



Understanding International Students Adoption Intention toward Korean-Made Healthcare Sensor Technologies for Their Parents and Elderly Relatives Using the UTAUT Model

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Abstract

This study investigates the factors influencing international students' intention to adopt Korean sensor-based healthcare devices for their elderly family members. Drawing on the Unified Theory of Acceptance and Use of Technology (UTAUT), the research examines how performance expectancy, effort expectancy, social influence, and facilitating conditions affect trust and, in turn, behavioral intention. Survey data were collected from 120 international students in Korea and analyzed using partial least squares structural equation modeling. The measurement model demonstrated strong reliability and validity for all constructs. Structural model results showed that facilitating conditions had a significant positive effect on trust ($\beta = 0.431, t = 3.729$), while effort expectancy, performance expectancy, and social influence were not significant predictors. Trust, however, exhibited a strong positive effect on behavioral intention ($\beta = 0.536, t = 6.217$), underscoring its central role in adoption decisions. These findings suggest that practical support, available resources, and compatible infrastructure are more critical than perceived ease of use, usefulness, or social pressure in building trust and encouraging cross-border adoption of Korean healthcare sensor technologies for elderly care.

Keywords: Adoption intention; Healthcare sensor devices; International students; Trust; UTAUT

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1. Introduction

Healthcare technology is rapidly transforming how medical care is delivered, with wearable and sensor-based devices enabling continuous monitoring of vital signs outside traditional clinical settings (Kim et al., 2024). These technologies are especially important for aging populations, because they can support safer independent living and earlier detection of health problems (Ben Arfi et al., 2021). South Korea has developed a strong medical-device industry and is actively expanding production and exports of digital and sensor-based healthcare solutions, positioning the country as a key player in this global market (Fortune Business Insights, 2024). Korean sensor technologies, including wearable and home-based systems for monitoring heart rate, blood oxygen, and other indicators, have been evaluated as accurate and clinically valuable in supporting patient care (Kim et al., 2024). For international students who live far from their parents or elderly relatives, these devices offer a practical way to support family health from abroad through remote monitoring.

The adoption of such technologies depends on how users perceive their benefits, ease of use, social expectations, and available support. The Unified Theory of Acceptance and Use of Technology (UTAUT) explains these influences through four main constructs: performance expectancy, effort expectancy, social influence, and facilitating conditions (Venkatesh et al., 2003). Studies in healthcare and mobile health contexts show that these factors often operate together with trust and perceived risk, because users must believe that devices are reliable, safe, and protect sensitive health data before they intend to use them (Kim et al., 2024; *Frontiers in Public Health*, 2022; Garavand et al., 2019).

For international students considering Korean sensor-based devices for elderly relatives in another country, decisions are further shaped by whether the technology fits the infrastructure, language, and clinical practices of the home context, meaning they act as intermediaries who transfer and adapt technologies across settings (Raffaghelli et al., 2022; Jena, 2020). However, most prior research has focused on people adopting healthcare technologies for their own use within a single country, and relatively little is known about how UTAUT constructs and trust operate in cross-border, proxy-care situations involving international students and their families (Garavand et al., 2019; Ben Arfi et al., 2021).

This study addresses these gaps by examining the factors that influence international students' intentions to adopt Korean sensor-based healthcare devices for their parents or elderly relatives living abroad. It analyzes how performance expectancy, effort expectancy, social influence, and facilitating conditions relate to adoption intention, and how these relationships are shaped by trust in this transnational family-care context. The results are expected to refine technology-acceptance understanding for cross-border healthcare and provide practical guidance for Korean device manufacturers and policymakers on designing and supporting sensor-based solutions that better meet the needs of international students and their families.

Existing UTAUT-based healthcare adoption studies primarily focus on self-use within single-country contexts. Limited attention has been given to proxy adoption decisions, where individuals evaluate technologies on behalf of elderly family members across national borders. This study addresses this gap by examining international students as transnational caregivers, thereby extending UTAUT into cross-border healthcare decision-making contexts.

2. Literature Review

2.1 International Students' Perspective

International students represent a unique user group in studies such as Understanding International Students' Adoption Intention toward Korean-Made Healthcare Sensor Technologies for Their Parents and Elderly Relatives Using the UTAUT Model. Their decisions are shaped by personal needs and responsibilities toward family back home, and their adoption intentions are influenced by perceived usefulness, ease of use, social influence, and facilitating conditions, consistent with UTAUT findings (Alvi, 2021). Additionally, social networks spanning both peers in the host country and family members back home play a critical role in shaping their decisions (Ouma & Muema, 2025).

When considering technologies such as healthcare sensor devices for parents or elderly relatives, international students evaluate not only technical functionality but also reliability, data security, and cross-cultural applicability, as well as the cost-benefit trade-offs, including

potential health improvements and reduction of long-term care expenses (Wang, 2021; Venkatesh et al., 2012). Despite extensive research on students' personal technology use, limited studies have explored international students as intermediaries who recommend or purchase technology for others, indicating a significant gap in understanding their adoption intentions in cross-border, familial, and healthcare contexts. These characteristics position international students as critical proxy adopters, justifying their role as the focal decision-makers in the proposed research model.

2.2. Korean-Made Healthcare Sensor Technology

Korean-made healthcare sensor technologies have gained increasing attention in recent years, particularly due to South Korea's advanced digital health infrastructure and its focus on elderly care innovation. Government-supported digital health programs have accelerated the development and implementation of AI and IoT-based sensor systems designed to support senior citizens in home and community settings. A review by Lee et al. (2024) emphasized that Korea's national strategy prioritizes preventive health care through remote monitoring systems, positioning sensor technology as a core component of future elderly care models.

Empirical studies further highlight user perceptions and adoption challenges. Zin et al. (2023) examined older adults in Korea and found that perceived usefulness, perceived ease of use, and facilitating conditions significantly shaped their acceptance of wrist-worn smart health-monitoring devices. Their study, grounded in the Technology Acceptance Model (TAM), showed that social influence was not a significant predictor, suggesting that Korean seniors prioritize functionality over social pressure when evaluating sensor-based devices. Smart-home sensor research offers similar insights. Jo et al. (2021) explored elderly experiences with IoT-based home monitoring systems and found that although initial interactions produced discomfort and usability concerns, acceptance increased once users recognized the systems' health-support benefits. These findings support the need for elderly-friendly design interfaces and targeted user education to reduce anxiety and enhance adoption.

Population-level research by Kim et al. (2023) revealed that although more than half of older Koreans use mobile health applications, the adoption of wearable sensors remains notably low. Their study found that only 7.1% of Korean seniors regularly used wearable health

devices, and that levels of frailty significantly influenced adoption behavior. Pre-frail and frail individuals showed different patterns of digital health engagement, suggesting that sensor design must account for diverse physical and cognitive needs. Adoption perspectives among caregivers have also been explored. Kim et al. (2024) investigated long-term care workers' acceptance of a sensor-equipped smart care bed designed to prevent pressure ulcers. The study found that acceptance increased with familiarity, suggesting that hands-on experience can significantly improve attitudes toward sensor-based technologies in clinical and caregiving environments. Collectively, prior research indicates that Korean-made healthcare sensor technologies offer significant potential for elderly care but face adoption barriers related to usability, digital literacy, and system familiarity. These findings highlight the importance of considering user readiness, contextual support, and health status when evaluating technology adoption, particularly in studies examining how international students might perceive and recommend such technologies for their parents or elderly relatives. These adoption challenges inform the inclusion of UTAUT constructs and trust in the proposed model.

2.3. Health Care Sensor For Elderly Parents

According to recent World Health Organization (WHO) statistics, the global population aged 60 years and above is expected to grow dramatically from 1 billion in 2020 to 1.4 billion in the coming years and will double to 2.1 billion by 2050. Additionally, the number of people aged 80 years or older is projected to triple, reaching 426 million by 2050 (World Health Organization, 2025). This unprecedented demographic shift underscores the increasing need for innovative healthcare solutions that can support the well-being, independence, and safety of older adults. In response, healthcare sensor technologies have emerged as a significant component of modern elderly care, including wearable devices, fall-detection systems, home-based monitoring tools, and chronic disease management sensors (Stavropoulos et al., 2020).

These technologies enable continuous and non-invasive monitoring of vital signs, daily activities, and potential emergency situations, thereby improving early detection of health issues and enhancing long-term disease management (Kazanskiy et al., 2024) Previous empirical studies have also examined factors influencing elderly individuals' adoption of

healthcare sensor technologies. One study found that effort expectancy, expert advice, perceived trust, and perceived cost significantly shape older adults' acceptance of smart home healthcare services, emphasizing the need for systems that are intuitive, credible, and economically accessible (Pal et al., 2018). Another line of research highlighted the importance of broader contextual factors, showing that demographics, socioeconomic status, health conditions, personal disposition, technology familiarity, and social influences collectively affect the adoption of health technologies among older adults, particularly those managing chronic diseases (Bertolazzi et al., 2024). These findings suggest that adoption behavior is multidimensional and influenced by both individual characteristics and external support mechanisms reinforcing the importance of addressing diverse needs when promoting Korean-made healthcare sensor technologies for elderly parents.

For international students living far from their elderly parents, such technologies provide an essential means of remote caregiving. Korean-made healthcare sensors in particular are widely recognized for their technological sophistication, reliability, and integration with smart healthcare ecosystems (Son, 2023). These devices allow international students to stay informed about their parents' health conditions, receive real-time alerts, and participate actively in health-related decisions despite geographical separation. Consequently, understanding perceptions and adoption intentions toward healthcare sensors is crucial not only for improving elderly care but also for reducing emotional and psychological burdens experienced by international students responsible for transnational caregiving. These caregiving needs and adoption considerations highlight the importance of trust, system reliability, and contextual support, thereby justifying the inclusion of trust as a central mediating construct and behavioral intention as the outcome variable in the proposed research model.

2.4. *UTAUT*

The Unified Theory of Acceptance and Use of Technology (UTAUT), introduced by Venkatesh et al., (2003), synthesizes eight major technology-acceptance frameworks to provide a comprehensive model for predicting individuals' intention to adopt and use new technologies. UTAUT has been extensively applied in the healthcare technology domain,

providing valuable insights into users' acceptance of telemedicine platforms, wearable medical devices, remote monitoring systems, and smart home healthcare solutions (Vidal-Silva et al., 2024; Wang et al., 2020; Yeoh & Chin, 2022). The model's strength lies in its ability to capture both individual and contextual determinants of technology adoption, making it highly suitable for analyzing complex, real-world health-technology environments. Moreover, UTAUT has shown strong predictive power across diverse populations and cultural settings, reinforcing its relevance for studies involving international users and cross-border caregiving contexts.

Previous empirical research using the UTAUT framework has consistently demonstrated the relevance of its core constructs across various healthcare technology settings. Studies on AI-based medical devices show that performance expectancy, effort expectancy, facilitating conditions, and social influence significantly influence medical professionals' adoption intentions, with trust emerging as a critical determinant in clinical environments (Kim et al., 2024). Other research focusing on patient use of IoT-based eHealth systems indicates that the risk-trust relationship strongly predicts adoption intention, whereas performance expectancy may play a limited or nonsignificant role depending on the context (Arfi et al., 2021). In broader IoT healthcare adoption studies, factors such as social influence, attitude, technology usefulness, privacy risk, health risk perception, financial concerns, and environmental conditions have been identified as influential (Al-rawashdeh et al., 2022). These findings collectively confirm that UTAUT variables, often supplemented with contextual factors like trust and perceived risk, provide a robust theoretical foundation for explaining adoption behaviors in healthcare technology settings. In cross-border caregiving contexts, international students evaluate healthcare technologies not for personal convenience but for elderly safety, system reliability, and remote manageability. Accordingly, traditional UTAUT predictors such as performance expectancy, effort expectancy, and social influence may influence adoption indirectly through trust formation rather than exerting direct effects. Given the previous findings, the following hypothesis are proposed:

H1: Performance expectancy has a positive effect on international students' trust in Korean healthcare sensor technologies.

H2: Effort expectancy has a positive affects international students’ trust in Korean healthcare sensor technologies.

H3: Facilitating conditions have a positive effect on international students’ trust in Korean healthcare sensor technologies.

H4: Social influence has a positive effect on international students’ trust in Korean healthcare sensor technologies.

H5: Trust has a positive effect on international students’ intention to adopt Korean healthcare sensor technologies for their elderly relatives.

Table 1. Operational Definition

Construct	Definition	Source
Performance Expectancy	The degree to which international students believe that using Korean-made healthcare sensors will improve the health monitoring, safety, and overall care management of their elderly parents.	(Venkatesh et al., 2003)
Effort Expectancy	The perceived ease with which both the international student and their elderly parent can learn, operate, and integrate the healthcare sensor technology into daily routines.	
Social Influence	The extent to which important individuals or groups such as family members, peers, healthcare professionals, or community networks that encourage or support the adoption of healthcare sensor technologies.	
Facilitating Conditions	The perceived availability of technical resources, customer support, language accessibility, and device compatibility that enable successful adoption and sustained use of Korean-made healthcare sensors.	
Behavioral Intention	The extent to which international students are willing, motivated, and intending to adopt and recommend Korean-made healthcare sensor technologies for monitoring their elderly parents’ health in the near future.	

2.5. Trust

Trust is a critical factor in shaping the adoption of digital health technologies, particularly in contexts involving cross-border decision-making or caregiving responsibilities. Kim et al., (2024) applied the UTAUT model with trust as a mediating variable and found that performance expectancy, effort expectancy, facilitating conditions, and social influence all positively influence trust, which in turn significantly predicts medical professionals’ behavioural intention to adopt AI-based healthcare devices. Similarly, Liu et al., (2023)

extended the UTAUT 2 framework for older adults in Hong Kong and demonstrated that trust, along with habit, is essential for mHealth adoption. Their study highlighted that social influence, service quality, and government policy contribute substantially to trust formation.

In telemedicine contexts, trust not only directly affects adoption intention but also moderates the relationships between key UTAUT constructs. It amplifies the effects of performance expectancy, effort expectancy, and social influence while weakening the influence of facilitating conditions (Wissawaswaengsuk et al., 2025). Additionally, studies of IoT-enabled healthcare systems for seniors in Indonesia confirm the critical role of trust; perceived trust and risk jointly mediate or moderate the effects of performance expectancy and effort expectancy on behavioural intention (Soelasih et al., 2025). Collectively, these studies underscore that integrating trust into the UTAUT framework significantly enhances its explanatory power for understanding adoption intention in healthcare technology, particularly for users making decisions on behalf of vulnerable populations, such as elderly relatives.

While prior studies have conceptualized trust as a moderator or direct antecedent, this study positions trust as a mediating mechanism that translates system-related perceptions into adoption intention. This approach aligns with proxy decision-making contexts, where confidence in system reliability must first be established before intention can form.

3. Methodology

3.1. Data Collection

This study targeted international students who have elderly parents or relatives and who are familiar with healthcare sensor technologies. Given the absence of an accessible sampling frame for this population, convenience sampling was applied. Data were collected between October- November 2025 through an online questionnaire distributed via Google Forms. The survey link was shared across various social media platforms commonly used by international

students and collected first-hand information in South Korea, including international student networks.

The questionnaire measured key constructs based on the UTAUT model, including Performance Expectancy, Effort Expectancy, Social Influence, Facilitating Conditions, and Behavioral Intention, as well as Trust in healthcare sensor technology. To ensure clarity and accessibility for participants from diverse cultural backgrounds, the survey was provided in English, which is widely used among international respondents.

A total of 120 valid responses were obtained from international students of various nationalities, age groups, and levels of familiarity with healthcare sensor technologies. This study followed ethical research guidelines. Participation was voluntary and anonymous, and respondents were informed about the purpose of the research prior to completing the questionnaire. Data analysis was conducted using SPSS for descriptive statistics and SmartPLS 4 for measurement model and structural model assessment.

3.2. Variables and Measurements

The measurement items for this study were adapted from well-established scales in technology adoption research and modified to fit the context of international students adopting healthcare sensor technologies for their elderly parents or relatives. All items were measured using a five-point Likert scale ranging from 1 (“strongly disagree”) to 5 (“strongly agree”).

Performance Expectancy (4 items), Effort Expectancy (4 items), Social Influence (4 items), Facilitating Conditions (4 items), and Behavioral Intention (4 items) were adapted from Venkatesh et al. (2003), with Behavioral Intention also drawing on Yu et al. (2021). Trust (4 items) was adapted from Kim et al. (2024). The wording of the items was slightly adjusted to reflect a proxy caregiving context, where international students evaluate the adoption of healthcare sensor technologies on behalf of their parents or elderly relatives rather than for personal use.

Representative items include: “Using the healthcare sensor technology will enable my parents/elderly relatives to detect health issues early” (Performance Expectancy); “My parents/elderly relatives would find the healthcare sensor technology easy to use” (Effort Expectancy); “Healthcare professionals (doctors/nurses) encourage the use of this healthcare sensor technology” (Social Influence); “I think there is someone available to help my parents/elderly relatives if they face difficulties using the healthcare sensor technology” (Facilitating Conditions); “I believe that healthcare sensor technology devices are highly accurate” (Trust); and “I intend to encourage my parents/elderly relatives to use the healthcare sensor technology in the near future” (Behavioral Intention). All measurement items demonstrated satisfactory reliability and validity, as reported in the measurement model results.

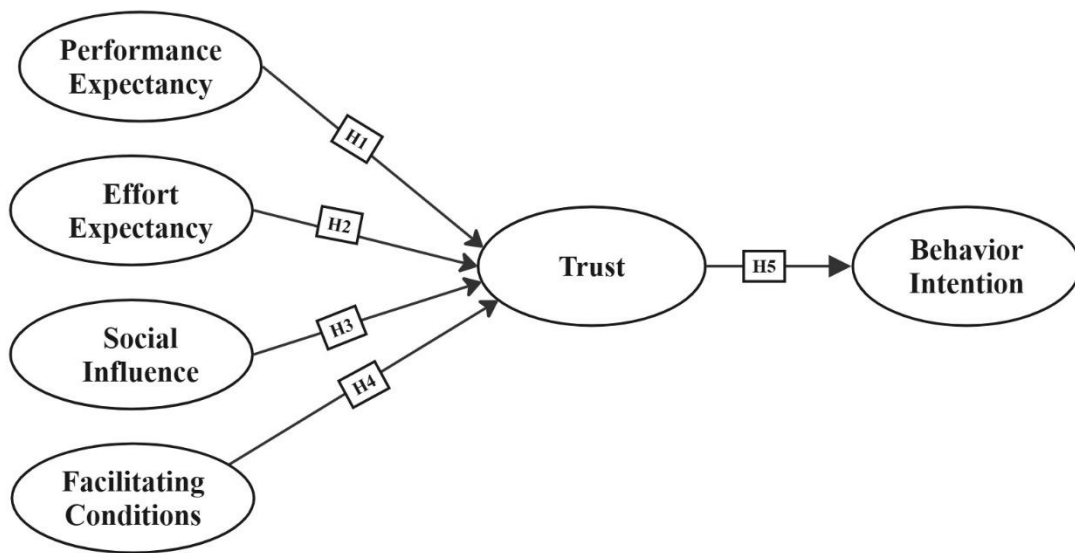


Figure 1. Research Model

4. Results

4.1. Sociodemographic Characteristics

The final sample comprised 120 international students, of whom 62.5% identified as male and 37.5% as female. The participants were predominantly young adults, as 92.5% were between 21 and 30 years old, followed by 5.0% aged 31- 40. Only 1.7% were below 20 years of age, and 0.8% were above 40. This demographic profile suggests that the study largely captures perspectives from a relatively young, digitally engaged group likely to be receptive to technology-based healthcare solutions.

About nationality, half of the respondents were from Nepal (50.0%), followed by those from Bangladesh (25.0%), India (5.8%), Indonesia (4.2%), Vietnam (3.3%), and China (0.8%), while the remaining 10.8% represented various other countries. This nationality distribution reflects the current composition of international students in South Korea, where students from South Asian countries constitute a substantial proportion of the international student population. As the focus of this study is on international students as proxy decision-makers rather than cross-national cultural comparison, this composition remains appropriate for examining cross-border caregiving adoption behavior. In terms of marital status, the majority were unmarried (88.3%), while 10.0% were married and 1.7% were divorced.

Regarding educational status, most participants were enrolled in a bachelor's degree program (69.2%), with smaller proportions studying in language courses (4.2%), master's programs (17.5%), doctoral programs (5.8%), or other academic tracks (3.3%), indicating that many are likely to remain in Korea for several years an important factor when considering long-term adoption of Korean healthcare devices within their families. Korean language proficiency, based on the TOPIK framework, was generally low: 52.5% reported no TOPIK level, while 15.0% held Level 1, 18.3% Level 2, 6.7% Level 3, and 3.3% Level 4, suggesting potential barriers to accessing Korean-language health information or device interfaces. In terms of employment, the majority were full-time students (86.7%), with smaller shares working part-time (8.3%), employed full-time (4.2%), or in other situations (0.8%). Additionally, while 31.7% reported currently using a healthcare device, 68.3% were non-users, indicating that a

substantial portion of the sample represents potential new adopters of Korean sensor-based healthcare technologies for themselves and their families. A complete summary of demographic results is provided in Table 2.

Table 2. Demographic Information

Item	Variables	n	Percent (%)
Gender	Male	75	62.5
	Female	45	37.5
Age/ Generation	Under 20	2	1.7
	21-30	111	92.5
	31-40	6	5.0
	Over 40	1	0.8
Nationality	Indian	7	5.8
	Nepalese	60	50.0
	Bangladeshi	30	25.0
	Chinese	1	.8
	Vietnamese	4	3.3
	Indonesian	5	4.2
	Others	13	10.8
Marital Status	Not Married	106	88.3
	Married	12	10.0
	Divorced	2	1.7
Current Educational Level	Language	5	4.2
	Bachelor's degree	83	69.2
	Master's degree	21	17.5
	Doctoral	7	5.8
	Others	4	3.3
Korean Language Proficiency (Topik exam Standard)	Level 1	18	15.0
	Level 2	22	18.3
	Level 3	8	6.7
	Level 4	4	3.3
	Level 5	1	0.8
	Level 6	4	3.3
Employment Status	None	63	52.5
	Student	104	86.7
	Employed full-time	5	4.2
	Employed part-time	10	8.3
Using any Health care devices	Others	1	0.8
	Yes	38	31.7
	No	82	68.3

4.2. Validity and Reliability Measurements

The measurement model demonstrated strong reliability and convergent validity across all constructs related to international students' adoption of Korean sensor-based healthcare devices. All item loadings exceeded the recommended threshold of 0.70, indicating that each item contributed meaningfully to its respective construct. For the Performance Expectancy dimension, factor loadings ranged from 0.924 to 0.956, with Composite Reliability (CR = 0.966), Cronbach's (0.953), and AVE (0.876), confirming excellent internal consistency and convergent validity.

The Effort Expectancy construct also showed robust measurement properties, with loadings between 0.904 and 0.929, CR of 0.952, Cronbach's of 0.933, and AVE of 0.832. Social Influence performed similarly well, supported by loadings from 0.848 to 0.914, CR of 0.940, 0.915 and AVE of 0.796. Facilitating Conditions also demonstrated strong reliability, with loadings between 0.844 and 0.919, a CR of 0.938, a Cronbach's of 0.911, and an AVE of 0.790. The Behavioral Intention construct met all reliability standards, reflected in factor loadings of 0.895 to 0.936, CR of 0.955 to 0.937, and AVE of 0.840. Finally, the Trust dimension exhibited high measurement quality, with loadings between 0.840 and 0.896, a Composite Reliability of 0.926, Cronbach's of 0.894, and AVE of 0.757. Together, these results confirm that all constructs demonstrate satisfactory reliability and convergent validity, supporting their suitability for subsequent structural model analysis (Hair et al., 2019). A complete summary of measurement reliability and validity results is provided in Table 3

Table 3. Validity and Reliability Results

Items	Loading	CR	AVE	Cronbach's α
Performance Expectancy				
PE1	0.936	0.966	0.876	0.953
PE2	0.924			
PE3	0.956			
PE4	0.927			
Effort Expectancy				
EE1	0.906	0.952	0.832	0.933
EE2	0.909			
EE3	0.929			
EE4	0.904			

Social Influence				
SI1	0.901			
SI2	0.914			
SI3	0.904	0.940	0.796	0.915
SI4	0.848			
Facilitating Conditions				
FC1	0.874			
FC2	0.919			
FC3	0.917	0.938	0.790	0.911
FC4	0.844			
Behavioural Intention				
BI1	0.895			
BI2	0.917			
BI3	0.936	0.955	0.840	0.937
BI4	0.919			
Trust				
T1	0.890			
T2	0.896			
T3	0.852	0.926	0.757	0.894
T4	0.840			

Note: CR (Composite Reliability); AVE (Average Variance Extracted)

Discriminant validity was assessed using the Heterotrait Monotrait Ratio (HTMT), and all values fell below the recommended 0.85 threshold, confirming that the constructs are empirically distinct. For instance, HTMT values between Behavioral Intention and Effort Expectancy (0.617), Performance Expectancy (0.797), and Social Influence (0.791) were within acceptable limits. Predictor constructs also demonstrated satisfactory separation, with HTMT values of 0.729 (Effort Expectancy-Facilitating Conditions), 0.651 (Effort Expectancy- Performance Expectancy), and 0.758 (Performance Expectancy-Social Influence). Trust was likewise well differentiated from the other constructs, with HTMT values ranging from 0.499 to 0.681. The highest value in the matrix was 0.819 (Behavioral Intention-Facilitating Conditions), remaining below the 0.85 guideline. Overall, these results support adequate discriminant validity of the measurement model (Hair et al., 2019), with detailed HTMT values shown in Table 4.

Table 4. Discriminant validity (HTMT criterion)

	BI	EE	FC	PE	SI	T
BI						
EE	0.617					
FC	0.819	0.729				
PE	0.797	0.651	0.639			
SI	0.791	0.708	0.768	0.758		
T	0.557	0.581	0.681	0.499	0.560	

Note: BI (Behavioral Intention); EE (Effort Expectancy); FC (Facilitating Conditions); PE (Performance Expectancy); SI (Social Influence); T (Trust)

4.3. Structural Model

The structural model results offer valuable insights into the factors influencing international students' intention to adopt Korean sensor-based healthcare devices for their elderly family members. Among the four UTAUT predictors of Trust, only Facilitating Conditions had a significant positive effect ($\beta = 0.431$, $t = 3.729$), indicating that students' perception of sufficient resources, infrastructure, and support enhances their trust in these devices. The dominance of facilitating conditions can be partially explained by respondents' low Korean language proficiency and limited prior experience with healthcare devices. These constraints increase dependence on external support, multilingual interfaces, and system compatibility, thereby strengthening the role of facilitating conditions in trust formation. In contrast, Effort Expectancy ($\beta = 0.163$, $t = 1.363$), Performance Expectancy ($\beta = 0.081$, $t = 0.648$), and Social Influence ($\beta = 0.056$, $t = 0.468$) were not statistically significant, suggesting that perceived ease of use, usefulness, and social pressure alone do not meaningfully increase trust in this context, which is consistent with previous UTAUT-based studies that also reported non-significant effects for these constructs in technology and m-health adoption as found in several previous studies (Ayaz & Yanartaş, 2020; *Frontiers in Public Health*, 2022; *KoreaScience*, 2023).

Trust, in turn, showed a strong and significant positive effect on Behavioral Intention ($\beta = 0.536$, $t = 6.217$), highlighting its critical role in shaping students' willingness to recommend or introduce these healthcare technologies to their parents or elderly relatives. Overall, the

findings underscore Facilitating Conditions as the primary UTAUT driver of Trust and confirm Trust as a key determinant of adoption intention, emphasizing the importance of practical support and reliable technology in promoting cross-border use of Korean healthcare sensor devices. The non-significant effects of performance expectancy, effort expectancy, and social influence suggest that international students prioritize system readiness and support over perceived usefulness or ease of use when making health-related decisions for elderly relatives. This aligns with risk-sensitive decision-making theory, where reliability and support outweigh convenience factors.

Table 5. Hypothesis Test Results

Hypothesis	Variable	Path coefficients	Sted	t-statistic	Result
H1	EE -> T	0.163	0.120	1.363	Not Supported
H2	FC -> T	0.431	0.115	3.729***	Supported
H3	PE -> T	0.081	0.125	0.648	Not Supported
H4	SI -> T	0.056	0.120	0.468	Not Supported
H5	T -> BI	0.536	0.086	6.217***	Supported

Note: BI (Behavioral Intention); EE (Effort Expectancy); FC (Facilitating Conditions); PE (Performance Expectancy); SI (Social Influence); T(Trust); * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$

5. Implications and Conclusion

5.1. Theoretical Implications

This study advances technology adoption research by applying the UTAUT framework (Venkatesh et al., 2003) to a cross-border caregiving context in which international students make health-technology decisions for elderly relatives abroad. Contrary to previous studies where Performance Expectancy, Effort Expectancy, and Social Influence significantly predicted trust and intention (Kim et al., 2024; Liu et al., 2023; Wang et al., 2020), these factors did not influence trust in this context suggesting that usefulness, ease of use, and social persuasion alone are insufficient when decisions involve elderly safety and remote caregiving.

Instead, Facilitating Conditions were the only significant driver of trust, emphasizing the importance of system readiness and support such as language accessibility, technical assistance, and device compatibility (Soelasih et al., 2025; Jo et al., 2021). Consistent with prior findings, trust strongly predicted adoption intention due to concerns over safety, accuracy, and data protection in healthcare technology (Arfi et al., 2021; Wissawaswaengsuk et al., 2025).

Thus, this study enriches theoretical understanding by demonstrating that trust acts as the pivotal bridge between system readiness and behavioral intention in proxy adoption situations and highlights the need for contextual expansion of UTAUT in global healthcare technology markets involving remote caregiving and cross-border technology deployment. The findings support the conceptualization of trust as a mediating bridge rather than an independent driver, particularly in remote caregiving contexts where adoption decisions are risk-sensitive and responsibility-driven.

5.2. Managerial Implications

This study provides actionable insights for healthcare technology developers, exporters, universities, and policymakers in South Korea involved in the cross-border deployment of healthcare sensor technologies. Since facilitating conditions emerged as the only significant driver of trust, stakeholders should prioritize system readiness and support infrastructure over purely functional improvements. Strengthening facilitating conditions such as multilingual interfaces, remote technical assistance, and user training resources can enhance user confidence and acceptance, particularly in international and elderly care contexts where dependence on external support is high (Jo et al., 2021; Liu et al., 2023).

For healthcare technology developers and exporters, the findings suggest that building trust requires ensuring compatibility with commonly used devices, providing clear guidance for elderly users, and offering accessible overseas customer support. Such service-oriented strategies align with prior evidence that system accessibility and contextual support play a critical role in digital health acceptance (Jo et al., 2021; Liu et al., 2023). Universities hosting large international student populations can function as intermediary platforms that facilitate

trust formation. Campus-based demonstrations, trial programs, and informational sessions can help international students better understand device functionality and reliability before recommending healthcare sensor technologies to their elderly relatives. These trust-building initiatives are particularly important given the strong influence of trust on adoption intention in digital healthcare settings (Arfi et al., 2021; Wissawaswaengsuk et al., 2025).

From a policy perspective, policymakers should focus on strengthening institutional trust through clear regulatory frameworks, international device certification, and robust data protection standards. Policy-driven initiatives that promote transparency, safety assurance, and cross-border interoperability can further reinforce confidence in Korean-made healthcare sensor technologies, especially when adoption decisions are made on behalf of vulnerable populations such as elderly family members (Kim et al., 2024).

Overall, by enhancing global compatibility, accessibility, and continuous user support, stakeholders can foster trust and encourage international students to adopt Korean-made healthcare sensor technologies for elderly family members abroad, consistent with prior digital health adoption research (Arfi et al., 2021; Wissawaswaengsuk et al., 2025).

5.3. Conclusion, Limitation and Future Studies

This study examined international students' adoption intention of Korean-made healthcare sensor technologies for elderly relatives abroad using the UTAUT framework with trust as a mediating variable. The results revealed that Facilitating Conditions significantly influenced trust, which in turn strongly predicted adoption intention. However, Performance Expectancy, Effort Expectancy, and Social Influence did not show significant effects on trust in this cross-border caregiving context. These findings emphasize the critical role of practical support and service accessibility in enabling trust and technology acceptance when users are responsible for remote caregiving decisions involving vulnerable family members.

Despite valuable contributions, this research has several limitations. First, the study applied convenience sampling within a single country, limiting the generalizability of the results across the wider international student population. Second, the investigation focused solely on

behavioral intention rather than actual adoption or long-term usage behavior. Third, the survey used English only, which may not fully reflect the perspectives of those with limited English proficiency. Additionally, the study examined only trust as a mediating factor, while other variables (e.g., perceived risk, cost, emotional stress of caregiving) may also be influential.

Future studies are encouraged to include broader and more balanced samples of international students across multiple host countries. Expanding the model to incorporate perceived risk, affordability, family health conditions, or digital literacy of the elderly user could deepen the understanding of proxy adoption behavior. Longitudinal studies tracking actual device usage over time would also offer stronger predictive insights. Finally, integrating perspectives from the elderly recipients themselves may provide a more comprehensive evaluation of acceptance in remote caregiving settings.

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