth while highlighting the positive advancements in information technology and considering the views of both men and women. The great majority (96%) of participants are learned individuals. A significant majority of 50% had an undergraduate degree. Followed by 24% having a Master and 13% having a diploma. This shows that the participants who responded to this questionnaire were spread across different levels of education who used telehealth.

**Table 2.** Respondents' demographic profile.

| Demographic detail | Category | Frequency | Percent |
|---|---|---|---|
| Age | 20 and below | 0 | 0 |
| | 21−30 | 14 | 14 |
| | 31−40 | 34 | 48 |
| | 41−50 | 25 | 73 |
| | 51 and above | 27 | 100 |
| Gender | Male | 45 | 45 |
| | Female | 55 | 100 |
| Education | Certificate | 5 | 5 |
| | Diploma | 13 | 18 |
| | Undergraduate | 50 | 68 |
| | Postgraduate | 24 | 92 |
| | Doctorate | 4 | 96 |
| | None of the above | 4 | 100 |

### 4.2. Reliability test

To further ensure the consistency of the variables, reliability analysis is crucial. The consistency of each variable in this study is assessed using Cronbach's alpha reliability test. The Cronbach's Alpha reliability range is displayed in **Table 3**. The coefficient alpha value is above 0.80, which shows that the level of reliability is very good (Sekaran and Bougie, 2016). Computer self-efficacy has the highest Cronbach's

Alpha value of 0.919, while trust has the lowest of 0.839. The result closer to one confirms strong internal consistency between the variables. This demonstrates the variables' strong internal consistency and suitability for future investigation.

**Table 3.** Reliability test.

| Variable | Item | Cronbach Alpha |
|---|---|---|
| Use telehealth | 5 | 0.896 |
| Effort expectancy | 3 | 0.909 |
| Performance expectancy | 3 | 0.884 |
| Computer self-efficacy | 3 | 0.919 |
| Trust | 3 | 0.839 |

## 4.3. Multiple regression

The model summary of the multiple regression analysis is shown in **Table 4**. The predictor variables in this regression are effort expectancy, performance expectancy, computer self-efficacy, and trust. These predictors are necessary to assess the intention to use telehealth in Malaysia. The multiple correlation coefficient, or *R*-value, for **Table 4** has a value of 0.906, indicating a high degree of prediction. The corrected R square value for the multiple regression model is 0.821. This shows that the independent variables explain 82.1% of the variability of the dependent variable in this study. According to Sekaran and Bougie (2016), the remaining 17.9% of the variation could not be explained by the predictors and could be explained by variables not covered in this study.

**Table 4.** Multiple regression model summary.

| Model Summary[b] | | | | | |
|---|---|---|---|---|---|
| **Model** | **R** | **R Square** | **Adjust R Square** | **Std.Error of the Estimate** | **Durbin-Watson** |
| 1 | 0.906[a] | 0.821 | 0.819 | 0.36384 | 2.056 |

a. Predictors: (Constant), iv_tru, iv_peex, iv_efex, iv_csef.
b. Dependent Variable: dv_useTelehealth.

## 4.4. Correlation coefficients

In a multivariate regression model, multicollinearity occurs when there is a correlation between several independent variables. This may impact the regression findings. The Variance Inflation Factor (VIF) can, therefore, calculate the amount by which multicollinearity has inflated the variance of a regression coefficient.

The VIF depicts the impact on the regression coefficient's standard error for each independent variable (Sarstedt and Mooi, 2019). A high VIF score denotes a high degree of correlation between the predictor variables, leading the model to forecast the dependent variable incorrectly. A well-distributed dataset can be obtained when the VIF is as small as possible, with a maximum value of 10 (Sekaran and Bougie, 2016). All of the independent variables in **Table 5** have VIF values lower than 5, indicating an acceptable moderate correlation between the variables.

The slope of the line between the predictor and dependent variables is represented by the standardized beta (β) value. The maximum score is 0.616 for performance

expectancy, while the lowest score is 0.092 for computer self-efficacy. Therefore, for performance expectancy, this would imply that the intent to use telehealth (DV) increases by 0.616 units for every unit increase in PEEX. While in second place is trust, the intent to use telehealth increases by 0.131 units for every unit increase in TRU. This is followed by effort expectancy (0.112) and computer self-efficacy (0.092).

**Table 5.** Multiple regression coefficients.

| **Coefficients[a]** | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Model** | | **Unstandardized B** | **Coefficients Std. Error** | **Standardized Coefficients Beta** | ***t*** | **Sig** | **Collinearity Tolerance** | **Statistics VIF** |
| 1 | (Constant) | 0.056 | 0.090 | | 0.618 | 0.537 | | |
| | iv_efex | 0.112 | 0.039 | 0.114 | 2.859 | 0.005 | 0.326 | 3.072 |
| | iv_peex | 0.616 | 0.036 | 0.645 | 16.938 | 0.000 | 0.359 | 2.787 |
| | iv_csef | 0.092 | 0.043 | 0.096 | 2.129 | 0.034 | 0.256 | 3.914 |
| | iv_tru | 0.131 | 0.041 | 0.122 | 3.235 | 0.001 | 0.367 | 2.724 |

a. Dependent Variable: dv_useTelehealth.

## 5. Discussion

### 5.1. Objective 1: To examine the influence of effort expectancy (EFEX) on telehealth adoption in Malaysia.

The hypothesis testing shows that EFEX has a positive relationship and significant influence on telehealth adoption in Malaysia. In **Tables 1** and **2**, the result of the research shows a significant influence with a significant value of 0.005, which is less than 0.05. A beta value 0.112 indicates a positive relationship between EFEX and telehealth adoption. This aligns with earlier literature reviews as it concurs with an Indonesian study result that shows that behavior intention to use telehealth is greatly influenced by effort expectancy. On a side note, computer anxiety significantly impacts effort expectancy (Napitupulu and Kusuma, 2021).

Effort expectancy, also known as perceived ease of use in the concept of TAM, is highlighted in the UTAUT model as a crucial component in most Technology Acceptance studies. In this research, EFEX represents the user's subjective perception of how simple and painless telehealth is. Telehealth is still relatively new to patients, so EFEX strongly correlates with behavioral intention. Devices or websites that are basic and straightforward to use tend to be more popular among users. Thus, it has been established that EFEX is a crucial indicator of users' intention to use healthcare technology. In Thailand's Community Health Centers, an analysis of factors influencing users' adoption of telehealth technology revealed that EFEX was the primary predictor of acceptable behavior (Napitupulu and Kusuma, 2021).

On the other hand, computer anxiety, as it was formerly known, technostress, is described as "evoking anxious or emotional reactions when it comes to utilizing a computer". It is an emotional connection that has a detrimental impact on effort expectancy, inadvertently influencing behavioral intention to use telehealth through effort expectancy. Lower computer anxiety and stronger computer self-efficacy may

significantly affect learning and effectively using the computer. (Achim and Kassim, 2015) In other words, when anxiety levels drop, so will an individual's judgment on how simple it is to use telehealth. As telehealth is still developing, one can postulate that computer anxiety needs to be addressed when examining how consumers adopt technological services.

The behavioural intention of people to adopt technology increases when they think that technology will require little effort. Due to their hectic schedules and complex work environments, doctors will use technology if they believe it to be simple to use, comprehend, adaptable, and convenient to learn. Because each user is distinct, they may feel and view an item differently. Physicians will be enthusiastic about employing the technology if they know and feel positive about it. However, some research has shown that attitude does not influence behavior-related intention to use technology. Researchers contend that doctors adopting a positive mindset toward technology will increase their commitment to and enthusiasm for its use. According to findings, telehealth acceptance is positively and significantly influenced by government backing and EFEX with the organizational health culture (Zailani et al., 2014).

## 5.2. Objective 2: To examine the influence of performance expectancy (PEEX) on telehealth adoption in Malaysia.

Out of the 4 hypotheses, performance expectancy is the most significant construct, with a *p*-value of 0.000 and a beta value of 0.616 (closest to 1). Performance expectancy, also known as perceived usefulness, significantly influences the adoption and utilization of telehealth in Malaysia.

Perceived usefulness relates to individuals' opinions on a certain technology that will enable them to do their tasks more effectively. According to prior studies, PEEX is the most significant determinant in determining a physician's behavioral intention to accept technology, which concurs with this research findings. It would positively affect their intention to accept technology if the physician believed it would improve their job performance and productivity. In this study, top management support significantly impacts hospital acceptance of telehealth. This correlates to organizational culture, which refers to the norms and values of the organization that may discourage people from exerting their greatest effort or may motivate them to do so. Hence, it is crucial to consider how organizational culture affects adopting new technologies (Zailani et al., 2014).

Napitulu and Kusuma (2021) also studied the simultaneous effect of PEEX on doctors' opinions and computer anxiety on intention to use telehealth in an Indonesian context. These significant connections between the different constructs indicate that a higher doctor's opinion will enhance the performance expectations of telehealth, which will boost people's intentions to use it. Telehealth, with the assistance of a doctor's opinion, for example, on a chat service in an application, makes it simpler for patients to be able to consult about their complaints at any time and anywhere, allowing them to make decisions as quickly as possible based on these opinions and suggestions. Thus, based on this finding, one can postulate that if users find that telehealth can help them to do a task more efficiently, like obtaining an e-prescription

or getting a medication delivered to their doorstep without leaving their house, they will use Telehealth more often in their daily lives.

### 5.3. Objective 3: To examine the influence of computer self-efficacy (CSEF) on telehealth adoption in Malaysia.

CSEF is the least significant construct in this study to influence telehealth adoption, with a *p*-value of 0.034 and a beta coefficient of 0.056 (closest to zero). This could be due to a significant number of respondents aged 31 years and above (86%). The beta coefficient for CSEF is also the lowest, probably due to most respondents being older individuals. Hence, CSEF may not deter these respondents from embracing telehealth.

According to Compeau and Higgins, computer self-efficacy assesses one's capacity to use technology for a specific task. According to some earlier studies, CSEF can increase people's and organizations' adoption of telehealth. The number of adoptions rises for those with a greater level of education. Job stability and experience may lower anxiety over the acceptance and use of telemedicine. In other words, those with more work experience may have less tension or anxiety when using new technologies or systems (Zailani et al., 2014).

### 5.4. Objective 4: To examine the influence of trust on telehealth adoption in Malaysia.

Trust is the second most significant construct after PEEX, with a *p*-value of 0.001 and a beta coefficient of 0.131. Consumers continue to be cautious about using telehealth in their daily lives.

Recent surveys have also revealed that people might not fully trust telehealth's promises. The potential of IT applications is frequently measured by the extent of consumer adoption rather than just the capabilities of cutting-edge technologies. Therefore, the success of healthcare IT solutions such as telehealth depends heavily on the capacity to identify, anticipate and manage users' approval or acceptance level. Users are more likely to trust a website if the perceived danger is low, according to a poll of over 2500 people looking for online medical advice. According to studies, the success of healthcare IT systems depends on patient and physician trust. Therefore, greater confidence in medical advice will raise technology's performance expectancy (Napitupulu, Kusuma 2021). Thus, a positive correlation exists between trust and performance expectancy on intention to use telehealth in Malaysia.

## 6. Recommendation

This research helps to understand better consumer intent to use telehealth in Malaysia. Based on the findings, the highest beta coefficient value is performance expectancy, trust, effort expectancy, and lastly followed by computer self-efficacy. Although this research has its own biases, appropriate action points can increase the adoption of telehealth in Malaysia.

Based on the key insights in discussion points, Expand Telehealth Infrastructure: Given the existing Telemedicine Blueprint and the heightened demand during the COVID-19 pandemic, continued investment in telehealth infrastructure is essential,

particularly in rural and underserved areas. This will ensure that all regions have the necessary resources to provide telehealth services effectively. Develop Comprehensive Telehealth Policies: It is crucial to create and enforce regulations that standardize telehealth practices, ensuring the delivery of quality care and maintaining patient safety. These policies should also address the digital divide to guarantee equitable access for all individuals. Subsidize Telehealth Services: Implementing subsidy programs to reduce the financial burden on patients is vital in promoting the adoption of telehealth services. This is especially important in a self-pay market like Malaysia, where financial barriers can hinder access to necessary healthcare services.

Healthcare Providers Adopt Telehealth Technologies: Clinics and hospitals should be encouraged to integrate telehealth into their services. Comprehensive training programs must be implemented to ensure healthcare professionals are proficient in using these technologies, facilitating a smooth transition to digital healthcare. Focus on Patient Education: Educating patients on the benefits and usage of telehealth services is crucial. Addressing concerns related to trust and efficacy will help increase acceptance and usage, ensuring that patients are comfortable and informed about telehealth options. Enhance Patient Trust: Developing and communicating robust security measures to protect patient data is essential. Trust is a significant factor in the adoption of telehealth services, and ensuring data security will foster greater confidence among patients.

Telehealth Service Providers: User-Friendly Platforms: Developing intuitive and easy-to-use telehealth platforms is imperative. Effort expectancy, or the ease with which users can navigate the technology, is a critical factor. Reducing the complexity of technology usage will make telehealth services more accessible to a broader audience. Collaborate with Traditional Healthcare: Forming partnerships with traditional healthcare providers to offer a hybrid model of care, which combines in-person and telehealth services, can enhance the overall healthcare experience. This collaborative approach ensures comprehensive patient care. Expand Service Range: Diversifying the types of services offered via telehealth is important. In addition to consultations, services should include follow-ups, remote monitoring, and mental health services. This expansion will cater to a wider range of patients' needs and improve overall healthcare delivery.

Educational Institutions: Incorporate Telehealth Training: Including telehealth training in medical and healthcare curricula is essential to prepare future healthcare professionals for the digital healthcare environment. This will ensure that new graduates are well-versed in telehealth practices and technologies. Research and Development: Encouraging academic research on telehealth is vital for the continuous improvement and adaptation of technologies and methodologies. Ongoing research will help to refine telehealth services and address emerging challenges in the digital healthcare landscape.

Patients and General Public: Promote Digital Literacy: Enhancing digital literacy among the public is essential to reduce computer anxiety and increase the self-efficacy of patients in using telehealth services. By providing education and resources, patients can become more comfortable and confident in navigating telehealth platforms. Engage in Feedback: Patients should be actively encouraged to provide feedback on telehealth services. This feedback is invaluable for providers to improve the quality

and user experience of their telehealth offerings, ensuring that the services meet the needs and expectations of users.

Private Sector and Investors: Invest in Telehealth Startups: Providing funding and support for innovative telehealth startups is crucial to encourage the development of new solutions tailored to the local market. Investments can drive innovation and help startups bring their telehealth technologies to a broader audience.

Corporate Partnerships: Encouraging corporate partnerships with telehealth providers can integrate telehealth services into employee health programs. These partnerships can promote the use of telehealth among employees, improving access to healthcare and supporting overall employee well-being. Addressing Specific Issues: Digital Divide: Addressing the digital divide is essential to ensure that telehealth services are accessible to both urban and rural populations. This could involve improving internet connectivity and providing affordable devices for accessing telehealth services, thereby enabling equitable access for all.

Trust and Privacy: Building trust through robust data privacy and security measures is crucial. Transparent communication about these measures can reassure users about the safety of their personal health information, fostering greater confidence in telehealth services. Integration with Existing Systems: Ensuring that telehealth systems are compatible with existing healthcare systems is necessary for seamless integration and data sharing between different healthcare providers. This compatibility will enhance the efficiency and effectiveness of healthcare delivery, providing a more cohesive experience for patients.

## 7. Limitations and future research

The respondents to this study are predominantly the researcher's contacts, which may represent a more learned and older generation, as discussed earlier. Therefore, if this study were to be conducted again in a bigger scale, the results might alter. Researchers should consider extending the study's emphasis to younger age groups and larger demographics and geographic locations for better results. Additionally, to test the correlations, add a demographic question of job tenure or work experience.

The biggest drawback of using online questionnaires for this research is the dearth of competent respondents with computer and Internet skills (Nayak and Narayan, 2019). This is because those without internet access, such as those with low incomes, those living in remote areas, and the elderly, cannot be surveyed online (Ball, 2019). Due to the lack of a time limit for respondents to complete the form and the researcher's absence, participants may assume the meaning of unclear or ambiguous statements.

Telehealth providers and government agencies must investigate users' intent to use telehealth in healthcare. This research will contribute to the literature on telehealth adoption, which is still in its infancy in Malaysia. Malaysia should jump on the bandwagon to embrace telehealth as it has gained traction globally. This will help the nation to provide healthcare to the public in general.

Another weakness of this study is that the research did not incorporate several UTAUT factors due to time constraints. Thus, future research might cover all UTAUT factors more holistically. The UTAUT model can also be re-looked to confirm the

instrument's validity. This could be accomplished by obtaining the instrument's reliability, content validity and construct validity using a new user population.

## 8. Conclusion

Using the Unified Theory of Acceptance and Utilization of Technology (UTAUT) model, the study on telehealth adoption in Malaysia provides significant insights into the factors influencing its acceptance among consumers and healthcare providers. The key constructs examined include performance expectancy, trust, effort expectancy, and computer self-efficacy. The findings highlight several critical points and recommendations for stakeholders, including telehealth providers, healthcare providers, and government agencies. Firstly, performance expectancy emerged as the most significant factor influencing telehealth adoption. This indicates that users are more likely to adopt telehealth services if they believe these services will enhance their efficiency and outcomes. Therefore, telehealth providers should focus on improving the functionality and reliability of their platforms to meet users' expectations.

Trust is another crucial factor that significantly impacts the adoption of telehealth. Consumers need to feel confident in the security and privacy of their personal health information. Telehealth providers must implement robust security measures and transparent policies to build and maintain trust with users. Effort expectancy, although less significant than performance expectancy and trust, still plays a vital role. Users prefer telehealth services that are easy to use and navigate. Hence, telehealth platforms should be user-friendly and accessible to individuals with varying levels of technical proficiency. Computer self-efficacy, while the least significant construct in this study, still affects telehealth adoption. It is essential for telehealth providers to offer adequate support and training to users, especially those who are less confident in their technical skills, to ensure a smooth and positive experience.

For policymakers, the establishment of comprehensive telehealth regulations and policies is paramount. Government support and clear legal frameworks can drive the widespread adoption of telehealth by addressing concerns related to confidentiality, liability, and cross-border issues. Such measures are particularly crucial in developing countries like Malaysia, where the telehealth infrastructure is still evolving.

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