The impact of utilizing care robots on sustainability

S. H. Park, M. R. Choi, H. Y. CHO, J. H. Kim, S. C. Lee, D. Y. Jung

Purpose The recent increase in the elderly population has led to a growing demand for nursing services. In response, new care robots, utilizing digital technologies, have been developed, offering delicate and precise caregiving services that were previously impossible. However, stakeholders such as the elderly, their families, and caregivers, have low awareness of digital technologies and face difficulties accessing them due to factors such as prices. In this study, the user experience of care robots becomes crucial. The user experience of care robots refers to various factors such as emotions, perceptions, cognitive outcomes, and frequency of use gained while using the product (Turja et al., 2020). Aforementioned, it is important to investigate how the user's experience of using care robots directly influences satisfaction and sustainability. **Method** This study, a survey was administered to caregivers in three nursing facilities after the caregivers used care robots for one week. The survey aimed to assess satisfaction and sustainability. Data acquisition took place from October 1st, 2023, to November 30th, 2023. Researchers collected a total of 80 surveys through direct visits. Pearson's correlation analysis was conducted to examine the relationship between variables. Cronbach's α coefficient and exploratory factor analysis were employed to analyze the reliability and validity of the survey instrument. Additionally, to verify the impact of caregiving robot user experience on sustainability, regression analysis was performed using Process Macro Model 4. **Results and Discussion** The demographic characteristics of the caregivers, 42 people had less than 4 years of experience as caregivers in nursing and 38 people had more than 5 years of experience. The Pearson's correlation analysis, significant correlations between variables were confirmed. Exploratory factor analysis yielded a total of 6 factors. The Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy was .783, degree of freedom 210, indicating an acceptable level, and Bartlett's test of sphericity showed a significance level of .000. Furthermore, Cronbach's α coefficient values of .734, indicate satisfactory reliability. Table 1 summarizes the results of hypothesis testing from regression analysis, showing that caregiving robot usage experience had a significant influence on both satisfaction (t=4.3182, p<0.01) and sustainability (t=6.4187, p<0.01). However, satisfaction did not significantly affect sustainability (t=-.2954, p>0.76). The study findings suggest that the advancement of care robots technology will play a crucial role in the future of elderly care and caregiving services. But, lack of significant association between satisfaction and sustainability can be attributed to the several following reasons. The first, limited utilization of various functional aspects of care robots may have hindered the acquisition of sufficient benefits in terms of sustainability. Secondly, the pursuit of short-term satisfaction without considering long-term impacts due to insufficient usage experience of care robots might have contributed to the lack of significant sustainability. Finally, prioritization of economic benefits due to the high purchase cost of care robots may have overshadowed considerations of sustainability. In conclusion, extensive research is needed to explore the long-term impacts of care robot usage experience on caregivers.

References

Turja, T., Aaltonen, I., Taipale, S., & Oksanen, A. (2020). Robot acceptancemodel for care (RAM-care): A principled approach to the intention to use care robots. *Information & Management, 57*(5), 103220. https://doi.org/10.1016/j.im.2019.103220

Table 1. Results of hypothesis testing

Table	hypothesis	(β)	(S.E)	t-value	p-value	Confidence interval (95%)	
						LLCI	ULCI
H 1	Experience of care robot → Satisfaction	.5992	.1387	4.3182	.0000	.3229	.8754
H 2	Experience of care robot → Sustainability	.9676	.1507	6.4187	.0000	.6675	1.2677
H 3	Satisfaction → Sustainability	−.0366	.1237	−.2954	.7685	−.2830	.2099