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Factors Affecting Elder Generation' Satisfaction With Smart Care in China

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Abstract

The process of digital modernization in the area of smart care, driven by smart care, has produced tremendous respect and better life for elders throughout the world. In an environment where the population is getting older, elder care has drawn social attention in China. Encouraging the elderly to engage with the smart care system and live improved quality of life have become social priority. We aimed to analyse the needs of elder generation in care and to explore the factors affecting elder generation's satisfaction with smart care in China. It conducted a quantitative study of 114 respondents' satisfaction with smart care by using a survey method. The results show that smart care has attracted increasing attention among the elder generation in the past few years. The focus of the thesis is about issues and analysis of shift concerning elders' satisfaction with smart care. The results of the study fill the gap that was identified. Therefore, according to the research results, changes can be made in robot design, age-friendly interaction, data monitoring, reliability, easy operation and reaction time to meet the needs and expectations of care for the elder generation.

Key words: Smart care; Elder generation; Satisfaction; Digital modernization

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1. INTRODUCTION

The World Health Organization (WHO) projects that by 2050, the percentage of adults over 60 will have doubled, from 11% in 2006 to 22%. In this regard, the world is confronted with significant social difficulties since the sustainability of care is under higher pressure due to the aging population. Retirement is expected to reach 70 years until 2060 in an increasing number of countries in the world. The decreasing capacity of the workforce and the increasing demand of managing comorbidities and chronic illnesses drive the aging generation towards a smart and sustainable future in terms of industry 4.0. A smart elder care system is becoming more and more popular as the digital world evolves quickly. It is of great significance to develop an understanding of what motivates the elder generation' satisfaction with smart care. Additionally, to improve the level of the elder's satisfaction, the relevant industry will grasp the new direction by updating robot design, age-friendly interaction, data monitoring, reliability, easy operation and reaction time for a smart and sustainable future in the context of digital modernization.

1.1 Research Objective

The study has a clear system of research objective to make it accepted and completed and as follows:

1.1.1 General Objective

To study satisfaction of the newly and continuously updated smart care among the elder generation in China.

1.1.2 Specific Objectives

(i). To examine the level **robot design (RD)** among the elder generation in China.

(ii). To examine the **age-friendly interaction (AI)** among the elder generation in China.

(iii). To examine the level of **data monitoring (DM)** among the elder generation in China.

(iv). To examine the **reliability (R)** among the elder generation in China.

(v). To examine the **easy operation (EO)** among among the elder generation in China.

(vi). To examine the **reaction time (RT)** among among the elder generation in China.

1.2 Research Questions

The paper aims to address the research questions as follows:

RQ (i): What is the relationship between **robot design (RD)** and elder generation's **satisfaction (S)** with smart care in China?

RQ (ii): What is the relationship between **age-friendly interaction (AI)** elder generation's **satisfaction (S)** with smart care in China?

RQ (iii): What is the relationship between **data monitoring (DM)** and elder generation's **satisfaction (S)** with smart care in China?

RQ (iv): What is the relationship between **reliability (R)** and elder generation's **satisfaction (S)** with smart care in China?

RQ (v): What is the relationship between **easy operation (EO)** and elder generation's **satisfaction (S)** with smart care in China?

RQ (vi): What is the relationship between **reaction time (RT)** and elder generation's **satisfaction (S)** with smart care in China?

2. FRAMEWORK AND LITERATURE REVIEW

There are numerous factors that affect the elder's satisfaction with smart care, which probably come from robot design, age-friendly interaction, data monitoring, reliability, easy operation and reaction time. From the perspective of an elder adult, the behavior of receiving smart care depends on the following factors. They may have a quick access of smart care in the context of Industry 4.0. Furthermore, smart elderly care has become immensely popular as it is an incredibly effective way to mitigate the imbalance between the requirement of service and the supply available in elderly care industry (Xiaoyun Liu, 2023).

2.1 Smart care

An integrated Smart care system is an effective way to improve the quality of life of the elderly. To address the care condition of the elder, smart care system with an integration of various spontaneous data which is transmitted to the big database and then robot or hospital care in a synchronous manner as seen in Figure 1.

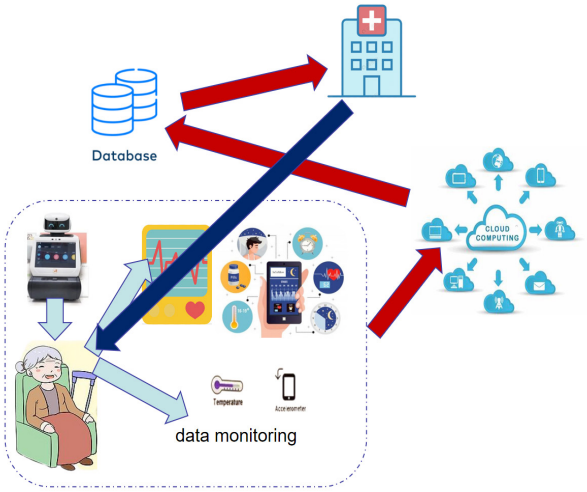

Figure 1
Smart Care System for the Elder

2.2 Satisfaction

Satisfaction is an emotional attitude that is generated when the actual feelings of the smart care are compared with expectations. Additionally, satisfaction with smart care affects elder's behavioral intentions of the increasingly popular means of life after their retirement (Guanyu Lin *et al.*, 2023). Satisfaction is defined by the dictionary as a state of liking or satisfaction without shortage. Furthermore, satisfaction has been defined and studied in a variety of research studies in areas such as business administration and tourism (Seung Wan Ju, 2021). As smart care industry for the elder is a prospect in the next three or four decades, it is also appropriate to study the area using the satisfaction perception. Therefore, the attitude towards technology is integral and vital to the study of elders' satisfaction with smart care.

2.3 Robot design

Robot design contains major two items for the preliminary objective of the design, which has functions in deployments of robots for elder care(Gianluca Bardaro, Alessio Antonini, Enrico Motta,2022). It is defined by how robots have yet to succeed as personal assistants in daily life among the elder. Robots in healthcare range from a great number of areas including family applications: surgical robots, hospital management support, healthcare worker and robot cooperation, patient interactions, physical and mental rehabilitation, home assistance, smart prevention and more.

2.4 Age-friendly interaction

Long-term conditions of care scenario makes it possible to close the gap between the elder and the smart care mechanism while rich and varied activities are done through technical interaction compared to the traditional care for the elder.(Christine Hine, 2022). Effective interaction and communication can create beneficial interaction and produce emotional as well as medical care for timely analysis.

2.5 Data monitoring

It produces unique interaction between the elder and care mechanism by monitoring and reminding sleep duration, how many times users wake up at night in a flexible way. Data monitoring is connected with the adaptation of artificial intelligence (AI) with a combination of robots as is mentioned.

2.6 Easy operation

Easy operation in the process of adopting smart care involves a significant factor that has impacts on acceptance of smart care while ease of use in service or equipment among the elder in the wholesome close-loop.

2.7 Reliability

Reliability refers to the ability to deliver expected standard at all time, how the smart care organization handles elder services problem, performing right services for the first time, providing services. (Kennedy Chinedu Okafor,2022)

2.8 Reaction time

Through smart care system with combination of concerning cloud computing, the elder generation can adopt smart care without the limitations of space and time. This study provides preliminary evidence for the use of the SMART protocol as a feasible, reliable, and valid assessment method to monitor cognitive performance in cognitively intact and MCI older adults (Dorociak, 2021).

2.9 Research Model

In addition, the hypotheses are put forward according to elements of each variable that will have a significant effect on elder generation's satisfaction with smart care as follows:

Hypothesis 1 Robot design of smart care will have a significant influence on elder generations' satisfaction with smart care.

Hypothesis 2 Age-friendly interaction will have a significant influence on elder generations' satisfaction with smart care.

Hypothesis 3 Data monitoring of smart care will have a significant influence on elder generations' satisfaction with smart care.

Hypothesis 4 Reliability of smart care will have a significant influence on elder generations' satisfaction with smart care.

Hypothesis 5 Easy operation of smart care will have a significant influence on elder generations' satisfaction with smart care.

Hypothesis 6 Reaction Time will have a significant influence on elder generations' satisfaction with smart care.

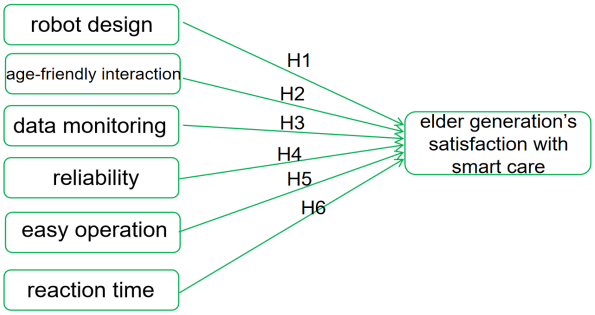

Figure 2
Research Model (Liu *et al*., 2020).

3. RESEARCH METHODOLOGY

Research methodology included several steps with a representative sample was selected and the survey was conducted; finally, data were analyzed and the model validity was evaluated (Vasić1, Kilibarda, & Kaurin, 2019).

The research approach adopted in this study is quantitative. The survey instrument included demographics characteristics and basic information about satisfaction of adopting smart care with measurement items on a 5-point Likert scale (DO and DO, 2020).

4. RESULTS AND DISCUSSIONS

This study involves a relatively large sample (114 respondents) and therefore, the Central Limit Theorem could be applied and hence there is no question on normality of the data. In order to determine the presence of multicollinearity among independent variables in this study. These methodologies involved calculation of both a Tolerance test and Variance Inflation Factor (VIF) (Kleinbaum *et al.*, 1988). The results of these analyses are presented in Table 1. As can be seen from this data, none of the Tolerance levels is greater than or equal to .01; and ii) all VIF values are well below 10. Thus, the measures selected for assessing independent variables in this study do not reach levels that indicate multicollinearity. The acceptable Durbin - Watson range is between 1.5 and 2.5. In this analysis Durbin - Watson value of 1.862, which is between the acceptable ranges, shows that there are no auto correlation problems in the data used in this research. Thus, the measures selected for assessing independent variables in this study do not reach levels indicating multicollinearity. (Alam Uni, Mohd. and Yasin, 2010)

Data for this study was gathered in April 14th-May 6th 2024 by primary data collection method through the elder generation survey administered among elder generation over 60 years. The respondents were gathered data from a secondary vocational school and a vocational university in Shenzhen, China. A total of 121 questionnaires

were distributed but only 114 are usable. Most of the respondents are females. 12.9 percent were between the age of 70 and 79. 12.2 percent of them were between the age of 80 and above. And 74.9 percent were between 60 and 69.

4.1 Correlation analysis

In statistics, Pearson Product-Moment Correlation Coefficient is sometimes referred to as PMCC. It is usually expressed in R or ρ.), The value range is between [-1,+1]. When R is greater than 0, it means that the two variables are positively correlated, and when R smaller than 0 indicates a negative relationship between the two variables. When the absolute value of R is less than 0.3, it means that the two variables are basically irrelevant; when the absolute value of R is between 0.3-0.5, it means that the two variables are low. The two variables are moderate. When the absolute value of R is greater than or equal to 0.8, it means that the two variables are highly correlated. P value (also known as significance value or Sig. value). For correlation analysis, the general specified table format is: P value uses*number representation (identified in the upper right corner of the correlation coefficient), P < 0.01 uses 2*numbers to indicate; P < 0.05 uses 1*number.

Dimensions include robot design, age-friendly interaction, data monitoring, reliability, easy operation and reaction time and satisfaction.

robot design 1

Age-friendly interaction 0.657 ** 1

Data monitoring 0.182 0.538 ** 1

reliability 0.254 ** 0.355 ** 0.194* 1

Easy operation 0.316 ** 0.332 ** 0.156 0.247 ** 1

Reaction time 0.204* 0.369 ** 0.454 ** 0.189* 0.418 ** 1

satisfaction 0.637 ** 0.835 ** 0.629 ** 0.513 ** 0.616 ** 0.714 ** 1**.

Table 1
Correlation

Dimension	Robot design	Age-friendly interaction	Data monitoring	Reliability	Easy operation	Reaction time	Satisfaction
Robot design	1						
Age-friendly interaction	0.657**	1					
Data monitoring	0.182	0.538**	1				
Reliability	0.254**	0.355**	0.194*	1			
Easy operation	0.316**	0.332**	0.156	0.247**	1		
Reaction time	0.204*	0.369**	0.454**	0.189*	0.418**	1	
Satisfaction	0.637**	0.835**	0.629**	0.513**	0.616**	0.714**	1

**. At the level 0.01 (double tail), the correlation is significant.
*. At the level 0.05 (double tail), the correlation is significant.

In order to study the relationship between robot design, age-friendly interaction, data monitoring, reliability, easy operation and reaction time, and satisfaction, the analysis method is used for research. The analysis results are as shown in the table above. The significance value is less than 0.01. The correlation coefficients are more than 0, indicating that there is a very significant positive correlation between the dimensions of each dimension. Compared with the correlation coefficients of each dimension, we can see that age-friendly interaction (0.835) has the greatest impact on satisfaction, followed by reaction time (0.714), robot design (0.637), data monitoring (0.629), easy operation (0.616) and reliability (0.513) .

4.2 Return analysis

Table 2
Regression analysis

Model		Unstandardized coefficients		Standardized coefficients	t	Sig.	Collinearity statistics	
		B	Standard error (S.E.)	Beta			tolerance	VIF
1	independent variables	-0.006	0.001		-3.861	0.000		
	robot design	0.118	0.000	0.188	350.860	0.000	0.517	1.935
	age-friendly interaction	0.295	0.001	0.347	544.848	0.000	0.365	2.740
	data monitoring	0.118	0.000	0.184	364.328	0.000	0.581	1.722
	reliability	0.118	0.000	0.187	449.802	0.000	0.855	1.170
	easy operation	0.117	0.000	0.227	508.714	0.000	0.744	1.344
	reaction time	0.235	0.000	0.334	708.680	0.000	0.667	1.498

a. Dependent variable：satisfaction
R^2=1，adjusted R^2=1
F=1124286.856，sig.=0.000
DW=2.049

In order to further the exploration of the correlation between variables, the method of multi-linear regression analysis was used. The detailed analysis results are shown in the table above. Because independent variables are satisfaction, independent variables are robot design, age-friendly interaction, data monitoring, reliability, easy operation and reaction time, perform F test of the model, (the model passes the F = 1124286.856, P = 0.000 <0.01), which indicates that robot design, age-friendly interaction, data monitoring, reliability, easy operation and reaction time have impacts on satisfaction. The R^2 is 0.1, and the adjusted R^2 is 1, which means that the variable has a 100% explanation reasons for variables.

For the multi-linearity of the model, the VIF value in the model is less than 5, which means that there is no common linear problem. And the D-W value is near Digital 2, indicating that which is between the acceptable ranges. Therefore, it shows that there are no auto correlation problems in the data used in this research. All these indicate that the model is well constructed.

4.3 Practical implications

It can be seen that through analyzing the regression coefficient of the independent variable can be seen that the significance value of robot design, age-friendly interaction, data monitoring, reliability, easy operation and reaction time is less than 0.05, which shows that the robot design, age-friendly interaction, data monitoring, reliability, easy operation and reaction time have positive effects on satisfaction.

To establish a regression model:

Y=-0.006 +0.118*x1 +0.295*x2 +0.118*x3 +0.118*x4 +0.117*x5 +0.235*x6

Y = Satisfaction

X1 = Robot Design

X2 = Age-friendly Interaction

X3 = Data Monitoring

X4 = Reliability

X5 = Easy Operation

X6 = Reaction Time

Compared with the value of standardization regression coefficient (BETA), the level of impact that each independent variable has on satisfaction ranks as follows:

age-friendly interaction > reaction time > easy operation > robot design > reliability > data monitoring.

4.4 Summary

To sum up, technical interaction between the elder and smart care mechanism is the most important factor to increase the elder generation's satisfaction in aged care context.

Due to the easy access of smart care, smart service can take place any time anywhere. Time saving is vital but a less important reason that attracts a huge variety of visitors around the globe than the primary motivation from technical interaction.

Seen from the results, smart care applications offer visitors a great number of location-specific information which attracts visitors attention (Cèsar Carreras and Federica Mancini, 2014). However, the arousal of technical uniqueness brought by smart care seems to be more appealing than information characteristics. By conducting this survey, the younger respondents, typically Generation Z, seem to feel safe, special and easy about technical interaction with smart care. The elder generation can be motivated by smart care mechanism inside the real world in the smart environments (Geronazzo, Michele, Serafin, Stefania, 2023). In addition, an interesting finding is that they care least about the data monitoring obtained from the smart care as it does not seem to be enough for them to be motivated to receive it.

Those young technology-oriented generations in their early 60s turned out to have experiences showing that smart care on the basis of human-centered based presentation (Cèsar Carreras and Federica Mancini, 2014).

5. CONCLUSIONS

Smart care users' hyper interest tends to be influenced by being exposed to auditory and visual variables among elder generation's needs. Therefore, the elder generation can be perceived as the potential avid users of smart care. This paper offers a unique lens for smart care utilization among the elder generation. It analyzes and gives a summary of the 6 dimensions of the elder generation's satisfaction. The thesis put forward a quantitative study of the elder adults' satisfaction based on the data analysis from SPSS (Li Jingxiong, 2021). Among the six product smartness dimensions, the results suggest direct influences on the attitudes of elder towards smart care. According to the result of the survey, the respondents at a relatively young age tend to be more satisfied with smart care. Its widespread adoption is to occur increasingly and rapidly among the elder generation and possesses both intelligence and sustainability with the integration of digital technology.

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