

The Impact of AI-Powered Health Monitoring on the Quality of Life and Social Participation of the Elderly: Technology Acceptance Model Perspective

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Abstract

This article mainly explores the use of AI intelligent health monitoring by elderly in Taiwan and uses the technology acceptance model. It uses literature analysis and fuzzy analytic hierarchy process as research methods to conduct a FAHP questionnaire survey among elderly in Tainan, Taiwan. The theory considers perceived ease of use, Perceived usefulness, attitude and behavioral intention, and through calculation of the relative weights between various dimensions, the study found that after the introduction of AI intelligent health monitoring, elderly can not only effectively obtain personalized health advice, but also because it is easy to operate, making the elderly think that AI intelligent health monitoring is helpful. In addition, with the support of the government and family members, it will be easier for the elderly to accept AI intelligent health monitoring, effectively manage their health, improve their quality of life, and actively participate in social activities.

Keywords : AI-Powered Health Monitoring, Elderly, TAM, Quality of Life, Social Participation

1. Introduction

In recent years, artificial intelligence (AI) has been able to overcome the huge intensive computing technology and creative limitations required by humans due to the advent of big data, and open up new application areas in the fields of education, marketing, healthcare, finance and manufacturing, thus affecting productivity and performance. have an impact [1]. However, the acceptance of emerging technologies by elderly remains to be explored. This study takes the elderly as the research object of AI intelligent health monitoring, and explores the acceptance of the use of AI intelligent health monitoring by the elderly, so as to further achieve independent health management, improve the quality of life, and actively participate in social activities. The research will use the technology acceptance model and the combined hierarchical analysis method to analyze the acceptance of AI intelligent health monitoring by the elderly and identify the influencing factors. The results of this study will help to understand the attitudes and needs of the elderly towards AI smart health monitoring, and serve as a reference for the government's subsequent promotion of smart elderly policies and the development of monitoring equipment or technology by related industries, so as to promote the wisdom of health care for the elderly. development and health and well-being.

2. Literature Review

An aging society has arrived, and the elderly have increasing needs for chronic diseases and daily monitoring.

Artificial intelligence (AI) can effectively use predictive analysis to identify high-risk individuals with diseases

such as diabetes, heart disease, and dementia. Medical providers can take appropriate care measures in a timely and specific manner [2], so AI intelligent health monitoring technology has become quite important. AI intelligent health monitoring has a wide range of applications, including physiological data monitoring (such as heart rate, blood pressure, blood oxygen, etc.), health advice generation, remote medical support and health assessment, which can effectively help elderly identify health risks early and take preventive measures, tailor-made exclusive exercise prescriptions for sarcopenia, frailty, etc. to reduce the risk of accidents and ensure the safety of daily life.

In addition, high demand for care may lead to social isolation of elderly [3]. Therefore, interaction between family members, professionals (such as fitness coaches) or caregivers is very important for elderly' acceptance of new technologies. Through social support and community internet can enable elderly to connect with people with similar experiences, thereby increasing their sense of social belonging [4], prompting elderly to continue socializing and participating in various activities, and reducing loneliness . Therefore, Tainan City, Taiwan, will launch a "movement campaign" in 2022 "Technology Application and Industrial Development" project combines social support with technological sports models to introduce wearable devices and sports equipment to 9 elderly fitness clubs across the city. This not only improves the convenience of elderly using AI smart health monitoring, but also inspires social participation motivations of elderly.

This study uses the Technology Acceptance Model (TAM) as the research framework, which was proposed by Davis

(1986) as a theoretical model to explain individuals' acceptance of information technology. The main core of TAM is that an individual's acceptance of technology is affected by two factors: perceived usefulness and perceived ease of use. These two factors in turn affect an individual's attitude towards technology, and lead to an individual's behavioral intention and final actual use [5].

AI intelligent health monitoring allows elderly to continue to improve their health and quality of life through health management monitoring and exercise training recommendations. It is also actively recommended to peers due to the promotion of government policies and their own benefits, allowing elderly to increase their social participation. Sense of participation [6]. However, overly complex operations or poorly thought out designs may lead to psychological rejection among elderly, affecting their acceptance and willingness to use them. Therefore, simplifying functions such as operating interfaces can help elderly accept new technologies more easily [7].

Finally, pursuing a healthy life is not something that can be achieved overnight [8]. However, as the elderly gradually accept AI intelligent health monitoring, and through continuous monitoring, reminders and suggestions, various health problems can be improved, and the health management capabilities of the elderly can be strengthened.

Reduce the need for medical care and actively participate in social activities to improve quality of life.

3. The construction of the acceptance of AI intelligent health monitoring among elderly

3.1. Research Framework

This study used a comprehensive focus group (Focus Group) to invite 20 scholars and industry experts with expertise in AI intelligent monitoring, health sports and elderly research experts. The discussion results are shown in Table 1 to determine the acceptance of AI intelligent health monitoring by elderly. The hierarchical structure includes five major dimensions and fifteen evaluation indicators, as shown in (Fig. 1).

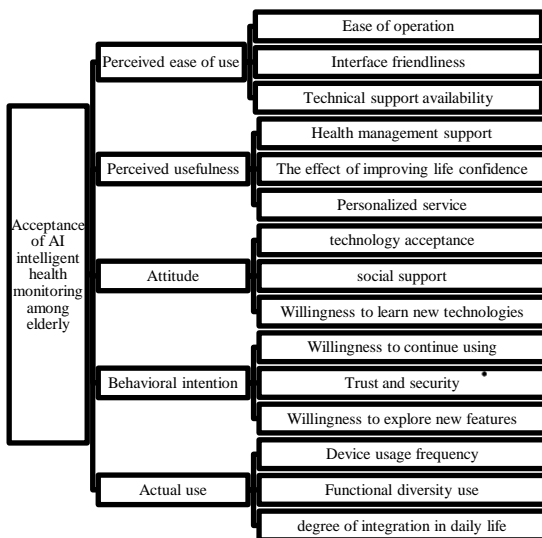


Fig 1 The hierarchical structure of the acceptance of AI smart health monitoring among elderly

Table 1. Comprehensive focus group discussion results

Facets	Facet Overview	Evaluation indicators	Assessment elements
Perceived ease of use	To explore the opinions of elderly on the difficulty of operating smart health monitoring technology.	Ease of operation	Evaluate how difficult it is for elderly to learn and operate AI smart health monitoring equipment and whether it is consistent with their daily habits and cognitive abilities.
		Interface friendliness	Check whether the design of the AI smart health monitoring device or application interface is simple, clear, and easy to understand and use.
		Technical support availability	Confirm whether elderly can receive real-time technical support when operating AI smart health monitoring.
Perceived usefulness	the extent to which elderly think smart health monitoring technology helps health management and quality of life	Health management support	In the process of health management, AI intelligent health monitoring provides various assistance, encouragement and resources to help individuals achieve and maintain health goals. .
		The effect of improving life confidence	Will the use of AI intelligent health monitoring increase the confidence of elderly in controlling their health, thereby improving their ability to live independently?
		Personalized service	AI intelligent health monitoring provides exclusive suggestions based on individual health needs, which can increase the willingness of elderly to use it and make them feel valued and cared for.
Attitude	Assessing the positive or negative attitudes of elderly towards smart health monitoring technology.	Technology acceptance	Do elderly actively accept AI smart health monitoring and consider it a useful resource in life?
		social support	The support of family and community can promote the positive attitude of elderly towards new technologies and encourage them to actively use AI intelligent health monitoring.
		Willingness to learn new technologies	Are elderly willing to invest time and energy in learning AI intelligent health monitoring and adapting to new health management technologies?
Behavioral intention	To explore the willingness and motivation of elderly to use smart health monitoring technology in the future.	Willingness to continue using	Are elderly willing to use AI smart health monitoring devices for a long time?
		Trust and security	Whether concerns about data privacy and security affect willingness to use.
		Willingness to explore new features	Are elderly willing to try the new features of their devices to further improve their quality of life?
Actual use	Analyze the actual use of smart health monitoring technology by elderly, including frequency of use and functional scope.	Device usage frequency	How often do elderly use AI smart health monitoring every day or every week, and whether they have formed stable usage habits.
		Functional diversity use	Do elderly use the various functions of AI intelligent health monitoring, such as physiological monitoring, emergency contact and health advice?
		degree of integration in daily life	Evaluate whether AI intelligent health monitoring has been integrated into daily life and provides obvious support for daily activities.

3.2. Research Subjects

In order to investigate the use of AI technology to integrate service innovation by Taiwanese elderly industry players, this paper takes the elderly who are using AI intelligent health monitoring in Tainan, Taiwan as the research object, and uses purposive sampling as the subjects of the FAHP questionnaire. In addition, before conducting the FAHP questionnaire survey in this paper, the researcher first explained the purpose of this paper to these FAHP questionnaire subjects, and conducted the FAHP questionnaire survey on the elderly who were willing to assist in the FAHP questionnaire survey.

4. Empirical Result of AI-Integrated Service Innovation Models

This paper further multiplies the five evaluation indicators with their respective dimensions, and the resulting value is the comprehensive weight.

Table 2 is the comprehensive weight of AI intelligent health monitoring acceptance.

Table 2. The comprehensive weight of AI intelligent health monitoring acceptance

Facets	weight	Evaluation indicators	weight	Comprehensive weight
perceived ease of use	0.209	Ease of operation	0.572	0.120
		Interface friendliness	0.263	0.055
		Technical support availability	0.165	0.034
perceived usefulness	0.302	Health management support	0.559	0.169
		The effect of improving life confidence	0.253	0.076
		Personalized service	0.188	0.057
Attitude	0.232	Technology acceptance	0.501	0.116
		Social support	0.315	0.073
		Willingness to learn new technologies	0.184	0.043
behavioral intention	0.141	Willingness to continue using	0.511	0.072
		Trust and security	0.307	0.043
		Willingness to explore new features	0.182	0.026
Actual use	0.116	Device usage frequency	0.472	0.055
		Functional diversity use	0.329	0.038
		Degree of integration in daily life	0.199	0.023

CI<0.1, CR<0.1

The most important evaluation indicators recognized by experts in AI intelligent detection, health sports and elderly research are "Supportability health management" (the comprehensive weight is 0.169) and "Ease of operation" (the comprehensive weight is 0.120 ranking Second), the third is "Technology acceptance" (the comprehensive weight is 0.116), the fourth is "The effect of improving life confidence" (the comprehensive weight is 0.076), and the fifth is "Social support" (the comprehensive weight is 0.073), and the evaluation indicators ranked sixth to fifteenth are: "willingness to continue using" (the comprehensive weight is 0.072), "Personalized service" (the comprehensive weight is 0.057), "Interface friendliness" (the comprehensive weight is 0.055), "Device usage frequency" (the comprehensive weight is 0.055), "Trust and security" (the comprehensive weight is 0.043), "Willingness to learn new technologies" (the comprehensive weight is 0.043), "Functional diversity use" (The comprehensive weight is 0.038), "Technical support availability" (the comprehensive weight is 0.034), "Willingness to explore new features" (the comprehensive weight is 0.026), and "Degree of integration in daily life" (the comprehensive weight is 0.023).

5. Conclusions and Recommendation

This study found that through the Technology Acceptance Model (TAM) and FAHP questionnaire survey, the acceptance of AI intelligent health monitoring among elderly can indeed effectively improve the quality of life and social participation. AI intelligent health monitoring can not only continuously monitor the physiological conditions of elderly, but also provide various management suggestions based on different health conditions, so that

elderly are willing to improve their physical health, enhance their quality of life and participate in social activities. However, in order to benefit more elderly, strategies to promote and increase the acceptance of AI smart health monitoring should be strengthened in the future to further promote healthy aging.

Therefore, in order to promote the popularization of AI intelligent health monitoring, this study recommends starting from the following dimensions:

5.1 Health management support

Because the elderly can understand their physiological status in real time through AI intelligent health monitoring, and cooperate with their own personal health management plans, they can manage their health goals more accurately.

Therefore, health management support should focus on the accuracy of data analysis and immediate response to abnormal physiological phenomena to ensure that elderly can take preventive health measures, enhance their confidence and control over health management, reduce the number of medical visits, and improve Take care of yourself. For example, conduct pattern analysis based on historical data, set personalized warning ranges, and stimulate motivation to participate in health management by setting personalized daily step goals or diet plans.

5.2 Ease of operation

The ease of use of AI intelligent health monitoring technology is an important factor influencing the use of it by elderly. Research shows that when the operating interface is clear, simple and easy to operate, it can reduce the user's learning curve and make it easier to operate new technologies. Therefore, for elderly, a more intuitive user interface and appropriate technical support can effectively reduce their rejection of AI smart health monitoring and increase their intention to use it. For example, set up a voice assistance system that allows users to operate in natural language or present it with clear icons (such as a heart-shaped icon representing heart rate data) to simplify text descriptions.

5.3 Technology acceptance

According to the Technology Acceptance Model (TAM), perceived usefulness and perceived ease of use are the core of technology acceptance. Therefore, the acceptance of AI smart health monitoring by elderly is closely related to their understanding of the system's practicality and ease of operation. In addition, in recent years, the elderly have paid more and more attention to health management, especially chronic disease management and daily health monitoring.

Therefore, providing accurate real-time data and corresponding treatment suggestions through AI intelligent health monitoring can make the elderly more accepting of AI intelligence. Health monitoring and continuous health management for yourself. For example, a simple mode is set up to gradually guide elderly to become familiar with core functions and provide various teachings. In addition, interactive lectures and demonstrations are used to

showcase technologies on how to improve health management.

5.4 The effect of improving life confidence

As age increases, various health functions gradually decline. For elderly, effective AI intelligent health monitoring technology can reduce elderly' anxiety about their health and promote self-confidence. Establish.

Through the complete analysis and positive feedback of AI intelligent health monitoring data, in addition to creating personalized intelligent health promotion plans, it can also enable elderly to better understand their physical conditions and maintain autonomy and enthusiasm in their daily lives. For example, set small goals and feedback, set achievable health goals in stages, and provide positive feedback or use AI to simulate professional health consultants to provide real-time answers and suggestions.

5.5 Social support

Through the promotion of AI smart health monitoring related devices and government and community policies, elderly can be encouraged to participate in online and offline community activities. In addition to reducing the loneliness caused by aging, they can also gain support from their peers. participation, thereby enhancing the sense of belonging of the elderly. For example, design activities such as "daily step challenge" or "walking competition", where participants can track their progress and compare with others, or hold special lectures to provide knowledge on chronic disease management, exercise guidance, etc., and set up real-time interactive Q&A sessions.

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