

# A Study on Technology Acceptance Model of Smart Homes for Future Elderly: From the Perspective of Perceived Value and Perceived Risk

劉, 玉琪

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Name: リュウ ギョクキ (Liu Yuqi)

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—From the Perspective of Perceived Value and Perceived Risk  
(将来の高齢者のためのスマートホームの技術受容モデルに関する研究  
—知覚価値と知覚リスクの観点から)

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### Abstract of Dissertation

Smart home, as one of the most prosperous industries of the Internet of Things, has tremendous potential in helping the elderly aging in place and dealing with the challenges of aging society. However, compared with the optimistic estimates of related industry and academia, currently, the acceptance and market penetration of smart homes for the elderly stays extremely low. The essential problem is that the existing smart home products and services for older adults could not meet their core value demand, and the application of technology and service delivery have not been able to eliminate or reduce their worries and perceived risks. As the most populous country in the world, China is one of the countries with the fastest aging process in the world. In the upcoming future, China will become the country with the most aging population globally which will bring a huge burden to the Chinese government and society. A huge base of aging population also indicates that there is an enormous blue ocean of business opportunities in the Chinese aging industry.

Targeted on the future elderly aged from 45-60 in China, this research develops the perceived value and perceived risk scales of smart homes for future elders by following the standard scale development process. The perceived value scale is consisted of perceived benefit and perceived cost scale, among which the perceived benefit scale contains eight factors with the integration of the PERMA-V wellbeing model, they are independence, healthcare, safety, positive emotion, engagement, relationship, meaning, and achievement, in total 38 measurement items; the perceived cost scale consists of three factors, namely monetary cost, study cost, and space cost, in total 15 items. And the perceived risk scale is made up of ten factors, namely privacy & security risk, physical risk, technological risk, performance risk, service risk, financial risk, psychological risk, industry & market risk, social support risk, policy & law risk, in total 70 items. The combination of these two scales could comprehensively evaluate the elderly's perception of smart homes from the value creation and risk avoidance perspective. Moreover, based on the development of perceived value and perceived risk scales, this study further develops a smart home technology acceptance model for the elderly by using perceived value and perceived risk as

the core variables through structural equation modeling. The result shows that the perceived benefit has a significantly positive effect on the attitude of future elders toward smart home using, which will further affect their behavioral intention to use. In contrast, the perceived cost and perceived risk exert a mainly negative effect in the model. Thus, maximizing the perceived benefit in the eight dimensions mentioned above, as well as controlling, reducing, or eliminating perceived risk and perceived cost is the core principle to improve the acceptance and adoption of smart homes for future elders.

The research breaks through the limitation of the conventional technology acceptance model and makes the value evaluation and risk assessment of high-tech applications for the elderly group much more precise and profound. The results of this research can provide guidelines and help corresponding designers, developers, industry practitioners, and policymakers to accurately grasp the value needs of the elderly and clarify the potential risks that should be avoided during the products and service development and delivery process. So that the maturity and market penetration of the smart home industry for older adults could be improved, the social pension burden could be relieved, and the all-around wellbeing of the elderly could be promoted, which endow the research with crucial theory and practice value.