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Exploring Technology Acceptance Models: A Systematic Review of Health Application Adoption in Asian Countries

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ABSTRACT

Background: Health applications are a crucial technological advancement in healthcare, enhancing service quality and access to essential information. Despite this, challenges in implementation and user adaptation remain. Evaluating these applications is vital, and the Technology Acceptance Model (TAM) provides a dependable framework for assessing user acceptance and meeting its intended goals.

Objectives: This review aims to explore the use of the TAM method for evaluating health applications adoption in Asia, focusing on ease of use, usefulness, user attitudes, and factors affecting technology acceptance.

Methods: The method used is Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA). Articles were gathered using PubMed and ScienceDirect employing Boolean search terms. The search focuses on technology acceptance and health applications, combined with the names of Asian countries. Eligible studies must describe the technology acceptance model of a health application in Asia. Quality assessment is performed using JBI and data are systematically extracted and analyzed.

Results: A total of 11 original articles meet the inclusion criteria from 2428 articles. TAM plays a pivotal role in understanding the adoption of healthcare technology in Asia. TAM original constructs are widely used, with some integrating additional factors. Continued integration and modification of TAM will enhance its utility in addressing evolving healthcare challenges, ultimately improving healthcare outcomes across diverse user settings. TAM's adaptability and integration with theories like PMT and SUS improve its relevance across various healthcare settings and user contexts.

Conclusion: Future research should mitigate biases, employ longitudinal and comparative analyses, and integrate TAM with complementary theories to advance healthcare technology adoption.

Keywords: Adoption; Evaluation; Healthcare; Innovation; Technology

INTRODUCTION

Technological advancements have profoundly impacted the healthcare sector, offering new opportunities to enhance the quality of health services through innovations in information and communication technology, as well as progress in data processing and artificial intelligence. Among these innovations, health applications are pivotal, encompassing various digital tools and platforms designed to manage and deliver healthcare services. They provide numerous opportunities in the health sector, simplifying the process for health workers and patients to access essential information about health services and disease prevention.[1] Health applications enable direct access to health information and virtual medical services, supporting a positive revolution in healthcare delivery by expanding accessibility, increasing efficiency, and giving individuals greater control over personal health.[2] This technology can support sustainable health care and monitoring at both individual and population levels; encourage healthy behavior, reduce health care visits, and provide personalized health

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services.[1] Although applications in the world of health provide significant benefits several issues need to be considered, such as difficulties in the registration process and concerns about the security of personal data.[3] In this context, it is important to evaluate user acceptance and the usefulness of health applications to assess the system's effectiveness and ensure it meets its intended goals.

The Technology Acceptance Model (TAM) stands out as one of the most widely used models for evaluating and predicting user acceptance.[4] Introduced by Davis in 1989, TAM provides a simplified, yet effective framework for understanding the factors that drive the acceptance and use of new technologies. TAM focuses on two key variables: perceived usefulness (PU) and perceived ease of use (PEU), which directly influence user attitudes and behavioral intentions toward technology adoption. The advantages of TAM lie in its adaptability and ease of application across various settings, making it particularly useful for examining technology acceptance in the health sector, where usability and ease of use are paramount.[5]

The importance of using TAM in this study stems from its ability to provide a systematic and user-centered approach to understanding the challenges and opportunities posed by health applications. By focusing on user behavior and perceptions, TAM allows for the identification of barriers to technology adoption and offers practical insights into how health applications can be optimized for better user engagement.[6] TAM is also a goal-based model, indicating that a user's intention to embrace innovation is a strong predictor of actual system use. The advantages of TAM lie in its adaptability and ease of application across various settings, making it particularly useful for examining technology acceptance in the health sector.[7] Recent reviews on health technology adoption including telemedicine[8], digital health for older adults[9], and general healthcare technology acceptance[10] highlight TAM's effectiveness in identifying key acceptance factors such as perceived usefulness and ease of use. Compared to other models, such as the Unified Theory of Acceptance and Use of Technology (UTAUT) or the Theory of Reasoned Action (TRA), TAM is relatively straightforward and provides clear insights into the critical factors affecting user behavior.[11] Thus, proven impactful in guiding the implementation of information and communications technology (ICT) in healthcare, helping to optimize technology design and improve user acceptance for better healthcare outcomes.

The purpose of this systematic review is to compile various published studies on the use of the TAM method in evaluating health applications in Asia Regions to gain an understanding of the convenience, usefulness, and user attitudes towards applications and identify the several elements that affect the acceptance of health technology. Asia, with its diverse population and healthcare systems at various stages of development[12], from advanced systems in countries like Japan and South Korea to emerging ones in nations like Indonesia and Vietnam, offers a valuable case study for evaluating the effectiveness of health applications, particularly due to the wide disparities in technological infrastructure, healthcare access, and user engagement, making it an ideal region for studying the applicability of TAM in predicting user acceptance.[13] This is the initial research that systematically examines how TAM influences technology acceptance in different health applications among Asia regions, offering valuable insights into adoption integration factors across diverse contexts.

METHODS

Study design

The articles gathered in this systematic review include 11 cross-sectional studies.

Search strategy

The Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) were used in this systematic review to help illustrate how information flowed through the various review phases.[14] It illustrates the quantity of articles that were found, included, and excluded, as well as the rationale for the exclusion of articles. The approaches employed to identify and gather pertinent studies in this review encompassed several stages: establishing inclusion and exclusion criteria, identifying sources of digital databases, describing search strategies, and examining the studies that were retrieved. The strategy is to search for relevant studies, which involves a collection of published literature and open-access articles from various databases, namely PubMed and ScienceDirect. Boolean search terms ("AND" & "OR") were used with the following words: technology acceptance and health application. The following words are combined with the name of each country in Asian Regions. At the final stage of screening, full-text manuscripts were reviewed to ensure that they met all eligibility requirements, and articles that did not meet the criteria were excluded.

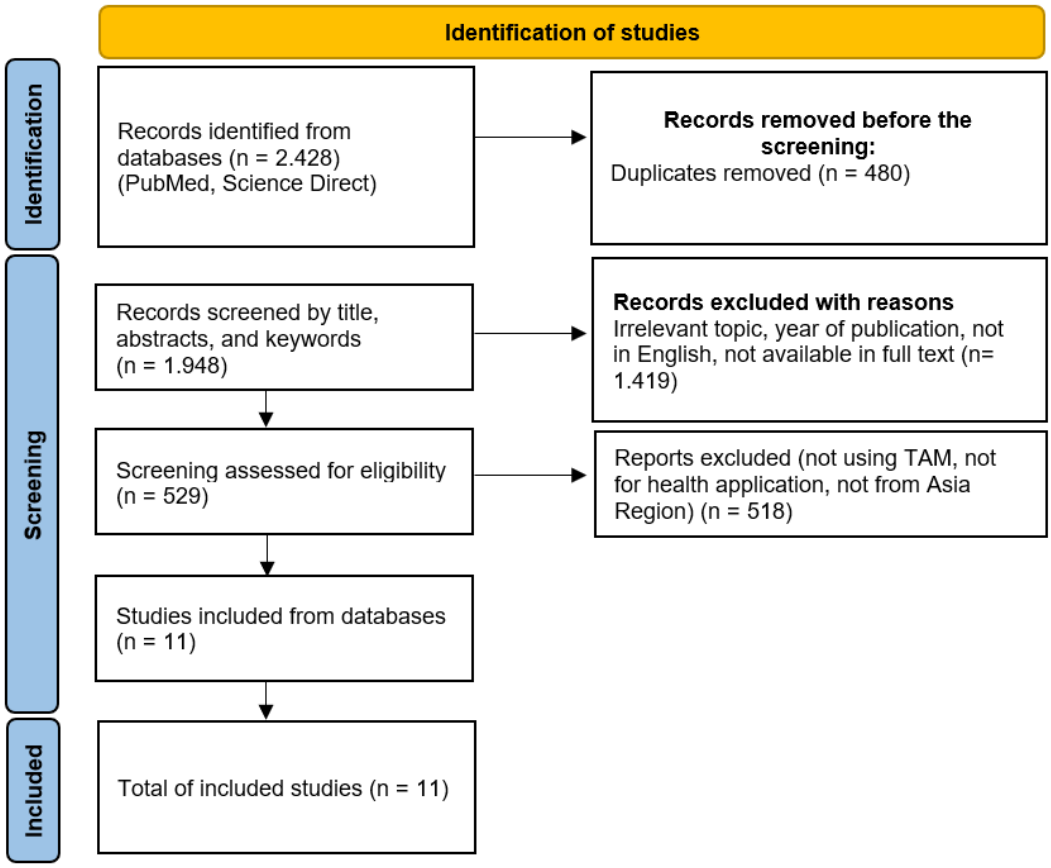

Figure 1. PRISMA Diagram flowchart showing the literature selection procedure

Eligibility criteria

The first eligibility criterion is the study must contain the TAM method. The second criterion is the study must be published between 2014 and 2024[15] and conducted in English. The third is it must evaluate application acceptance in Asian Regions. Studies that met less than these criteria were considered excluded from the review. The flow diagram of the process for selecting literature for review is demonstrated in Figure 1.

Data Analysis & Quality Assessment

The title and abstract of each study were quickly evaluated to start the screening process. If the study passes this preliminary stage with success, the entire document will be obtained and stored in a different folder for the thorough and final review stage. Every reference was downloaded to the Mendeley reference management. The data were extracted in three steps. First, we looked at the theories used to study how certain factors affect the acceptance of technology in health applications. The studies were then grouped based on the year of publication, the type of publication, and the nation of origin. Ultimately, we identified the concepts explored in the study, answered the research questions, and analyzed the findings.

The quality of the included studies was evaluated using the Analytical Cross-Sectional Studies JBI Checklist, a widely recognized tool in systematic reviews for assessing research quality. A standard process in systematic reviews involves critiquing or appraising research evidence. This assessment aims to help determine the methodological rigor and potential biases in studies' design, implementation, and analysis. The process involves a comprehensive evaluation to ensure that each study adheres to high standards of research practice. All papers meeting the inclusion criteria outlined in the protocol for the systematic review must undergo rigorous appraisal by two independent evaluators.[16] However, it is important to note that the checklist was not d esigned to critique the efforts of individual researchers. The quality assessment checklist is demonstrated in Table I.

Table I. Quality assessment checklist by JBI

No	Question
1	"Were the criteria for inclusion in the sample clearly define?"
2	"Were the study subjects and the setting described in detail?"
3	"Was the exposure measured in a valid and reliable way?"
4	"Were objective, standard criteria used for measurement of the condition?"
5	"Were the confounding factors identified?"
6	"Were strategies to deal with confounding factors stated?"
7	"Were the outcomes measured in a valid and reliable way?"
8	"Was appropriate statistical analysis used?"

Table II. Quality assessment results

Author (Year)	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Total
Nugroho., et al (2021)	1	1	1	1	1	1	1	1	**8**
Samadbeik., et al (2023)	1	1	1	1	1	1	1	1	**8**
Kama., et al (2020)	1	1	1	1	1	1	1	1	**8**
Rajak & Shaw (2021)	1	1	1	1	1	1	1	1	**8**
Kwak., et al (2020)	1	1	1	1	1	1	1	1	**8**
Pande., et al (2017)	1	1	1	1	1	1	1	1	**8**
Jeon & Park (2015)	1	1	1	1	1	1	1	1	**8**
Chuenyindee., et al (2022)	1	1	1	1	1	1	1	1	**8**
Qu., et al (2023)	1	1	1	1	1	1	1	1	**8**
Markam (2017)	1	1	1	1	0	1	1	1	**7**
Cho., et al (2020)	1	1	1	1	1	1	1	1	**8**

RESULTS AND DISCUSSION

Eleven full-text and original articles fulfilled the inclusion criteria and thus underwent further review. The articles have publication years in the form of 2015 (n=1), 2017 (n=2), 2020 (n=3), 2021 (n=2), 2022 (n=1) and 2023 (n=2). The quality assessment is an additional factor used to establish the significance of each included study, in addition to the inclusion and exclusion criteria. Each question was assessed as "yes" (earning 1 point), "no" (earning 0 points), "unclear" (earning 0 points), and "not applicable" (earning 1 point). The quality of each study was then classified as low (0-3 points), moderate (4-6 points), or high (7-8 points) according to prior criteria [17] [16]. The outcomes of the assessment process are illustrated in Table II.

Since every included article passed the quality assessment, it can be inferred that they are all sufficiently qualified to be used for additional analysis. Furthermore, the extensive summary of every included article in this review is provides in Table III.

As indicated in Table 3, studies primarily relied on questionnaire surveys. These results align with previous review studies which also observed that the most common technique of gathering data was through questionnaire surveys.[18] The diverse research objectives across the collected 11 studies underscore a common thread in their focus on understanding and enhancing the acceptance of healthcare technologies across varied contexts and populations in Asian Countries. They all aim to identify factors influencing technology acceptance and propose strategies to improve adoption and utilization. Several studies focus on developing or analyzing acceptance models for specific healthcare systems or services. These studies delve into the intricacies of technology acceptance within organizational settings, emphasizing the importance of organizational support and user characteristics. The integration of user personal characteristics such as age, gender, education, cultural and social economic factors experience play a role in influencing the adoption of health information systems, though this effect appears to be relatively weak.[19] Demographic factors such as sex do not significantly affect the latent variables of the TAM, however educational level does show a significant relationship with system acceptance. This reflects the broader understanding that educational background can facilitate technology adoption.[20] The path coefficient values indicate that these personal characteristics act as external variables impacting system use through indirect effects. This suggests that while personal characteristics contribute to system acceptance, they are not the primary determinants.

Table III. Summary of article used in this review

No	Author, Year, & Country	Methods & Sample	Health Application	Results
1	Nugroho et al., 2021, Indonesia	Cross-sectional questionnaires with 217 respondents (village midwives using the app)	Maternal and Child Health Information System (MCHIS)	POS was the most significant factor influencing the acceptance model. This was followed, in decreasing order, by BI, PE, PC, PU, and PEU.
2	Samadbeik et al., 2023, Iran	Cross-sectional, questionnaires with 300 students respondents from medical sciences university	mHealth	A substantial correlation was seen between ATU and BI, as well as between PEU and PU. In general, students are more likely to intend to use mHealth if PEU is taken into account throughout its design and implementation.
3	Kamal et al., 2020, Pakistan	A face-to-face survey method from 275 participants	Pakistan Telemedicine	PU and PEU are significant factors that influence the acceptability of telemedicine services. After that come the following: FC, trust, and SI. Regarding usage intention, there was a negative correlation with resistance to technology, and TA
4	Rajak & Shaw, 2021, India	Cross-sectional questionnaire survey from 289 respondent	mHealth	SI has been observed to affect BI, PU, ATU, and PEU in the current study. However, BI is negatively impacted by PR, RC, and PPC.
5	Kwak et al., 2020, South Korea	44 older persons completed 25 item TAM questionnaire after using the application for 10 days	HeRO Application	Older adults can easily deal with the HeRO application and recognize its benefits in their lives, based on the PEU: "I find the HeRO application system cumbersome to use," and PU: "The HeRO application supports critical aspects of my life"
6	Pande et al., 2017, India	A questionnaire with 9 statements was distributed to 101 clinicians at Kastruba Hospital	LearnTB	High levels of user experience were reported PU and BI had a substantial correlation, and there was a significant correlation between PU and PEU. Clinicians' BI for the Learn TB application is most affected by the application's PU.
7	Jeon et al., 2015, South Korea	110 adult Android users who intended to control their weight	Obesity-Management App	While technical support and training had a significant impact on PEU but not PU, self-efficacy had no discernible impact on either PU or PEU. Technical support and training had a considerable impact on PEU; however, the study's subjects were healthcare consumers rather than healthcare professionals and thus lacked the necessary computing expertise or training.
8	Chuenyindee et al., 2022, Thailand	An online questionnaire with 56 questions in all 800 participants	Thai Chana App	The greatest significant influence was seen by BI on AU followed by ATU on BI. A substantial direct effect of PU was observed on ATU. PEU was found to have a significant direct impact on ATU. Additionally, a highly significant direct influence of AU on SUS was observed. A significant direct effect of PS and PV was observed on PU.

9	Qu et al., 2023, China	Cross-sectional questionnaire survey with 1364 participants	Weight Management App	The factors that jointly predicted attitude were PU and PEU. PU was predicted by PEU. The factors that predicted BI were PU, PEU, ATU, and PR. There was no significant effect of HA on BI. The utility, safety, usability, and health consciousness of weight management applications should be the main priorities for developers and marketers.
10	Markam, 2017, Indonesia	Cross-sectional observational study with a sample of 30 users	P-Care BPJS	The impact of PU on the ATU was substantial. PEU had a beneficial impact on PU, along with ATU. The bilateral impact on ATU was positive. The goodness of fit score of 0.741 indicates a good fit for the model and R2 0.790 indicates that 79% of the behavioural data variability in p-care BPJS use can be explained by the components analyzed, PU and PEU are crucial in determining users' acceptance.
11	Cho et al., 2020, China	Cross-sectional sample survey from 346 respondent	Health & Fitness Apps	PEU had no effect while PU significantly influences continuance intention. Both PEU and PU affect various factors, including satisfaction, investment size, and quality of alternatives. Relationship commitment is positively affected by investment size and satisfaction but negatively impacted by alternative quality. Intention to continue is strongly influenced by relationship commitment.

(POS: perceived organizational support; BI: behavioural intention to use; PE: perceived enjoyment; PC: personal characteristics; PU: perceived usefulness; PEU: perceived ease of use; ATU: attitude to use; FC: facilitating conditions; SI: social influence; PR: perceived risk; TA: technological anxiety; RC: resistance to change; PPC: perceived physical condition; AU: Actual System Use; SUS: System Usability Scale; PS: Perceived Severity; PV: Perceived Vulnerability; PCU: perceived convenience of use; HA: health awareness)

The original Technology Acceptance Model (TAM) includes key constructs such as “perceived ease of use” (PEU), “perceived usefulness” (PU), “behavioral intention” (BI), and “actual use” (AU).[21] Several of the study used in this review used TAM with its original constructs, some extended the factors affecting TAM, and others integrated TAM with other frameworks. This is a primary benefit of using TAM as its efficacy and efficiency, together with its synchronization feature that can be adjusted and masked to capture more nuances of technology adoption in certain contexts. The summary of each article’s key constructs can be seen in Table IV. The PU construct generally measures how much users believe that a health application will enhance their performance or well-being. Across various studies, PU often emerges as a crucial determinant of adoption. PU is shown to be a key factor influencing user acceptance of health applications, though its impact is sometimes overshadowed by other factors such as organizational support.[19] While PEU represents how effortless users find interacting with the application. This construct is particularly influential in settings where users may have varying levels of technological proficiency.[22] While both PU and PEU are essential for adoption, their relative importance and the additional factors affecting adoption can vary significantly depending on user demographics, cultural contexts, and the specific type of application, leading to the development of the TAM model.

TAM developments enhance the model's applicability and relevance in diverse user settings, particularly in complex environments, services, and applications. By incorporating a broader range of variables, this approach improves the model's applicability and relevance in diverse user settings and healthcare contexts across Asia. The extended modifications are organized based on their factor types, utilizing the four modification categories of TAM described by[23] as depicted in Figure 2.

Table IV. Summarize key constructs of technology acceptance

No	Author (Year)	Factors Affecting TAM
1	Samadbeik et al (2023); Kwak et al (2020); Markam (2017)	Original: PEU, PU, BI, AU
2	Pande et al (2017)	Original: PEU, PU, BI, AU Integrated with SUS
3	Nugroho et al (2021)	Original: PEU, PU, BI, AU Added: POS, PC, and PE
4	Kamal et al (2020)	Original: PEU, PU, BI Added: SI, FC, Trust, Privacy, PR, TA and Resistance to Technology
5	Rajak et al (2021)	Original: PEU, PU, BI, AU Added: TA, SI, PR, Trust, RC, and PPC
6	Chuenyindee et al (2022)	Original: PEU, PU, ATU, AU Integrated with PMT and SUS with added: PS, PV
7	Qu et al (2023)	Original: PEU, PU, BI, ATU Added: HA and PR
8	Jeon et al (2015)	Original: PEU, PU, BI Added: "Compatibility, Self-Efficacy, and Technical Support and Training"

(POS: perceived organizational support; BI: behavioural intention to use; PE: perceived enjoyment; PC: personal characteristics; PU: perceived usefulness; PEU: perceived ease of use; ATU: attitude to use; FC: facilitating conditions; SI: social influence; PR: perceived risk; TA: technological anxiety; RC: resistance to change; PPC: perceived physical condition; AU: Actual System Use; SUS: System Usability Scale; PS: Perceived Severity; PV: Perceived Vulnerability; PCU: perceived convenience of use; PMT: Protection Motivation Theory; IM: Investment Model)

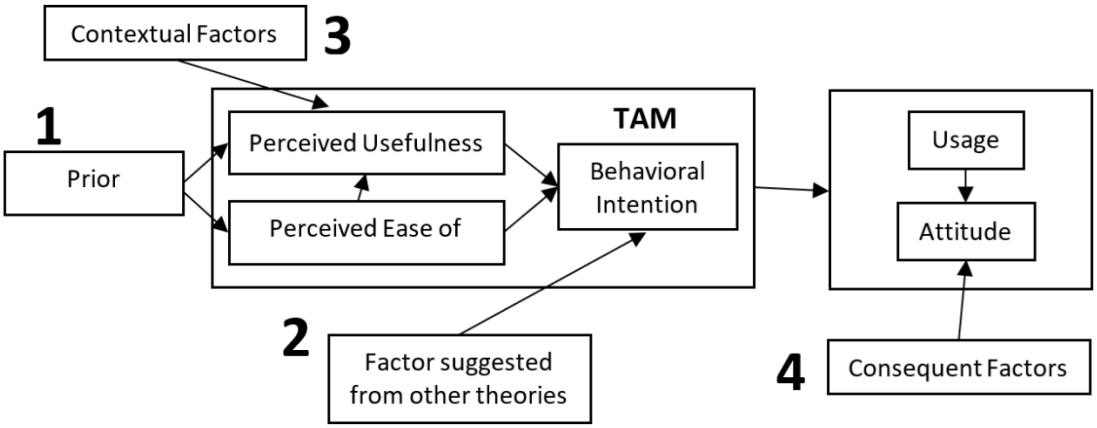

Figure 2. Four categories of TAM modifications[23]

The modifications encompass the following categories: (a) prior factors (external factors), which anticipate the fundamental variables of TAM, PEU, and PU; (b) Factors derived from alternative theories, integrating elements proposed by other theories to reinforce TAM; (c) Contextual factors, which exert moderator effects; and (d) Consequent factors, which pertain to studies assessing attitudes toward the practical utilization of health application.

Modification in prior factors, like organization support and personal characteristics used for evaluating applications in government environments, found that organizational support was the main determinant of actual system use in Indonesian health information systems.[19] An effective communication environment, the presence of a help desk, and the availability of auxiliary resources are examples of favorable work conditions that demonstrate organizational support. Ongoing training is also necessary for users in Iran and Indonesia to stay up to date with the most recent version of the program, make sure that their perceived ease of use is taken into

consideration when assessing the efficacy of utilizing health technology, and increase their technological proficiency.[20] Tech support and training along with compatibility and self-efficacy added as prior factors in the TAM model as a concept of Innovation Diffusion Theory (IDT) in South Korea.[24] This concept extracted pertains to the extent to which a technological innovation aligns with the values, experiences, and requirements of its potential users. Technical support and training play a crucial role, especially for non-professional users who lack essential computing education. This deficiency can lead to lower PEU.

In different geographic settings, modification of TAM with prior factors such as social influence, trust, technology anxiety, and consequent factors such as risk perception, facilitating conditions, and resistance to technology is needed to determine the intention to use the application. Significant drivers for acceptance in developing countries, like India, are PU and PEU.[25] Therefore, it advised policymakers to take into account an application's easy accessibility, task efficiency and enhanced productivity when developing and executing it. Software with tangible benefits and ease of use will be preferred by users.[20] Reluctance to use technology and favorable environmental circumstances were some of the contributing elements to the utilization intention barrier in a rural population in Pakistan.[25] In order to make internet facilities easily accessible in rural places, the government must work with telecommunications corporations. Additionally, public awareness campaigns are necessary since they may help persuade public opinion toward accepting new technologies. Apart from rural areas, developed countries like India also experience high levels of technology anxiety, leading to low usage.[26] Social impact can boost use in a favorable way because it frequently plays a significant part in persuading users to accept technology, which can then be added to modified TAM as prior components.

Elderly consumers must also be taken into account in health app development, since they may be impacted by numerous acceptability variables. Older individuals are aware of the value and necessity of health-related technology. Thus, it is important to take into account a number of elements that influence their sense of intention to utilize technology in order to pinpoint the specific effects of health tech.[27] There will be a greater understanding of why older people have difficulty using mobile or computer-based technology as a result of modified TAM prior factors, such as perceived physical condition, being added to the understanding of how biological and psychological state changes due to aging in older people can affect cognitive and physical capabilities, such as vision, hearing, and mentality.[26] Seniors need apps that are simple to use, meaning they should be straightforward to install, engage with, comprehend, and utilize skillfully. This is because using apps helps them reduce problems and challenges that come with providing health services and improves their quality of life.[27]

Integrating TAM could lead to enhanced benefits by taking into account additional factors beyond those considered in its standalone framework. Integration of TAM with Protection Motivation Theory (PMT) and System Usability Scale (SUS) could comprehensively assess and measure the intention and perceived usability of Thailand apps utilizing characteristics like perceived severity (PS) and perceived vulnerability (PV).[28] Assessing usability serves as an initial checkpoint for gauging the effectiveness of technology and enables the refinement of systems to optimize their utility for users. Integration of TAM, SUS, and PMT shows how tech could holistically measure intention and perceived usability. Understanding severity, vulnerability, and health impact can foster a positive attitude toward application use and help developers understand any risk that indirectly influences perceived usability.[28] When users' attitudes and expectations align with their experience using an app, it positively impacts their perception of usability.

Extending TAM to include health awareness and perceived risk constructs can provide insights into the psychological mechanisms influencing the adoption behavior of applications in China.[29] Analyzing health awareness and behavior patterns offers an effective theoretical approach for exploring the intricate causal relationships underlying user technology adoption, thus addressing potential limitations. To gain a thorough understanding of the relationship and its impact on the decision-making process, TAM can be integrated with the Investment Model (IM) as used in a health and fitness app in China.[30] IM initially utilized in interpersonal relationship contexts, has more recently been adapted to assess users' commitment to technology. This integration offers the potential to establish a robust explanatory framework, enhancing comprehension of users' intentions to persist in using a technology. It can address the limitations of the TAM theoretical framework and enrich the understanding of the factors influencing sustained user behavior within apps.[30]

Other research highlights the value of incorporating alternative models to enrich the analysis of technology adoption. Similar studies conducted in 2021, systematically reviewed the mobile health application adoption in developing countries, employing a range of theories including TAM, UTAUT, Theory of Reasoned Action (TRA), PMT, and Theory of Planned Behaviour (TPB). These reviews reveal that TAM is the most frequently utilized model.[31] Studies have either applied TAM in its original form, extended its constructs, or integrated it

with other theoretical frameworks. Other research emphasizes the importance of alternative models in understanding technology adoption. For example, studies using the UTAUT framework have identified social influence and performance expectancy as key predictors of technology acceptance, particularly in healthcare environments.[32] Similarly, other theories like TRA and TPB offer complementary perspectives by focusing on factors like attitude, perceived behavioral control, and subjective norms. These comparisons not only highlight TAM's versatility in adapting to diverse contexts but also underscore the valuable insights provided by other models. Together, they deepen our understanding of the multifaceted factors influencing technology adoption in healthcare.

The incorporation of TAM modifications and integration with other frameworks enhances its applicability in diverse user settings and healthcare contexts, as evidenced by studies across various geographic regions. However, future research should address limitations such as publication bias and reliance on self-reported measures, while also exploring longitudinal trends, conducting comparative studies, and developing new measurement tools. Investigating user acceptance factors, particularly among elderly populations, and integrating TAM with complementary theories like PMT and SUS offer promising avenues for advancing technology adoption research in healthcare applications, thus ensuring more effective interventions and applications in the future. Addressing limitations will be crucial for advancing the field and ensuring the validity and reliability of research outcomes. By addressing these gaps, future studies can further enhance the understanding of technology adoption in healthcare and contribute to the development of more effective interventions and applications.

CONCLUSION

TAM has a pivotal role in understanding technology adoption across diverse Asian regions. TAM's simplicity and effectiveness make it a preferred evaluation model, facilitating a comprehensive analysis of factors influencing user behavior. Through modifications and integrations, TAM adapts to complex user settings, offering insights into acceptance drivers and usability concerns while enhancing its utility in addressing evolving healthcare challenges. The review highlights TAM's significance in guiding the development and implementation of health applications, emphasizing the importance of considering user perceptions and cultural nuances. Ultimately, translating research into actionable strategies is crucial for widespread adoption and improved healthcare outcomes in Asia.

For policymakers and developers, it is essential to prioritize the establishment of robust organizational support and provide regular training to enhance technological proficiency among users. Health applications should be designed with a focus on the specific needs of populations, ensuring they are user-friendly and accessible. Integrating TAM with complementary theories, such as Protection Motivation Theory (PMT) and the System Usability Scale (SUS), can offer a more comprehensive assessment of both intention and usability. Public awareness campaigns addressing technological anxiety and resistance to change, particularly in rural areas, are crucial for increasing acceptance and use. Future research should focus on longitudinal and comparative studies to track adoption trends over time, develop new measurement tools to better capture user experiences, and promote multidisciplinary collaborations to tackle the complex challenges of technology adoption in diverse healthcare contexts across Asia.

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