

# BEHAVIOR ON ACTUAL ADOPTION OF TECHNOLOGY AND INNOVATION HEALTH PRODUCTS IN THAILAND

Chaodeethirathkul, P. <sup>1</sup>, and Pankham, S.<sup>2\*</sup>

<sup>1,2)</sup> College of Digital Innovation Technology, Rangsit University, Pathum Thani, Thailand  
Email: pakkawaan.c@rsu.ac.th, <sup>2\*</sup> corresponding author: sumaman.p@rsu.ac.th

## Abstract.

The current era of disseminating information and news related to products through the use of technology and innovation for marketing allows consumers to be aware of and have access to the product's information widely, this paper analyzes the behavior on actual adoption aiming to bring about the technology and innovation health products in Thailand by means of a mixed method research design wherein the data collection draws in behavior on actual adoption factors which include the health belief, perceived credibility, perceived ease of use technology, consumer innovation, attitude toward use a technology, perceived usefulness, adoption intention. These factors account for CFA to associate technology and innovation health products to consistent with empirical data at a statistically significant level of 0.01. throughout the target campaigns, raising awareness about the benefits and credibility of health products.

**Keywords:** Behavioral, actual adoption, technology and innovation, health products.

## 1. Introduction

Globalization is the result of developments in communications, and information technology that manifests in the growth of economic, political, technological, and cultural connections between individuals, communities, and businesses around the world. However, the internet and the emergence of e-commerce make globalization a key strategy for the increased integration of economies, including the movement of products and services, technology, and information across borders. <sup>[1]</sup> The current era of disseminating information and news related to the products through the use of technology and innovation for marketing allows consumers to be aware of, and have access to the product's information widely. The technology advancements have brought about a range of innovation products that are transforming the healthcare landscape, both globally and in Thailand. These products encompass a wide array of technologies, including mobile health applications, wearable devices, telemedicine platforms, and remote monitoring systems. <sup>[2]</sup> A number of variables to perceived usefulness, ease of use of technology, perceived trust, social norms, and perceived benefits are affecting people's behavior. <sup>[3]</sup> When using technology and innovation for health products.

While the previous research has investigated factors individually, there is a need to examine their interrelationships comprehensively to combine and affect the behavior. <sup>[4]</sup> The utilization of technology and innovation products in healthcare has the potential to greatly impact individuals' behavior toward health-related practices and services. Understanding factors that influence product adoption and usage is to critical improving healthcare outcomes. In this way, to create a CFA in the context of Thailand that captures the complex interplay of factors shaping individuals' behavior in using technology and innovation products for health. <sup>[5]</sup> This study will use CFA to gain insights into the underlying mechanisms to drive individuals' usage behavior and inform the strategies for promoting the effective use of the products in healthcare units. <sup>[6]</sup> To fill gaps in the

existing literature, this study proposes the development of a confirmatory factor analysis (CFA) to investigate the factors influencing the use of technology and innovation health products in Thailand. CFA is a statistical technique that allows for the examination of multiple variables and their interrelationships at the same time, allowing for a comprehensive understanding of complex phenomena. By using CFA, this study aims to provide a comprehensive view of the underlying mechanisms influencing individuals' usage behavior. This is highlighted as a “Key” main for the study aimed to, 1) analyze the behavior on actual adoption, 2) CFA to associate the behavior on actual adoption of technology and innovation health products in Thailand.

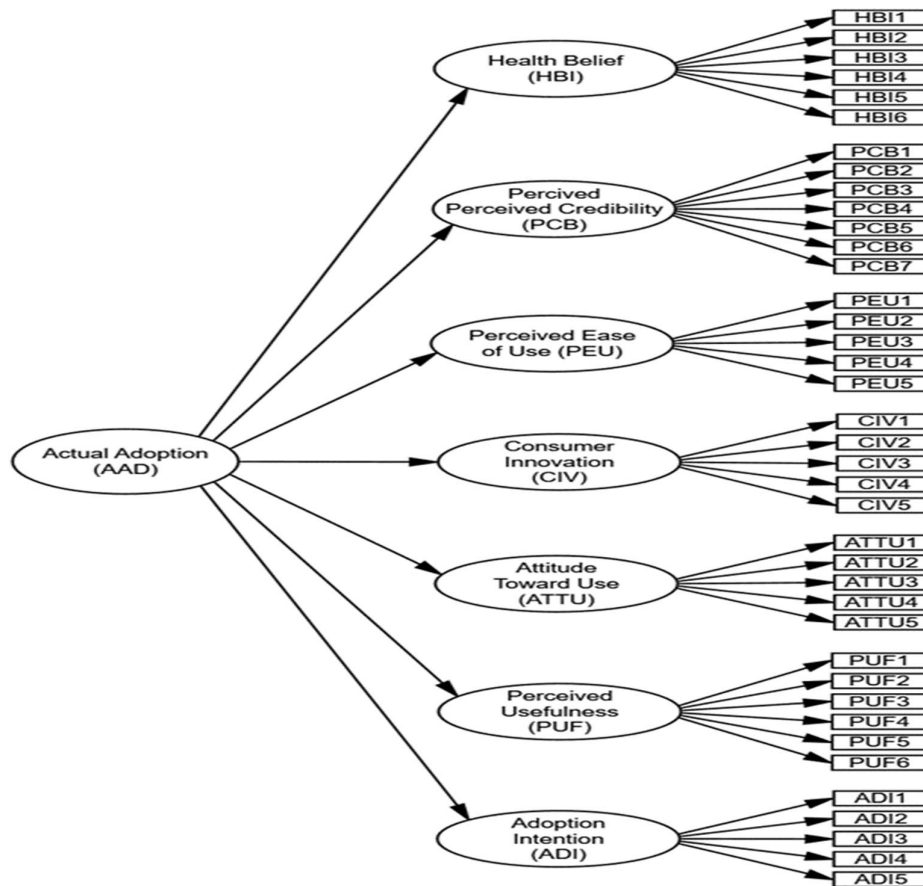
## 2. Literature Reviews and Framework

Health Belief Model (HBM) is a widely recognized and influential framework in the field of health behavior research, providing valuable insights into how individuals' beliefs impact their health-related behaviors. According to the HBM, individuals' perceptions of their susceptibility to illness and the perceived benefits of engaging in health-related actions significantly influence their health behavior. The Health Belief Model's application in the context of technology and innovation health products sheds light on the pivotal role of individuals' risk perceptions and belief in the effectiveness of these products. As a result, health practitioners and policymakers can tailor interventions and campaigns to emphasize the benefits of these products.<sup>[7]</sup> Especially, the individuals who perceive themselves at risk. Understanding the interplay between beliefs, risk perceptions, and health behavior can foster the development of effective strategies to promote the adoption and utilization of technology and innovation products, ultimately leading to improved health outcomes and enhanced overall well-being. Perceived ease of use is a critical factor that affects individuals' behavior in using technology and innovation products. To emphasize the importance of perceived ease of use as a determinant of user acceptance of technology.<sup>[8]</sup> If individuals perceive the products to be easy to understand, operate, and navigate, they are more likely to engage with and adopt these products for their health needs. User-friendly interfaces, intuitive functionalities, and clear instructions can enhance the perceived ease of use, thereby facilitating individuals' adoption and usage of health-related technology products. Which, the perceived credibility refers to individuals' perceptions of the trustworthiness and reliability of technology and innovation products for health. Trust plays a crucial role in the adoption of technology.<sup>[9]</sup> When individuals perceive the products to be credible, they are more likely to utilize them for health-related purposes.<sup>[2]</sup> Factors that influence perceived credibility include the reputation of the product, the credibility of the manufacturer or provider, and the presence of scientific evidence or endorsements from trusted sources.<sup>[10]</sup> Enhancing perceived credibility through transparency, quality assurance, and evidence-based information can positively impact individuals' adoption and usage of technology and innovation products for health.

Consumer innovation refers to individuals' propensity to adopt new technology and innovation products<sup>[11]</sup>, to identify consumer innovativeness as a significant predictor of technology adoption behavior. Individuals with a higher level of consumer innovation are more likely to embrace and adopt technology and innovation products for their health.<sup>[12]</sup> These individuals are characterized by their openness to new experiences, their willingness to take risks, and their curiosity about innovative solutions.<sup>[10]</sup> Understanding the role of consumer innovation can help identify target populations and design targeted strategies to promote the adoption and usage of technology and innovation products for health. And innovation products for health, perceived

usefulness is a crucial factor that affects people's behavior. <sup>[13]</sup> Perceived usefulness refers to people's perceptions of how many products can improve their health outcomes and make activities related to their health more convenient. Factors that contribute to perceived usefulness include the features, functionalities, and benefits offered by the products. <sup>[14]</sup> Clear communication of the value proposition and tangible benefits of using the products can enhance individuals' perceived usefulness, thereby driving their adoption and usage behavior. <sup>[15]</sup> Attitude toward the products represents the individual's overall evaluation and subjective feelings towards technology and innovation products for health. Individuals with favorable attitudes are more inclined to consider the products as valuable assets for their health and well-being. <sup>[16]</sup> Factors that shape attitudes include personal experiences, social influence, and the perceived fit between the products and individuals' needs and preferences. <sup>[17]</sup> Understanding the individual's attitudes toward the products can inform strategies to promote positive perceptions and increase the likelihood of adoption and sustained usage, especially, an adoption intention refers to the individuals' plans and intentions to adopt and use technology and innovation products for health purposes. It reflects the individual's motivation and readiness to engage with these products. Individuals with a strong adoption intention are more likely to initiate and sustain the use of such products. Assessing the individual's adoption intention can provide insights into their readiness to adopt technology and innovation products and the potential barriers or facilitators that may affect their behavior. <sup>[18]</sup> However, the actual adoption of technology and innovation for health in Thailand is a critical topic as to improve healthcare services and outcomes. Behavior models play a significant role in understanding the factors influencing the adoption of health technology and innovation by individuals and healthcare providers. One such model is the Technology Acceptance Model (TAM), which proposes that the intention to adopt technology is influenced by perceived usefulness and perceived ease of use. A study applied TAM to assess healthcare professionals' willingness to adopt electronic health records (EHRs) in Thailand. The research found that perceived usefulness and ease of use significantly influenced the intention to adopt EHRs, highlighting the importance of addressing these factors in promoting technology adoption in the healthcare sector into important goals in the study behavior on actual adoption of technology and innovation health products in Thailand on the factors in the research framework to show as figure1.

**Fig 1.** Framework to study factors of behavior on actual adoption of technology and innovation health products in Thailand.



### 3. Methodology

This is mixed-method research design to combines quantitative analysis using an online survey with qualitative analysis using the e-Fuzzy Delphi Technique. By integrating expert opinions and collecting empirical data, this approach aimed to provide comprehensive insights into users' behavior regarding technology and innovation products for health in Thailand to the methods followed:

- 1) Step 1; e-Fuzzy Delphi Technique-based qualitative research on problem statement into the first

step entailed a synthesis of the existing literature and the identification of research questions pertaining to Thai consumers' use of cutting-edge technology and products for health. This step helped to establish the problem statement and the research objectives to a selection of Experts: In this study, 21 experts with the necessary knowledge and expertise to provide insights into behavior on the actual adoption of technology and innovative health products. The e-Fuzzy Delphi technique was employed to gather expert opinions. This process involved two rounds of questionnaires using e-Delphi as, round 1, to online survey was conducted to elicit qualitative opinions from the experts regarding the factors influencing users' behavior when using technology and innovation products for health. The experts provided insights, suggestions, and the potential variables to be considered, In round 2, a closed-ended questionnaire was developed based on the analysis of the responses from the first round. The variables identified were presented, and the experts were asked to rate their appropriateness using the 7-point rating scale aimed to quantify the experts' opinions and reach a consensus on the important factors. Consensus

measurement in the results obtained from the experts' opinions was summarized using the Fuzzy Delphi Theory. This method enabled the measurement of consensus among the experts and helped identify to analyze the behavior on actual adoption of technology and innovation health products of the factors and indicators that qualitative study.

2) Step 2; Online survey research based on the insights and consensus obtained from step 1, an online questionnaire was developed. The purpose of the questionnaire was to gather quantitative data from 890 online users of technology-related health innovation in Thailand. The targeted group was given the online questionnaire to collect for CFA to associate the behavior on actual adoption of technology and innovation health products that quantitative study.

In this regard, the equerries such as the data analysis of factors and indicators in behavior on actual adoption of technology and innovation health products, that the qualitative data to analyzed by using three main stages, i.e., data reduction, data organization, data interpretation to conclusion. On CFA to associate the behavior on actual adoption of technology and innovation health products, that quantitative data to analyzed by descriptive statistical analysis including frequency, percentage, mean, standard deviation, and confirm factor analysis (CFA) by LISREL programmed, the coefficients highlight the significance of these relationships in influencing individuals' behavior and adoption such as the products to show as table 1.

**Table 1.** Index values for harmonization tests.

Utilized statistically in the audit	Criteria for evaluation	Statistics found	Indicators
1. Chi-square: $\chi^2$	not statistically significant	928.795	Harmonious
2. $\chi^2/df$	$\leq 2.00$	1.976	Harmonious
3. GFI	$\geq 0.90$	0.944	Harmonious
4. AGFI	$\geq 0.90$	0.908	Harmonious
5. CFI	$\geq 0.90$	0.979	Harmonious
6. SRMR	$\leq 0.08$	0.035	Harmonious
7. RMSEA	$\leq 0.08$	0.032	Harmonious
8. HOELTER	$> 200$	469	Harmonious

#### 4. Majors Findings

The behavior on actual adoption of technology and innovation health products in Thailand on major findings were followed:

##### 4.1 Factors and indicators in behavior on actual adoption of technology and innovation health products.

The behavior on actual adoption of technology and innovation health products of 7 factors including the health belief, perceived credibility, perceived ease of use, consumer innovation, attitude toward use, perceived usefulness, and adoption intention to 39 indicators to follows;

- 1) Health belief to, 1.1) the use of technology and innovation products for health can increase

the  
risk of disease, 1.2) the use of technology and innovation products for health can reduce the severity of the disease, 1.3) the use of technology and innovation health products can help monitor the symptoms of the disease, 1.4) the use of technology and innovation health products can primary prophylaxis is possible, 1.5) the use of technology and innovation products for health improves, 1.6) the use of technology and innovation products for health can help to plan treatment.

2) Perceived credibility to, 2.1) the technology and health innovation products provide reliable information, 2.2) the technology and innovation products for health can protect personal data, 2.3) the technology products and health innovation represent health information accurately, 2.4) the technology and innovation products for health create confidence, 2.5) the technology and innovation products for health has a stable usage system, 2.6) the technology products and innovation for health to displayed accurately, 2.7) the technology and innovation products for health to show the stable results.

3) Perceived ease of use to, 3.1) the use of technology and innovation products for health to easy and simple, 3.2) the use of technology and innovation products for health doesn't require much effort, 3.3) the use of technology and innovation products for health to be convenient continuously, 3.4) the use of technology and innovation products for health to learn easily, 3.5) the use of technology and innovation products for health to the easy steps of understanding.

4) Consumer innovation to, 4.1) a new health technology and innovation products are launched through various media, 4.2) regularly following the new health products, technologies, and innovation, 4.3) trying the news technology and health innovation products that are to be launched, 4.4) the first groups to purchase a newly launched health technology and innovation product, 4.5) a buying of new health technology and innovation products to release on a regular basis.

5) Attitude toward use to, 5.1) the variety of technology and innovation products for health, 5.2) the satisfaction every time to use technology and innovation products for health, 5.3) a feeling worried about health when using technology and innovation products, 5.4) a feeling the confidence that technology and innovation health products will improve health, 5.5) a feeling the confident to technology and innovation health products can be used in daily life.

6) Perceived usefulness to, 6.1) the technology and innovation health products of helping the achieve health goals, 6.2) the use of technology and innovation health products to beneficial of health care, 6.3) the use of technology and innovation health products to improve in the quality of life, 6.4) the technology and innovation of health products to have good discipline of health care, 6.5) the use of technology and innovation health products to helping the cost reduce of health care, 6.6) the use of technology and innovation health products to prevent the dangers of congenital diseases such as high blood pressure seizures and highest sugar.



7) Adoption intention to, 7.1) an intent to use technology and innovation health products when a having the opportunity, 7.2) an intent to use technology and innovation health products of first, 7.3) an intent to use the technology and innovation health products on a daily basis, 7.4) an intent to continue using the technology and innovation health products to the future, 7.5) an intend to introduce on acquaintances to the use of technology and innovation health products.

**4.2 CFA to associate the behavior on actual adoption of technology and innovation health products.**

The CFA to associate the behavior on actual adoption of technology and innovation health products includes health belief (HBI), perceived credibility (PCB), perceived ease of use (PEU), consumer innovation (CIV), attitude toward use (ATTU), perceived usefulness (PUF), adoption intention (ADI) of each factor to the regression coefficients, standard errors, t-values, and R<sup>2</sup> values. Whereof, the health belief construct had coefficients ranging from 0.62 to 0.83, indicating beliefs about disease risk and benefits, perceived credibility to coefficients ranging from 0.72 to 0.77, on measuring credibility perceptions, perceived ease of use to coefficients ranging from 0.63 to 0.73, on assessing perceptions of ease and convenience, consumer innovation to coefficients ranging of 0.43 to 0.76, on capturing openness to new products, attitude toward use to coefficients ranging of 0.67 to 0.79, on measuring satisfaction and applicability, perceived usefulness to coefficients ranging of 0.72 to 0.84, on assessing beliefs about effectiveness and value, adoption intention to coefficients ranging of 0.62 to 0.87, on indicating intentions to use and recommend to others, in all factors to consistent with empirical data at statistically significant level of 0.01, to shows as table 2, and figure 2.

**Table 2.** CFA to associate the behavior on actual adoption of technology and innovation health products of 7 variables.

Variable	Statistical values			R <sup>2</sup>
	b	SE	t	
<b>1. Health Belief (HBI)</b>	1.00	-	-	0.87
HBI1: The use of technology and innovation products for health can increase the risk of disease.	0.68	-	-	0.46
HBI2: The use of technology and innovation products for health can reduce the severity of the disease	0.62	0.05	19.12**	0.38
HBI3: The use of technology and innovation health products can help monitor the symptoms of the disease.	0.66	0.05	18.71**	0.44
HBI4: The use of technology and innovation health products can primary prophylaxis possible	0.83	0.07	20.42**	0.68
HBI5: The use of technology and innovation products for health improvement.	0.73	0.06	18.59**	0.53
HBI6: The use of technology and innovation products for health can help to plan treatment.	0.71	0.06	18.13**	0.51

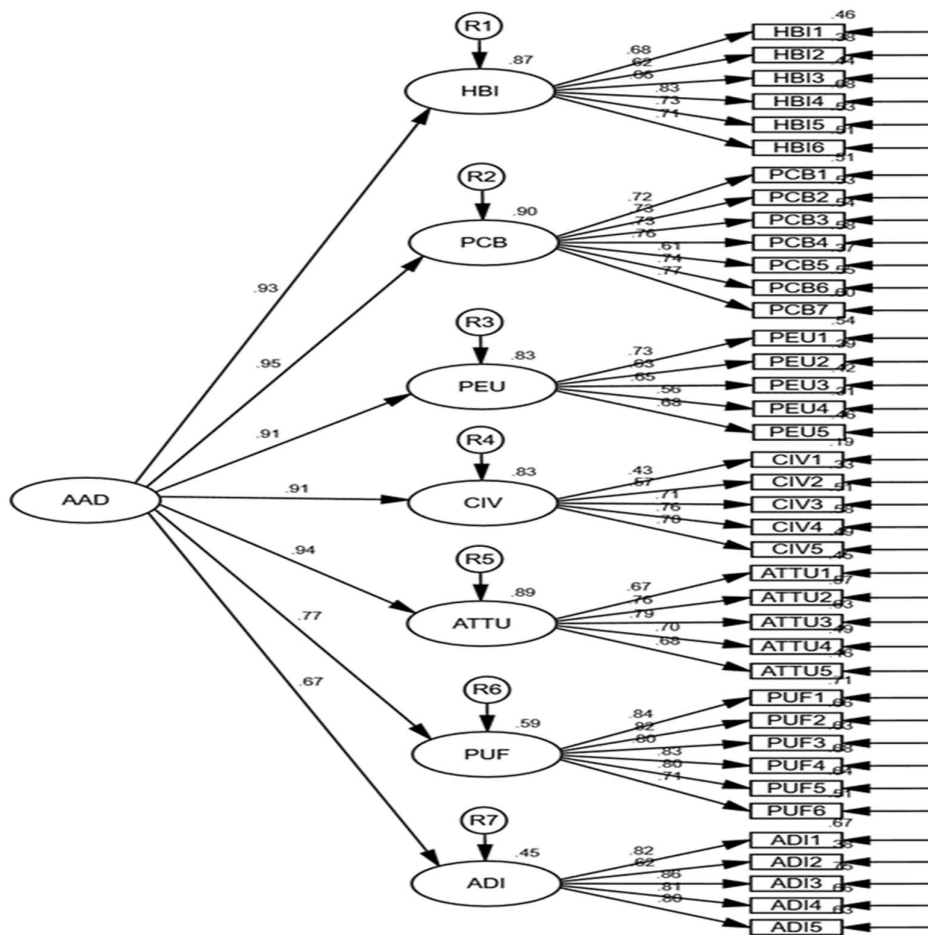
<b>2. Perceived Credibility (PCB)</b>	0.95	0.06	18.28**	0.90
PCB1: The technology and health innovation products provide reliable information.	0.72	-	-	0.51
PCB2: The technology and innovation products for health can protect personal data	0.73	0.04	24.99**	0.53
PCB3: The technology products and health innovation represent health information accurately.	0.73	0.05	19.07**	0.54
PCB4: The technology and innovation products for health create confidence	0.76	0.05	20.10**	0.58
PCB5: The technology and innovation products for health has a stable usage system.	0.61	0.05	16.33**	0.37
PCB6: The technology products and innovation for health to be displayed accurately.	0.74	0.05	18.91**	0.55
PCB7: The technology and innovation products for health to show stable results.	0.77	0.06	18.93**	0.60
<b>3. Perceived Ease of Use (PEU)</b>	0.91	0.06	16.25**	0.93
PEU1: The use of technology and innovation products for health to be easy and simple.	0.73	-	-	0.54
PEU2: The use of technology and innovation products for health doesn't require much effort.	0.63	0.06	17.70**	0.39
PEU3: The use of technology and innovation products for health to be convenient continuously.	0.65	0.06	17.06**	0.42
PEU4: The use of technology and innovation products for health to be learned easily.	0.56	0.05	14.76**	0.31
PEU5: The use of technology and innovation products for health to the easy steps of understanding.	0.68	0.06	18.06**	0.46
<b>4. Consumer Innovation (CIV)</b>	0.91	0.07	10.77**	0.83
CIV1: New health technology and innovation products are launched through various media.	0.43	-	-	0.19
CIV2: Regularly following the new health products, technologies, and innovation.	0.58	0.09	11.51**	0.33
CIV3: A trying the news technology and health innovation products that are to be launched.	0.71	0.12	11.44**	0.51
CIV4: The first groups to purchase a newly launched health technology and innovation product	0.76	0.12	11.68**	0.58
CIV5: A buying of new health technology and innovation products to release on a regular basis.	0.70	0.13	11.42**	0.49
<b>5. Attitude Toward Use (ATTU)</b>	0.94	0.07	13.66**	0.89



ATTU1: The variety of technology and innovation products for health.	0.67	-	-	0.45
ATTU2: The satisfied every time to use technology and innovation products for health.	0.76	0.05	23.68**	0.57
ATTU3: A feeling worried about of health when using technology and innovation products.	0.79	0.07	19.25**	0.63
ATTU4: A feeling the confidence in technology and innovation in health products will improve health.	0.70	0.08	16.69**	0.49
ATTU5: A feeling the confidence in technology and innovative health products that can be used in daily life.	0.68	0.08	16.33**	0.46
<b>6. Perceived Usefulness (PUF)</b>	0.77	0.08	16.13**	0.59
PUF1: The technology and innovation health products of help them achieve health goals.	0.84	-	-	0.71
PUF2: The use of technology and innovation health products to beneficial of health care.	0.82	0.04	25.66**	0.67
PUF3: The use of technology and innovation health products to improve the quality of life.	0.80	0.04	26.09**	0.64
PUF4: The technology and innovation of health products to have the good discipline of health care.	0.83	0.03	27.19**	0.68
PUF5: The use of technology and innovation health products to help the cost reduction of health care.	0.80	0.03	26.15**	0.65
PUF6: The use of technology and innovation health products to prevent the dangers of congenital diseases such as high blood pressure seizures and highest sugar.	0.72	0.04	21.05**	0.51
<b>7. Adoption Intention (ADI)</b>	0.67	0.08	14.27**	0.45
ADI1: An intention to use technology and innovation health products, when having the opportunity.	0.82	-	-	0.67
ADI2: An intention to use technology and innovation health products first.	0.62	0.04	19.59**	0.38
ADI3: An intention to use technology and innovation health products on a daily basis.	0.87	0.04	27.56**	0.75
ADI4: An intention to continue of using technology and innovation health products in the future.	0.81	0.03	26.54**	0.66
ADI5: An intent to introduce acquaintances to the use of technology and innovation health products.	0.80	0.04	22.92**	0.63

\*\* *p-Value* < 0.01.

**Fig 2.** CFA to associate the behavior on actual adoption of technology and innovation health products.



$\chi^2/df.$  of 1.976, GFI. Of 0.944, AGFI. of 0.908, CFI. of 0.979, RMSEA. of 0.032.

\*\* Significant level of 0.01.

## 5. Discussion

Behavior on actual adoption factors include health belief, perceived credibility, perceived ease of use of technology, consumer innovation, attitude toward the use of technology, perceived usefulness, and adoption intention. These factors account for CFA to associate technology and innovation health products to consistent with empirical data at a statistically significant level of 0.01. Additionally, factors such as perceived ease of use, credibility, consumer innovation, perceived usefulness, attitude toward use, and adoption intention play crucial roles in influencing individuals' behavior toward adopting and using technology and innovation health products. The results of the regression coefficients shed light on the relationships between the key factors and the behavior of users regarding technology and innovation products for health in Thailand. Health belief construct showed positive and significant relationships with the overall behavior of users regarding technology and innovation products for health. <sup>[19]</sup> Perceived risk of disease and the benefits of using these products indicate that individuals who perceive themselves to be at risk of certain health conditions and who recognize the benefits of these products are more likely to engage in their use. <sup>[20]</sup> Perceived credibility emerged as an important factor influencing users' behavior. The perceived Ease of Use construct also demonstrated a significant influence on

individuals' behavior. <sup>[21]</sup> Which emphasizes the role of perceived ease of use in determining user acceptance and adoption of technology. Consumer Innovation was found to be a significant predictor of users' behavior. <sup>[22]</sup> Consumer innovation, characterized by openness to new technologies and a propensity to adopt innovative products, is more likely to embrace and adopt these products for their health needs. This finding supports prior research highlighting the influence of consumer innovation in technology adoption behavior. <sup>[23]</sup> Attitude toward use to demonstrate a significant relationship with users. Positive attitudes lead to behavior intentions and subsequent behavior. The perceive technology and innovation health products as useful in enhancing health outcomes, facilitating health-related activities, and providing benefits such as improved quality of life, cost reduction, and prevention of diseases and are more motivated to adopt and utilize these products. Health belief, perceived credibility, perceived ease of use, consumer innovation, attitude toward use, perceived usefulness, and adoption intention to significant roles in shaping individuals' behavior and adoption of technology and innovation products for health throughout the target campaigns, raising awareness about the benefits and credibility of the products, emphasizing a ease of use a technology and innovation to usefulness in healthcare of achieving the goals.

## **6. Conclusion**

Behavior on actual adoption of technology and innovation health products of health belief to the use of technology and innovation products for health can increase the risk of disease, perceived credibility to the technology and health innovation products provide reliable information, perceived ease of use to the use of technology and innovation products for health to easy and simple, consumer innovation to a new health technology and innovation products are launched through various media, attitude toward use to the variety of technology and innovation products for health, perceived usefulness to the technology and innovation health products of helping the achieve on health goals, and adoption intention to intend to use technology and innovation health products when a having the opportunity. CFA to associate technology and innovation health products to consistent with empirical data at a statistically significant level of 0.01., throughout the target campaigns, raising awareness about the benefits and credibility of the products, emphasizing the ease of using technology and innovation to usefulness in healthcare of achieving the goals.

## **7. Suggestions for Implementation**

Health organizations and policymakers can leverage the findings of this research to develop targeted interventions and campaigns aimed at promoting the adoption of technology and innovation products for health. By emphasizing the benefits, credibility, ease of use, and usefulness of these products, they can increase individuals' motivation and intention to use them. Manufacturers and developers of technology and innovation health products can use the insights from this study to enhance the design and features of their products. Emphasizing user-friendly interfaces, ensuring data protection, and providing accurate and reliable information can improve individuals' perceptions of credibility and ease of use, thereby increasing the adoption and usage of these products. Healthcare professionals and practitioners should actively incorporate technology and innovation health products into their practices and recommendations. By advocating for these products, and emphasizing their positive outcomes, convenience, and relevance to patients' specific health needs, healthcare providers can play a

pivotal role in encouraging individuals to integrate such products into their daily routines and overall healthcare management. By doing so, they can contribute to the overall improvement of healthcare outcomes and patient well-being.

## References

1. Jedaman P, Kenaphoom S, Jongmuanwai B, Niyomves B. (2021). *Journal of Physics: Conference Series*. DOI: 10.1088/1742-6596/1835/1/012097
2. Phulkerd, S., Schram, A., Collin, J., Thow, A.-M., Ngqangashe, Y., Schneider, C. H., & Friel, S. (2022). Towards reconciling population nutrition goals and investment policy in Thailand understanding how investment policy actors defined, framed and prioritised nutrition. *Globalization and Health*, 18(1), 94. <https://doi.org/10.1186/s12992-022-00888-4>
3. Dorison, C. A., Lerner, J. S., Heller, B. H., Rothman, A. J., Kawachi, I. I., Wang, K., Rees, V. W., Gill, B. P., Gibbs, N., Ebersole, C. R., Vally, Z., Tajchman, Z., Zsido, A. N., Zrimsek, M., Chen, Z., Ziano, I., Gialitaki, Z., Ceary, C. D., Lin, Y., Coles, N. A. (2022). In COVID-19 Health Messaging, Loss Framing Increases Anxiety with Little-to- No Concomitant Benefits Experimental Evidence from 84 Countries. *Affective Science*, 3(3), 577–602. <https://doi.org/10.1007/s42761-022-00128-3>.
4. Taksima, T., Chonpathompikunlert, P., Sroyraya, M., Limpawattana, M., & Klaypradit, W. (2019). Effects of Astaxanthin from Shrimp Shell on Oxidative Stress and Behavior in Animal Model of Alzheimer’s Disease.
5. Byrne, D. V. (Ed.). (2021). *Food, Health and Safety in Cross Cultural Consumer Contexts*. Basel, Switzerland: MDPI-Multidisciplinary Digital Publishing Institute. <https://doi.org/10.3390/books978-3-0365-1339-3>
6. Adenle, A. A., Chertow, M. R., Moors, E. H. M., & Pannell, D. J. (2020). *Science, Technology, and Innovation for Sustainable Development Goals Insights from Agriculture, Health, Environment, and Energy*. Oxford University Press.
7. Japa, O., Prakhamin, K., & Flynn, R. J. (2022). Identification and expression of a transforming growth factor beta (TGF- $\beta$ ) homologue in the tropical liver fluke *Fasciola gigantica*. *Parasitology Research*, 121(12), 3547–3559. <https://doi.org/10.1007/s00436-022-07679-1>
8. Venkatesh, V., Morris, M. G., Davis, G. B., & Davis, F. D. (2003). User acceptance of information technology: Toward a unified view. *MIS Quarterly*, 27(3), 425–478. <https://doi.org/10.2307/30036540>
9. Alscher, A., Schnellbacher, B., & Wissing, C. (2023). Adoption of Digital Vaccination Services It Is the Click Flow, Not the Value-An Empirical Analysis of the Vaccination Management of the COVID-19 Pandemic in Germany. *Vaccines*, 11(4). <https://doi.org/10.3390/vaccines11040750>
10. Moon, J. W., & Kim, Y. G. (2001). Extending the TAM for a World-Wide-Web context. *Information & Management*, 38(4), 217-230. [https://doi.org/10.1016/S0378-7206\(00\)00061-6](https://doi.org/10.1016/S0378-7206(00)00061-6)
11. Khosrow-Pour, D., B. A., & Mehdi. (2018). *Entrepreneurship, Collaboration, and Innovation in the Modern Business Era*. IGI Global.
12. Lucero-Prisno, D. E., Olayemi, A. H., Ekpenyong, I., Okereke, P., Aldirdiri, O., Buban, J. M., Ndikumana, S., Yelarge, K., Sesay, N., Turay, F. U., Huang, J., & Kouwenhoven, M.

- (2022). Prospects for financial technology for health in Africa. *Digital Health*, 8. <https://doi.org/10.1177/20552076221119548>
13. Aral, S. O., & Douglas, J. M. (2008). *Behavioral Interventions for Prevention and Control of Sexually Transmitted Diseases*. Springer Science & Business Media.
  14. Klionsky, D. J., Abdel-Aziz, A. K., Abdelfatah, S., Abdellatif, M., Abdoli, A., Abel, S., Abeliovich, H., Abildgaard, M. H., Abudu, Y. P., Acevedo-Arozena, A., Adamopoulos, I. E., Adeli, K., Adolph, T. E., Adornetto, A., Aflaki, E., Agam, G., Agarwal, A., Aggarwal, B. B., Agnello, M., Tong, C.-K. (2021). Guidelines for the use and interpretation of assays for monitoring autophagy *Autophagy*, 17(1), 1–382. <https://doi.org/10.1080/15548627.2020.1797280>
  15. Daim, T. U., Behkami, N., Basoglu, N., K k, O. M., & Hogaboam, L. (2016). *Healthcare Technology Innovation Adoption Electronic Health Records and Other Emerging Health Information Technology Innovations*. Springer.
  16. David, I., Poissant, L., & Rochette, A. (2012). Clinicians' expectations of Web 2.0 as a mechanism for knowledge transfer of stroke best practices. *Journal of Medical Internet Research*, 14(5), e121. <https://doi.org/10.2196/jmir.2016>
  17. Greenberg J, Baron RA. (2014). *Behavior in organizations* (9<sup>th</sup> ed.). Upper Saddle River, NJ: Prentice-Hall.
  18. Sun, H., Fang, K., & Shi, Y. (2023). Green innovation and industrial ecosystem reconstruction in achieving environmental sustainability. *Frontiers Media SA*.
  19. Jeyakumar Nathan, R., Soekmawati, Victor, V., Popp, J., Fekete-Farkas, M., & Ol h, J. (2021). Food Innovation Adoption and Organic Food Consumerism-A Cross National Study between Malaysia and Hungary. *Foods* (Basel, Switzerland), 10(2). <https://doi.org/10.3390/foods10020363>
  20. Panari, C., Lorenzi, G., & Mariani, M. G. (2021). The Predictive Factors of New Technology Adoption, Workers' Well-Being and Absenteeism The Case of a Public Maritime Company in Venice. *International Journal of Environmental Research and Public Health*, 18(23). <https://doi.org/10.3390/ijerph182312358>
  21. Thanasuta, C., Thamakaison, C., & Kongkam, L. (2017). Applying the technology acceptance model to investigate the factors affecting electronic health record system adoption in Thailand. *Journal of Health Informatics in Developing Countries*, 11(1), 18-33. <https://doi.org/10.1016/j.techfore.2010.11.007>
  22. Thongchai, P. (2012). Development of criteria for selection of research consultants, *Research Methodology & Cognitive Science*, (9)2, 30-40.
  23. Mungchu A, Teemueangsa S, Jedaman P. (2020). Science educational management of SIAOE model for sustainability the quality improving a Thai's Basic education, Thailand. *Journal of Physics: Conference Series*. 2020;1835.