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The Impact of Self-Efficacy on Telemedicine Adoption in Emerging Country

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Abstract

Telemedicine has emerged as a vital innovation in healthcare, improving access to medical services by reducing the need for physical interactions. Previous studies revealed that self-efficacy influences individuals' perceptions and behaviors toward adopting new technologies, especially telemedicine. However, these studies do not emphasize understanding how three sources of self-efficacy, namely, enactive mastery (EM), vicarious experience (VE), and verbal persuasion (VP), affect telemedicine adoption (TA) through perceptions of telemedicine technology. Based on the sample of 240 respondents, structural equation modeling (SEM) analysis was utilized to examine the proposed hypotheses. The results revealed that enactive mastery and vicarious experience positively influence perceived ease of use (PE), with vicarious experience also significantly impacting perceived usefulness (PU). Perceived ease of use significantly impacted perceived usefulness, strongly influencing telemedicine adoption. These findings confirm the impact of self-efficacy, especially enactive mastery, and vicarious experience components in sharping perceived ease of use and perceived usefulness. These are essential for driving telemedicine adoption and facilitating its adoption in an emerging country. The findings highlight the importance of these self-efficacy sources in telemedicine adoption strategies and suggest that enhancing individuals' direct experiences and observational learning can foster telemedicine usage in emerging markets.

Keywords: Telemedicine Adoption; Self-efficacy; Technology Acceptance Model; Emerging Countries.

1. Introduction

Self-efficacy has influenced the behavior of individuals to do or not to do something [1, 2]. In the past decades, several studies have attempted to investigate the role of psychological factors in adopting technology in the healthcare industry [3, 4]. Prior studies agree that self-efficacy significantly influences individuals' use of telemedicine [5-7]. Self-efficacy is defined as the expectations of individual efficacy that determine initiating behavior, how much effort will be dedicated, and how long he/she sustains the obstacle encountered and can be classified into three sources: enactive mastery, vicarious experience, and verbal persuasion [1, 8]. The COVID-19 pandemic has deeply reformed public health systems globally, demanding strategies that diminish the risk of direct exposure among people in society. Telemedicine technology emerges as one of the vital strategies to improve the quality of the public health system. Telemedicine is

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medical experts using information and communication technology to provide public health services to remote populations. It involves the interchange of data related to the diagnosis, treatment, and prevention of diseases and the continual research and education of medical services [9]. Based on BIS Research, the worldwide telemedicine market was valued at approximately $22 billion in 2019. It is anticipated to reach $123 billion by 2030, with a compound annual growth rate of 17% from 2019 to 2030 [10]. Today, the Thai healthcare system faces difficulties meeting the growing demand for healthcare services. The estimated overall expenditure in Southeast Asia is expected to exceed USD 740 billion, with Thailand's portion being substantial.

Nevertheless, the physician-to-patient ratio in Thailand is only 0.47 per 1,000 patients. This discrepancy underscores the significant unmet medical needs in Thailand [11]. Telemedicine can be realized as a mechanism to enhance patients' access to healthcare services at a lower cost but with more convenience since telemedicine does not require physical interaction between healthcare service providers (e.g., doctors, nurses, and pharmacists) and patients. However, telemedicine has been realized as an innovative healthcare service technology, and its adoption and continual usage, especially in emerging countries such as Thailand, face several challenges. The problems encompass infrastructure deficiencies, including unreliable internet access in rural regions, inadequate availability of telemedicine-compatible devices, and the absence of dependable technical support systems for healthcare practitioners and patients. Moreover, digital literacy constitutes a substantial obstacle, especially for older persons and rural communities, who may lack confidence in utilizing digital platforms and have difficulties with intricate user interfaces. Insufficient awareness and trust in telemedicine's capabilities intensify these issues, as individuals may doubt their health information's dependability, efficacy, and confidentiality.

This deficiency in confidence is directly linked to self-efficacy, which affects individuals' opinions of their capability to utilize telemedicine technologies proficiently. The challenges are infrastructural readiness, lack of adequacy in digital literacy, and healthcare regulatory issues that slow the telemedicine adoption rate. Furthermore, investigating these factors is still unclear despite attempts to understand what factors act as antecedents to drive individuals' perceptions and behaviors to adopt and continue using telemedicine. More investigation is needed, especially into psychological factors. One of the psychological factors that has been paid attention to in the telemedicine context is self-efficacy. Self-efficacy refers to individuals' belief in their capability to perform behaviors essential to yield specific performance accomplishments [1]. Previous literature argues that individual beliefs such as self-efficacy cause individual action [12]. Also, these studies mainly focus on enacting mastery, which is one source of self-efficacy, especially [6, 7]. However, to our knowledge, other sources of self-efficacy, vicarious experience, and verbal persuasion have been paid little attention to in previous literature. Also, developed and emerging countries' cultures are different [13]. Cultural differences provide dissimilar reasons for adopting new products and services [14, 15]. The role of self-efficacy in adopting telemedicine may not be the same in developed and emerging countries. Earlier literature examines factors that affect telemedicine adoption in developed or Western countries [6]. However, few studies have investigated the impact of self-efficacy on telemedicine adoption in emerging countries [7]. To enhance the understanding of self-efficacy in emerging countries, this study investigates the effect of elements (enactive mastery, vicarious experience, and verbal persuasion) of self-efficacy on the adoption of telemedicine.

The rest of this study contains section two, formulating a theoretical foundation and a conceptual framework; section three, proposing research methodology; section four, presenting data analysis and research findings; section five, discussing theoretical contributions and managerial implications; section six, concluding; and section seven, revealing limitations and directions for future research.

2. Literature Review

2.1. Self-Efficacy Theory

Self-efficacy theory is proposed by Bandura (1977), defined as the expectations of individual efficacy that determine initiating behavior, how much effort will be dedicated, and how long he/she will sustain the obstacle encountered [1]. There are three sources of self-efficacy: enactive mastery, vicarious experience, and verbal persuasion [6]. Enactive mastery refers to the degree of recognition of individuals and their ability to succeed on tasks [8]. Vicarious experience is defined as individuals perceiving the behavior of others (e.g., friends, family, influence, and role models), observing what they can do, evaluating the outcome of their behavior, and using this information as a guideline for doing something [2]. Lastly, verbal persuasion is when individuals are convinced by people who succeed in a specific task [16]. This theory is applied to various areas, and one application area is the adoption of telemedicine [7, 17]. Social cognitive factors such as self-efficacy are strongly related to healthcare app adoption [5]. Because individuals have high self-efficacy, they tend to recognize their ability to use telemedicine, observe how to use telemedicine from others, and follow suggestions from influencing people.

2.2. Technology Acceptance Model (TAM) and Cultural Differences in Technology Adoption

The concept of the Technology Acceptance Model (TAM), derived from Davis (1989), relates to telemedicine adoption [18]. Individuals will accept new technology or products when they perceive ease of use and usefulness toward new technology or products [19]. Prior research confirms that TAM can be applied in telemedicine contexts such as

contactless payment technology, mobile healthcare, and telemedicine for physicians [7, 17, 20]. Cultural differences provide different norms, beliefs, attitudes, and behaviors of individuals in each society, such as individualism vs. collectivism, uncertainty avoidance, and long-term vs. short-term orientation [13, 21]. Existing literature investigates the impact of self-efficacy on telemedicine adoption in a Western context. However, the norms of Western and Eastern countries are not the same. Different norms reflect individuals' attitudes and behavior, which may lead to the rate of technology adoption. In collectivism, low uncertainty avoidance, and long-term orientation, the impact of imitation among individuals in society dominates technology adoption [22].

2.3. The Impact of Self-Efficacy on Telemedicine Adoption

Although much literature explains the impact of self-efficacy on telemedicine adoption, these studies focus on the multi-dimensional concept of self-efficacy. Apart from enactive mastery, other dimensions of self-efficacy, which are vicarious experience and verbal persuasion, lack examination in the telemedicine context. This study proposes the impact of three dimensions of self-efficacy on telemedicine adoption. A conceptual framework of this study is shown in Figure 1.

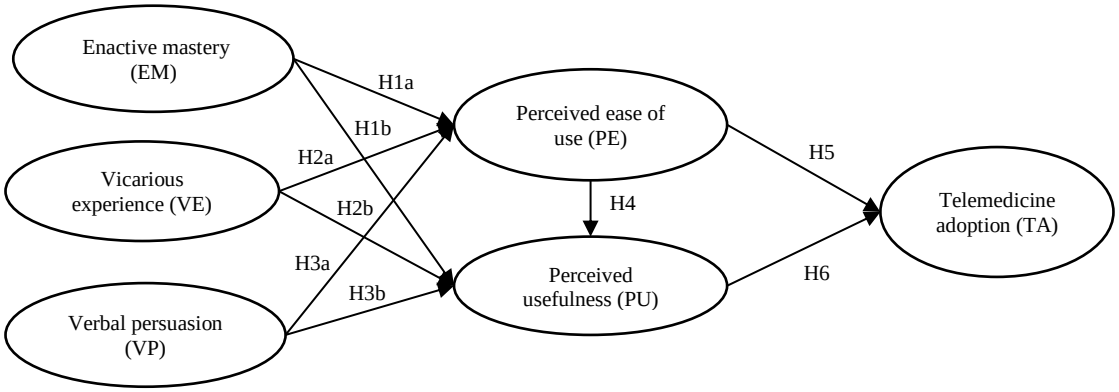


Figure 1. A conceptual framework

Enactive mastery plays a crucial role in telemedicine adoption. Individuals who believe in their ability to use telemedicine technology find it easier [7]. This confidence also enhances their perception of its usefulness in daily life. Enactive mastery also builds confidence through successful experiences, making telemedicine technology seem more straightforward and beneficial. This confidence and positive perception are crucial for the widespread adoption of telemedicine. For these reasons, we can hypothesize that.

H1: Enactive mastery positively impacts (a) perceived ease of use and (b) perceived usefulness.

Vicarious experience increases the likelihood that individuals will perceive new technology, such as telemedicine, as easy to use. Observing others teaches individuals how to perform tasks without directly engaging with them. They watch others use the technology, learn from their experiences, and evaluate the outcomes. These observations help individuals find telemedicine easy to use and recognize its usefulness. Hence,

H2: Vicarious experience positively impacts (a) perceived ease of use and (b) perceived usefulness.

Verbal persuasion can enhance the perceived ease of use and usefulness of telemedicine for individuals who are not familiar with it. When people are persuaded by those with experience or expertise in telemedicine, they are likelier to find it easy to use. By consulting with and following the guidance of these experts, individuals can more easily recognize the benefits of telemedicine. As such, we can hypothesize that,

H3: Verbal persuasion positively impacts (a) perceived ease of use and (b) perceived usefulness.

When individuals perceive telemedicine as easy to use for improving their health, they recognize its benefits, such as the convenience of meeting with a doctor or nurse and cost savings in terms of time and transportation. As they perceive the ease of use and usefulness of telemedicine technology, they are more likely to accept new technologies that enhance their quality of life, such as telemedicine, instead of visiting a doctor at a hospital or clinic. Therefore, it can be hypothesized that

H4: Perceived ease of use has a positive impact on perceived usefulness.

H5: Perceived ease of use has a positive impact on telemedicine adoption.

H6: Perceived usefulness has a positive impact on telemedicine adoption.

3. Research Methodology

This quantitative study conducts survey research in Thailand. Thailand can be a good proxy for an emerging country in which the healthcare industry heavily invests in developing telemedicine systems, and many hospitals provide telemedicine services [23]. However, several studies examine self-efficacy's impact on telemedicine adoption in a Western context. Our findings can contribute to expanding the boundary of knowledge in adopting telemedicine in the Eastern context. The empirical data was collected using the quota sampling method to ensure the representation of respondents of different strata, such as sex and age [24]. The quota sampling method has advantages and disadvantages. In terms of strengths of the quota sampling method, this method improves the representation of the sample related to the population of the study, provides prediction as good as the probability sampling method, enhances the response rate, and increases the efficiency of cost and time than probability sampling [25, 26].

However, there are weaknesses in the quota sampling method, such as the variation of respondents from different characteristics, leading to the potential bias of research findings [27]. For these reasons, we find the advantages outweigh the disadvantages of the method. The respondents were selected using a quota sampling method to ensure representation across age and gender groups, minimizing bias. However, this non-probability approach may still carry some risk of selection bias due to its reliance on pre-defined quotas. For the Thai population, the number of populations aged between 36 and 55 is highest compared with other groups [28]. In this study, quotas are set into three groups according to generation: 16-35 (Generation Z), 36-55 (Generation X), and 56+ (Baby Boomer). For the gender of the Thai population, the ratio of males and females is approximately equal [29]. Another criterion is that a respondent must have experienced telemedicine service at least once. This approach ensures that the sample reflects the diversity of the population while focusing on individuals with prior experience using telemedicine, which enhances the reliability of the findings.

A self-administered questionnaire with a cover letter to explain the research objective is used in this study. To increase the credibility of research findings and reduce the bias of respondents, all respondents are anonymous by not asking for their contact information, such as name, telephone number, and e-mail address, in the questionnaire. We adopt the measures from previous studies to develop the measures of six constructs in this study (enactive mastery, vicarious experience, verbal persuasion, perceived ease of use, perceived usefulness, and telemedicine adoption). All constructs in this study are measured by a five-point Likert scale (1 = strongly disagree to 5 = strongly agree). The three sources of self-efficacy, which are active mastery (3 items), vicarious experience (3 items), and verbal persuasion (6 items), were measured by the items modified from Wangwongwiroj & Yasri (2021) [30]. To evaluate perceived ease of use, we use a four-item measure and perceived usefulness, and a three-item measure is adapted from Zhang et al. (2017) [7]. For telemedicine adoption, a three-item measure is modified from Dam et al. (2018) and Zhang et al. (2017) [5, 7]. The constructs were measured using validated scales adapted from previous studies, and reliability was ensured by conducting a pilot test and confirming internal consistency through Cronbach's alpha values above the acceptable threshold of 0.7. The detailed constructs and measurement items are shown in the Appendix I.

For data analysis, structural equation modeling (SEM), using a two-step approach, is used to investigate the interrelationship among constructs in the conceptual framework. AMOS version 24 was used for data analysis. To calculate the sample size (n) for data analysis, Hair et al. (2010) suggest that a ratio of sample size to the number of observed variables should be greater than 10 [31]. In this study, the number of observed variables is 21. Hence, the sample size of this study should be greater than 210.

4. Results

4.1. Sample Profile

The majority of the sample is male (50.4%). Most respondents are between 16 and 35 years old (45.8%). Regarding education, the largest group holds a bachelor's degree (42.5%), followed by those with a master's degree or higher (26.7%). The income distribution shows that most respondents earn between 20,001-30,000 Baht per month (32.9%), and the largest group occupation is private sector employees (40.8%). Most respondents use hospital or healthcare services 2-3 times a year (57.9%), and most spend the average medical expenses per visit between 1,001-3,000 Baht (52.1%) when visiting hospitals or medical facilities. Most usually go with family (50.4%), followed by those who go alone (42.9%). The sample profile is shown in Table 1.

Table 1. Sample profile

		N	%
Gender	Male	121	50.4
	Female	119	49.6
Age	16-35 years old	110	45.8
	36-55 years old	90	37.5
	above 56 years old	40	16.7
Education attainment	Primary School	1	0.4
	Secondary School	19	7.9
	Vocational Certificate / Diploma	54	22.5
	Bachelor's Degree	102	42.5
	Master's degree or higher	64	26.7
Monthly Income (Baht)	Less than 10,000 Baht	49	20.4
	10,001-20,000 Baht	37	15.4
	20,001-30,000 Baht	79	32.9
	30,001-40,000 Baht	25	10.4
	More than 40,000 Baht	50	20.8
Average times using the services at a hospital or healthcare facility	Less than once a year	56	23.3
	2-3 times a year	139	57.9
	More than 3 times a year	45	18.8
Average medical expenses per visit	Less than 1,000 Baht	76	31.7
	1,001-3,000 Baht	125	52.1
	More than 3,000 Baht	39	16.3
Occupation	Student	52	21.7
	Private sector employee	98	40.8
	Government official / State enterprise employee	50	20.8
	Business owner	35	14.6
	Homemaker	5	2.1
Who do you usually visit the hospital or medical facility with?	Alone	103	42.9
	Family	121	50.4
	Friend	14	5.8

4.2. Hypothesis Testing

Structural equation modeling (SEM) was employed to examine the interrelationships among constructs in the conceptual framework using a two-step approach. First, confirmatory factor analysis (CFA) was conducted to validate the measurement items. Convergent validity refers to the extent to which two measures of the same trait agree, and discriminant validity, which ensures that constructs are distinct, was assessed to confirm the model's goodness of fit. Convergent validity is satisfied when factor loadings exceed 0.7, and the squared multiple correlations are greater than 0.5 [32, 33]. Discriminant validity is established when the square root of a construct's AVE (Average Variance Extracted) is greater than its correlations with other constructs in the model. Following the suggested modification indices, the measurement model was revised, and item VP6 was removed as its factor loading did not meet the recommended threshold. The final measurement model demonstrated an acceptable fit to the data (Chi-square = 318.933, df = 170, CMIN/df = 1.876, GFI = 0.888, RMSEA = 0.061; CFI = 0.945; NFI = 0.891). Table 2 presents the confirmatory factor analysis results, confirming that convergent and discriminant validity were achieved.

Table 2. Measurement Model Results

Constructs and items	Loading	t-value	SE	Alpha	Composite Reliability	AVE
Enactive Mastery				0.678	0.821	0.339
EM1	0.435	-	-			
EM2	0.629	7.617	0.183			
EM3	0.595	5.929	0.242			
Vicarious Experience				0.709	0.910	0.453
VE1	0.692	-	-			
VE 2	0.651	8.624	0.130			
VE 3	0.675	8.896	0.112			
Verbal persuasion				0.805	0.982	0.458
VP1	0.754	-	-			
VP2	0.701	10.258	0.100			
VP3	0.623	9.096	0.086			
VP4	0.659	9.640	0.096			
VP5	0.637	9.312	0.092			
Perceived ease of use				0.875	0.986	0.636
PE1	0.738	-	-			
PE2	0.774	11.804	0.099			
PE3	0.785	11.869	0.093			
PE4	0.886	13.265	0.094			
Perceived usefulness				0.835	0.972	0.652
PU1	0.872	-	-			
PU2	0.645	11.214	0.073			
PU3	0.882	17.448	0.061			
Telemedicine adoption				0.893	0.983	0.739
TA1	0.893	-	-			
TA2	0.792	15.529	0.066			
TA3	0.892	18.996	0.056			

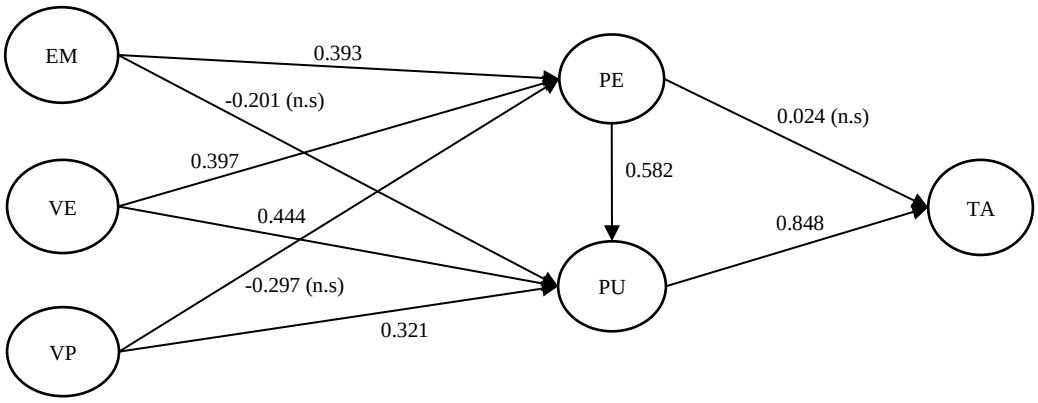
Based on the data presented in Table 3, the measurement model demonstrates acceptable convergent and discriminant validity. Most factor loadings exceed 0.6, Composite Reliability (CR) values surpass the 0.7 threshold for all constructs, and Average Variance Extracted (AVE) values are close to the recommended 0.5 level for most constructs. Discriminant validity is confirmed as the AVE values are generally higher than the squared inter-construct correlations. While the AVE value for the Enactive Mastery construct falls slightly below the 0.5 benchmark, its high CR and Cronbach's Alpha indicate strong internal consistency. For most constructs, the square root of the AVE is greater than its correlations with other constructs, affirming discriminant validity. These confirmatory factor analysis results validate the measurement model, allowing further path analysis.

Table 3. Discriminate Validity

Construct	EM	VE	VP	PE	PU	TA
Enactive Mastery	**0.582**					
Vicarious Experience	0.947	**0.673**				
Verbal persuasion	0.914	0.810	**0.677**			
Perceived ease of use	0.592	0.468	0.340	**0.797**		
Perceived usefulness	0.455	0.577	0.459	0.657	**0.807**	
Telemedicine adoption	0.413	0.520	0.398	0.596	0.858	**0.860**

Note: The square root of AVE of each construct is shown in bold on the diagonal

Following the validation of the measurement model, the proposed hypotheses were tested by analyzing the structural model and path coefficients linking independent constructs to their respective dependent constructs, as defined by the research hypotheses. The structural model achieved acceptable model fit statistics, indicating a good fit with the data. The results of the hypothesis testing are summarized in Figure 2 and Table 4.



Notes: n.s = not significant; Chi-square = 270.987; df = 155; CMIN/df = 1.748; RMSEA = 0.056; CFI = 0.957; NFI = 0.907

Figure 2. The Path Coefficient for all hypotheses of interest in the study

Table 4. Hypotheses testing

Hypothesis	Loading	t-value	Result
H1a: Enactive mastery has a positive impact on perceived ease of use.	0.393**	2.033	Supported
H1b: Enactive mastery has a positive impact on perceived usefulness.	-0.201	-1.367	Not Supported
H2a: Vicarious experience has a positive impact on perceived ease of use.	0.397**	2.554	Supported
H2b: Vicarious experience has a positive impact on perceived usefulness.	0.444***	3.156	Supported
H3a: Verbal persuasion has a positive impact on perceived ease of use.	-0.297	-1.561	Not Supported
H3b: Verbal persuasion has a positive impact on perceived usefulness.	0.321*	1.709	Partial Supported
H4: Perceived ease of use has a positive impact on perceived usefulness.	0.582***	6.552	Supported
H5: Perceived ease of use has a positive impact on telemedicine adoption	0.024	0.367	Not Supported
H6: Perceived usefulness has a positive impact on telemedicine adoption	0.848***	11.888	Supported

Notes: *p <0.1; **p <0.05; ***p < 0.01

The influence of the three sources of self-efficacy—enactive mastery, vicarious experience, and verbal persuasion—on telemedicine adoption is examined through two key perceptions of telemedicine technology: perceived ease of use and perceived usefulness. The findings indicate that enactive mastery significantly enhances perceived ease of use ($\beta = 0.393$; $p < 0.05$; supporting H1a) but does not exhibit a significant positive impact on perceived usefulness ($\beta = -0.201$; $p > 0.05$; not supporting H1b). Vicarious experience positively affects both perceived ease of use ($\beta = 0.397$; $p < 0.05$; supporting H2a) and perceived usefulness ($\beta = 0.444$; $p < 0.01$; supporting H2b), emerging as the strongest contributor to self-efficacy influencing perceptions of telemedicine. Verbal persuasion does not significantly impact perceived ease of use ($\beta = -0.297$; $p > 0.05$; not supporting H3a) but shows a partial positive effect on perceived usefulness ($\beta = 0.321$; $p < 0.1$; partially supporting H3b). Additionally, the results confirm a strong relationship between perceived ease of use and perceived usefulness ($\beta = 0.582$; $p < 0.01$; supporting H4). However, perceived ease of use does not significantly influence telemedicine adoption ($\beta = 0.024$; $p > 0.05$; not supporting H5), while perceived usefulness has a significant and positive impact on telemedicine adoption ($\beta = 0.848$; $p < 0.001$; supporting H6). These findings suggest that strategies to promote telemedicine adoption should prioritize enhancing perceived usefulness, particularly by leveraging vicarious experiences to shape users' perceptions of telemedicine technology's benefits positively.

5. Discussion

The study aims to investigate the impact of three sources of self-efficacy: enactive mastery, vicarious experience, and verbal persuasion on telemedicine adoption through perceptions of ease of use and usefulness in the emerging country – Thailand. The finding shows that self-efficacy is an antecedent that enhances individuals' adoption of new technology. Enactive mastery and vicarious experience show a positive effect on the perceived ease of use of telemedicine. Vicarious experience also strongly impacts telemedicine's perceived ease of use and usefulness. Nevertheless, enactive mastery does not significantly impact perceived usefulness. This implies that direct experience may not always translate to usefulness perception, especially in emerging countries with telemedicine adoption. Verbal persuasion did not significantly influence perceived ease of use and was found partially significant in perceived usefulness in our study. The finding aligns with the study of Lunenburg (2011), which indicates that verbal persuasion can enrich self-efficacy and subsequent perceptions and behaviors [16]. In telemedicine adoption in emerging countries, verbal persuasion alone may have a limited effect on changing perceptions of the technology's ease of use and usefulness. Unlike prior studies, this study provides a novel perspective on how self-efficacy shapes willingness to adopt telemedicine. Whereas earlier studies mainly focused on enactive mastery as the key source of self-efficacy, this study

is one of the pioneering works to include and explore the roles of vicarious experience and verbal persuasion in telemedicine adoption. By treating self-efficacy as a multi-dimensional construct, our study offers a more comprehensive viewpoint on how self-efficacy influences technology adoption behaviors that can help telemedicine practitioners and policymakers design more effective strategies for enhancing telemedicine adoption, especially in the emerging market context. While existing literature has mainly studied this in the context of developed or innovation-driven countries, this study extends the understanding of self-efficacy and technology adoption within emerging markets.

This study highlights the unique challenges and opportunities in emerging markets like Thailand, providing valuable insights and theoretical and practical contributions. The findings emphasize the significance of considering local cultural and infrastructural factors, providing a broader insight into how self-efficacy impacts technology adoption in various contexts. The findings of this study underscore the nuanced relationship between self-efficacy and telemedicine adoption, particularly in emerging markets like Thailand. In such contexts, cultural norms, technological literacy, and infrastructural disparities are pivotal in shaping individual perceptions of technology. For instance, the collectivist culture in many emerging economies fosters a firm reliance on observational learning and peer influence, making vicarious experience a critical driver of telemedicine adoption. Similarly, challenges such as limited exposure to advanced technologies and lower digital proficiency may explain why verbal persuasion alone does not significantly influence adoption behavior [34-36]. Recent studies emphasize that telemedicine adoption strategies must consider socio-cultural contexts to overcome adoption barriers effectively [37, 38]. These insights highlight the importance of tailoring telemedicine strategies to local socio-cultural and economic conditions, ensuring that interventions address the specific barriers and facilitators relevant to each market. By recognizing these contextual elements, healthcare stakeholders can develop targeted approaches that resonate with emerging country populations' unique needs and expectations.

This study provides specific practical contributions for practitioners such as healthcare providers and policymakers to enhance telemedicine adoption in emerging countries. Recognizing the significance of vicarious experience, governments and healthcare practitioners can capitalize on this by endorsing telemedicine via public demonstration events, webinars, and live case studies that illustrate practical applications. For instance, facilitating interactive sessions where individuals can witness physicians or colleagues utilizing telemedicine technologies can enhance confidence and trust. Moreover, video lessons or testimonials from reputable community members and influencers can effectively promote vicarious learning. These projects will illustrate the simplicity of telemedicine and emphasize its advantages in practical environments. Firstly, the strong impact of enactive mastery and vicarious experience on perceived ease of use and perceived usefulness imply that healthcare providers should focus on prioritizing practical learning and observational opportunities of telemedicine adoption and usage by implementing training programs or workshops that permit prospective users to participate and engage with telemedicine technology and services to enhance their familiarity and confidence with telemedicine technology. Moreover, presenting successful use cases can empower the influence of vicarious experience, subsequently developing the perceived value of telemedicine usage. Secondly, the limitations of verbal persuasion in changing perceptions of telemedicine found in this study imply that it might not be enough to encourage telemedicine verbally. Alternatively, a more practical approach with real-world examples and success stories could work better. This realization guides policymakers in creating immersive experiences that foster self-efficacy through direct involvement and observation rather than concentrating on conventional awareness efforts. Thirdly, perceived usefulness is critical to telemedicine technology adoption in emerging country contexts. Therefore, telemedicine platforms should be advantageous and beneficial. To establish telemedicine platforms and services that satisfy these requirements and promote wider acceptance, usability testing and iterative design processes taking user feedback into account can be valuable.

6. Conclusion

The goal of this study is to investigate the role of self-efficacy in the adoption of telemedicine in an emerging country, Thailand. Although previous research confirms that self-efficacy acts as an antecedent affecting the likelihood of adopting the new technology, our study is one of the few empirical studies scrutinizing the multi-dimensional sources of self-efficacy impacting the adoption of healthcare-related technology, telemedicine. Using a Structural Equation Modelling (SEM) technique with 240 samples, the results highlight the imperative of the three sources of self-efficacy: enactive mastery, vicarious experience, and verbal persuasion, on perceived ease of use, perceived usefulness, and, eventually, telemedicine adoption. The outcomes represent those two sources of self-efficacy: enactive mastery and vicarious experience, which act as vital factors affecting individuals' perceptions of telemedicine. Enactive mastery positively affects perceived ease of use, indicating that individuals who acquire direct familiarity with telemedicine technology tend to find it more user-friendly. The vicarious experience demonstrates both improved perceived ease of use and perceived usefulness. This emphasizes the importance of observational learning in technology adoption. While the study focuses on Thailand as a representative emerging country, the findings offer valuable insights that can be generalized to other emerging markets facing similar challenges in healthcare infrastructure, digital literacy, and technology adoption. Nevertheless, verbal persuasion shows no significant impact on either perceived ease of use or usefulness. It can be implied that in the context of telemedicine adoption in emerging countries, only verbal persuasion may not be adequate to change an individual's perception and behavior to adopt telemedicine usage.

6.1. Limitations and Directions of Future Research

Although our study provides several theoretical and practical contributions, some limitations must be considered. Firstly, the data in this study was collected in Thailand to represent the adoption of telemedicine in emerging countries. The results should be carefully generalized to other countries with different cultural contexts. In the future, investigation in other emerging countries can increase the generalizability of self-efficacy theory in adopting telemedicine in emerging countries. Secondly, while a quantitative survey method was selected for this study, conducting in-depth interviews could offer additional insights into the adoption of telemedicine. Furthermore, future research could study other technology acceptant models, such as the unified theory of acceptance and use of technology (UTAUT) model and expectation Confirmation Model (ECM), to enhance understanding of telemedicine adoption. Lastly, other psychological factors that may hinder the acceptance of telemedicine technology, such as technophobia and e-health readiness, should be explored. We hope that our findings will increase the interest of this topic in the research domain of telemedicine.

7. Declarations

7.1. Author Contributions

Conceptualization, D.H.; methodology, D.H. and S.T.; software, D.H. and S.T.; validation, D.H., C.K., W.P., W.V., and S.T.; formal analysis, D.H. and S.T.; investigation, D.H., C.K., W.P., W.V., and S.T.; resources, D.H.; data curation, D.H., C.K., W.P., W.V., and S.T.; writing—original draft preparation, D.H. and S.T.; writing—review and editing, D.H., C.K., W.P., W.V., and S.T.; visualization, D.H., C.K., W.P., W.V., and S.T.; supervision, D.H.; project administration, D.H.; funding acquisition, D.H. All authors have read and agreed to the published version of the manuscript.

7.2. Data Availability Statement

The datasets generated during and/or analyzed during the current study are not publicly available due to IRB stipulations but are available from the corresponding author upon reasonable request.

7.3. Funding

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7.4. Institutional Review Board Statement

This study was reviewed and approved by the Ethics Committee of Chonburi Cancer Hospital, under Protocol No. 008/2023.

7.5. Informed Consent Statement

Not applicable.

7.6. Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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Appendix I

Table A1. The constructs and measurement items of this study

Constructs	Measurement items
Enactive Mastery (EM)	I become confident in my ability when I complete a specific task.
	I become confident in my ability when I gain direct experience from a specific task.
	I become confident in my ability when I have a chance to do a specific task, no matter what the result would be.
Vicarious Experience (VE)	I become confident in my ability when someone demonstrates a specific task beforehand.
	I become confident in my ability when I see someone with a similar skill set as me accomplishing a specific task.
	I become confident in my ability when I see someone with a similar level of competency as me doing a specific task.
Verbal Persuasion (VP)	I become confident in my ability when other people tell me I am good at my work.
	I become confident in my ability when other people tell me to improve on something.
	I become confident in my ability when others compliment me on my learning performance.
	I become confident in my ability when others tell me I can overcome challenges by working hard.
	I become confident in my ability when others tell me I am perfect.
	I become confident in my ability when others tell me that I have done my best, even though the result is undesirable.
Perceived Ease of Use (PE)	Learning to operate telemedicine will be easy for me.
	I can quickly become skillful at using telemedicine.
	I can get the telemedicine to do what I want.
	Telemedicine is easy to use for me.
Perceived Usefulness (PU)	Using telemedicine will improve my quality of life.
	Using telemedicine will mean more healthcare conveniences.
	I find telemedicine to be helpful in my life.
Telemedicine Adoption (TA)	I intend to use telemedicine.
	I am considering using telemedicine.
	I would recommend telemedicine to others.