

Emotional Factors of Mobility Aids from Senior Lifestyle Standpoint

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Abstract

This paper mainly investigates the important literature related to Kansei Engineering and the seniors' mobility aids, and it will also conduct research on the lifestyle trends of the pre-seniors and the seniors. In order to establish the development foundation for matching the seniors' emotional-factor preferences and their product semantics, this study firstly examines the research of lifestyle by A.I.O. inventory, and then analyzes the trends and the current situations of the seniors' lifestyles by using factor analysis and cluster analysis methods. Meanwhile, through questionnaire survey, observation, as well as interviewing, it analyzes the seniors' consumer behaviors, and by means of the variance analysis to understand the cognitions, the consumer attitudes, and demands to the mobility aids among the different groups of seniors. On the other hand, it conducts surveys and cross-comparison in what are needed for the related industries to develop the seniors' mobility aids. Finally, we obtain the emotional factors by analyzing and summarizing the seniors' mobility aids.

Keywords: Kansei Engineering, Lifestyle, Mobility Aids, Seniors.

1. Introduction

1.1 Research background

Internationally, a society that its ratio of population ages 65 years and over to total population is 7%, 14%, or 20%, is so called an ageing society, an aged society, or a super-aged society. From the perspective of demographic change, Taiwan became ageing society in 1993, and is expected to become aged society and super-aged society in 2018 and 2025, respectively.

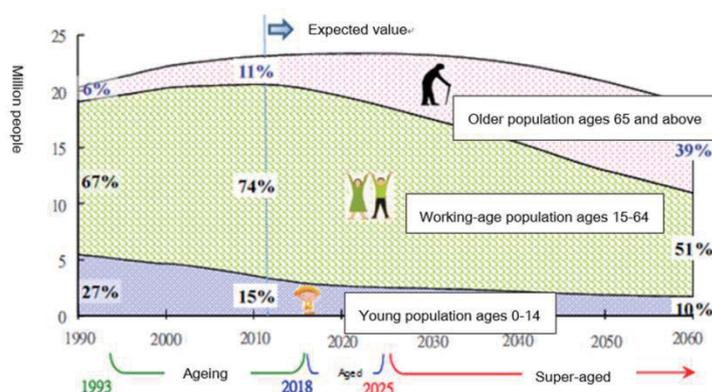


Fig 1. Demographic change chart (Council for Economic Planning and Development, Executive Yuan, 2012)

The main issue for seniors is to solve the problem of moving with difficulty. Their health obviously declines without constant activities. Furthermore, living independently can be an improvement to successful aging and a huge positive feedback on body and soul. The population of seniors has increased rapidly in recent years. Therefore, various related health care measures and developments of mobility aids draw more attention today, especially the ones for helping maintain the activities of daily life.

1.2 Research motivation and purpose

The mobility aids on the market have not yet met the various needs of seniors. Therefore, this study aims for investigating the mobility aids demanded for daily life in emotional aspect; it also aims for an overall plan and design to meet the various demands of the mobility aids for seniors. To move is one of the key propositions of life. We need to keep on moving to create pleasures and satisfy the basic needs (Hollwich & Bruce, 2016).

The mobility aids for seniors should have more and more proper design in psychological aspect. Designers should consider the differences between cultures, conventions or people's behaviors, and they should use the key elements of form, such as shape, color, quality and material, to let the users feel visual and sensational joyfulness by accurate encoding. A designer should adapt these elements into the concept of design by the realization of psychological, emotional and sensational aspects, thus the product's form can convey its true meaning.

Referring to the objectives set above, this study includes four objectives as follows:

1. Analyze senior's lifestyle by using questionnaires with AIO scale. Summarized ethnic preference emotional factor of mobility aids.
2. Explore consumer behavior and product usage scenarios from seniors by case study and observation.
3. Explore the critical design factor of mobility aids industry.
4. Compare the demands of seniors and industry to verify that whether user preferences and current industry strategy have consistency or not.

2. Literature reviews

The research perspective of sociology of aging focuses on investigating how the industrialization, the change of society, and the transformation of economy structure influence the seniors. The scientists of social medicine think that we can't understand the aging process of a person only by his or her timing biological growing process; we can't measure it only by his or her timing age and biological age, either. The more important thing is to study the influence of social-psychological aspect. In the design process, we need to consider the three foundation stones which constitute the relationships: Meet, Communicate, and Expect. We will focus on the quantity or the quality, according to the different objectives and the different levels of the desire to expand and deepen the sense of connection. (Wildevuur et al., 2014). IN sociology of aging, there are many theological discussions about the seniors' roles and situations in society. Among them, there are also many theories which contradict to each other. The famous three of them are disengagement theory, activity theory and socio-environmental theory.

2.1 Seniors Lifestyle trends

According to WHO's (World Health Organization) definition, people over 65 years old in demographic called "the elderly", also mentioned in the discussions as economic dependence of elderly people. The origin of "seniors" is due to most of the elderly feel rejection and resentment about any implied nouns directly related to "age". For example, "golden age", "aged over 60 ethnic groups" or "retired people" etc.

Thus, the word "senior" appears in foreign literature in 1980s, thereby reduce psychological aversion by the hints about age (Fu, 2004). Generally, these names reflect those 55 years or older. However, more recent articles have used the phrase "maturing market," which includes pre-seniors (those 50 to 64) and seniors (age 65 and older) (Whitford, 1998).

"Exploring new patterns for butler service applications" (Zhou et al., 2008) mentioned: "seniors refers to the age of 50 ethnic groups. This population can be subdivided into two different lifestyles: the group still in the workplace, the other group has been retired." The couples relatively have more discretionary money and time. Squandered is not acceptable. Seniors still hope to cut costs in order to enjoy life with young generation. Therefore, this population tends to increase the convenience of living and trustworthy caring service. Such services may include their own healthcare management and daily trivia.

Seniors still in the workplace have adequate financial resources. The largest household expenditure often comes from children's education funding and daily expense. Accordingly, lots of information may come from the network collected by colleagues or children.

For retired seniors, many children have been married and settle down. They had no shortage of life and had extra time being with friends or engage in activities they interested in. Such as travel, sports or taking care of grandchildren. To engage in leisure activities, they need to maintain a healthy body and mind. Therefore, they're more willing to have regular physical examination. Establish a good relationship and take counsel and treatment with doctors.

2.2 Mobility Aids

The development of the mobility aids in Taiwan today is focus on the people with disabilities, not only in health care perspective, but also in design or producing or marketing perspective, and it classifies seniors as people with disabilities.

In recent years, since the aging of the population become fully developed, businesses in mobility aids extend the services to seniors with limited mobility.

But in fact, there are still many distinctions between the seniors and the people with disabilities. The latter need supports for their body parts with physical disabilities, but the other parts of them are still maintain proper functions compared to their ages. Furthermore, the disable level of the person with disability is usually more stable, and his or her adaptability is usually better too.

Comparatively speaking, the seniors' overall body functions are decline, although not likely to be "disable", but the decline processes in a comprehensive and sustained way; moreover, a senior's adaptability to a new environment is relatively weaker. The common type of seniors' disabilities is lower limbs disability. The mobility aids designed for lower limbs disability are usually divided into two types: walking aid and mobility device.

The former includes cane, crutch and walker; they are mainly for the seniors who still remain muscle strength and the sense of equilibrium but have difficulty to walk. The latter includes wheelchair (electrical or manual), special wheelchair, stair lift and mobility scooter; they are mainly for the seniors without independent mobility. The designs and researches of wheelchairs today are various; an advanced wheelchair has multiple functions such as moving, standing, and lifting up and down stairs.

The mobility aids and the medical equipment of seniors, and related products usually have higher development thresholds and stricter verifications; therefore, their verification periods are often up to three to five years. This is the main reason why the relative enterprises' developments and designs cannot be sustainable. The relative government intuitions and business owners should see the arrival of aging society and pay attention to the potential of these products.

Table 1. Subsidy Programme for People with Disabilities

1. Personal mobility aids
2. modified components of furniture
3. Communicate and IT aids.
4. personal care and protection aids
5. Biochemical test equipment and materials.
6. Daily living aids.
7. muscle strength and balance training aids
8. Orthotics and Prosthetics
9. Aids to prevent pressure sores
10. Other aids.

The qualified of Low-income household, Low and middle income households and disabilities, which

mentioned in the preceding paragraph, is identified by municipal, county (city) competent authorities.

1. Low-Income Family: The maximum grant is full amount.
2. Mid-Income Family: The maximum grant is 75% of all.
3. None of the above: The maximum grant is 50% of all.

The specific grant assistive devices project is identified by the central competent authority. The second grant about assistive devices, amount, minimum years to apply, subsidies objective, assessment, devices specifications and other requirements should be based mainly on standard from the central competent authority. Older women and those who use mobility aids are among the most vulnerable group in society. The mobility aids not only support its users, but also limit them. In some cases, a mobility aid will turn to be considered as an obstacle to move outdoors (Rowles & Bernard, 2013). The friendlier the environment is, the less barriers of the facilities are. Second, the worry for security affects the elderly's willing to go out (Chen, 2016).

2.3 Kansei Engineering

Kansei is a Japanese word which means sensibility, and indicates psychological feelings given by a product overall. Factors such as Shape, Material, Size, Color, and User Interface, each will affect consumer inner feelings arise with a product. The feelings will not only affect the degree of consumer preferences, but also affect the willingness to purchase.

“Kansei Engineering” was introduced by the Japanese scholar Nagamachi Mitsuo in the 1970s, and made known to public first in the speech made by Kenichi Yamamoto, the president of the Japan automobile company – Mazda, at University of Michigan in 1986. At that time, Kenichi Yamamoto and Nagamachi Mitsuo worked together in automotive design, hoped to meet the customers' needs by understanding their Kansei from their five senses (taste, sight, touch, smell, and hearing), and quantified them with psychological or physical quantities (Nagamachi, 1989). In short, Kansei Engineering is to qualify and present people's feelings, and investigate what needs do those design cases meet (Chang & Deng, 2007).

Klaus Krippendorff once remarked that Product Semantics is not only related to product design that designers care about, but also related to the awareness of users. In recent years, many industries have imported Kansei Engineering technology to develop new products, and related research and published results have spread all over the world. The international related research has confirmed the effectiveness of Kansei Engineering for interpreting human sensibility (Miyazaki et al., 1993).

For product design, whether the cultural context, the functional context, or the usage context is important. When the part of a product was separated from the whole and put together with different object, the product's meaning may change. The permutations of semiotics determine the Kansei Semantics which the product shows. Crozier indicated that the product-appearance factors (Size, Shape, Color), the design concept, the functionality and the usage experience of a product, are all related to how to evoking pleasure and interest (Crozier, 1994).

With the advent of the ageing society in Taiwan, the prototype of senior market has gradually

emerged, but not yet mature. The literatures cited in this study propose the variety of possible senior lifestyles in recent years. There are more and more groups of different lifestyles, even people of the same age will have totally different values.

There have been discussions about the innovative multi-functional mobility aids in the relative literatures, but their impact in psychological level need to be investigated deeper. This study probes seniors' motivations of using mobility aids by consumer behavior, and reveals that the strategies in which the seniors buy the mobility aids are complicated. People often buy something because they like it, not because they need it. But mobility aids have been subordinated to the aids used by people with disability for many years, without independent regulation. Therefore, people generally have had negative perception "Disability" to mobility aids. "Merchandises cannot be sold is not because they are not good, but because their Kansei information is not designed properly." Yuji Kosaka, a well-known scholar in Kansei Engineering, said in 2010. Accordingly, the goal of this study is to redefine the Kansei information of mobility aids.

3. Research method

3.1 Listing and numbering questionnaire survey design

The questionnaire of this study has three sections of questions: "AIO lifestyle", "Emotional Quality Cognition to Mobility Aid", and "Design Condition Cognition to Mobility Aid". It includes the issues related to the senior's lifestyle, the various aspects of life, and the conditions of the emotional factors of products.

The questions about "Emotional Quality Cognition to Mobility Aid" and "Design Condition Cognition to Mobility Aid" are related to the emotional factors. The former topic focuses on emotional descriptions on the design of mobility aid; the latter centers on the preference survey to the four main factors of mobility aid: material, color, shape, and quality.

3.2 Observational research

Observational research is a social research technique that involves the direct observation of phenomena in their natural setting. Record every event and behavior of objects during the time. This differentiates it from experimental research in which a quasi-artificial environment is created to control for spurious factors, and where at least one of the variables is manipulated as part of the experiment. Be sure to obtain the agreement from object that is going to be observed.

3.3 Interview method

In this study, according to the results deduced from the lifestyle trends and the analyses of consumers' behaviors through participant observation method, an interview outline is carried out. Consequently, a final achievement is conducted by, through grounded theory, the results of interviews. Interviews are particularly useful for getting the story behind a participant's experiences. A qualitative research interview seeks to cover both a factual and a meaning level, though it is usually more difficult to interview on a meaning level. (Kvale, 1996) The interviewer can pursue in-depth information around the

topic. Interviews may be useful as follow-up to certain respondents to questionnaires, e.g., to further investigate their responses.

3.4 Factor analysis

This study conducts factor analysis for the questionnaire evaluation. Factor analysis is used to verify that there are indeed some potential characteristics in the questionnaires, and then clarify the inner structure of them. It is a statistical method used to extract the hidden concept from a group of test scores with common features. By factor analysis, we can extract the main factors that really affect the outcome behind the numerous variables associated with each other.

4. Analysis of research results

4.1 References Results from analyses of lifestyle questionnaire surveys

Total number of respondents: 213, valid questionnaires: 202, invalid questionnaires (incomplete and inconsistent): 11. There are eleven population statistical variables: gender, age, education, marriage, finance, health, residential area, residential situation, residential form, primary carer, use of mobility aids. Detailed data is shown as below:

(1) Gender -- female: 46% (92 people); male: 54% (110 people)

Table 2. Gender distribution of the respondents

		Number of people	Percentage
Gender	female	92	46%
	male	110	54%

(2) Age -- 55-59 years old: 35% (Majority); 60-64 years old: 29%; 65-69 years old: 12%; 70-74 years old: 11%; 75-79 years old: 6%; 80-89 years old: 6%; 90 years old: 3% (five people)

Table 3. Age distribution of the respondents

		Number of people	Percentage
Age	55-59 years old	69	35%
	60-64 years old	58	29%
	70-74 years old	24	12%
	65-69 years old	21	11%
	75-79 years old	12	6%
	80-89 years old	11	6%
	90- years old	5	3%

(3) Education: illiterate: 29%; elementary school: 11%; junior high school: 29%; senior/ vocational high school: 3.5%; university/college: 24%; master: 3%; Ph. D.: 0.5%

Table 4. Education distribution of the respondents

		Number of people	Percentage
Education	senior/ vocational high school	7	3.5%
	university/college	49	24%
	elementary school	22	11%
	junior high school	59	29%
	illiterate	58	29%

	master	6	3%
	Ph. D.	1	0.5%

(4) Marriage: married, spouse alive: 81.92%; widowed: 4.31%, divorced or separated: 12%; unmarried: 2%

Table 5. Marriage distribution of the respondents

		Number of people	Percentage
Marriage	married, spouse alive	165	82%
	widowed	8	4%
	divorced or separated	25	12%
	unmarried	4	2%

(5) Finance: roughly enough: 10.65%; wealthy: 87.54%; slightly difficult: 2.81%; very difficult: none

Table 6. Finance distribution of the respondents

		Number of people	Percentage
Finance	roughly enough	21	10%
	wealthy	175	87%
	slightly difficult	6	3%
	very difficult	0	0%

(6) Health -- normal: 16%; good: 37.69%; very good: 25.31%; not good: 10%; very bad: 0.96%

Table 7. Health distribution of the respondents

		Number of people	Percentage
Health	normal	32	16%
	good	76	38%
	very good	71	35%
	not good	21	10%
	very bad	2	1%

(7) Residential area -- southern Taiwan: 26%; northern Taiwan: 32%; middle Taiwan: 40%; eastern Taiwan: 0.96% (one person); both northern and southern Taiwan: 0.96%

Table 8. Residential area distribution of the respondents

		Number of people	Percentage
Residential area	southern	53	26%
	northern	65	32%
	middle	81	40%
	eastern	1	0.96%
	other	2	0.96%

(8) Residential situation -- couple live together: 7.12%; live with children: 49%; live alone: 38.65%; care facility: 1%; live in children's houses in turn: 2%; alternate between oversea and Taiwan: 0.96%; three-generation: 0.96%

Table 9. Residential situation distribution of the respondents

		Number of people	Percentage
Residential situation	couple live together	14	7%
	live with children	99	49%
	live alone	76	38%

care facility	2	1%
live in children's houses in turn	5	2%
other	6	3%

(9) Residential form -- townhouse without elevator: 15%; apartment without elevator: 17.15%; bungalow or floor 1 of apartment: 11.5%; apartment with elevator: 6%; community building: 45.7%; townhouse with elevator: 5.77%

Table 10. Residential form distribution of the respondents

		Number of people	Percentage
Residential form	townhouse without elevator	30	15%
	apartment without elevator	35	17%
	bungalow or floor 1 of apartment	23	11%
	apartment with elevator	12	6%
	community building	91	45%
	townhouse with elevator	11	5%
	other	0	0%

(10) Primary career -- act freely and need no career: 81.04%; child or grandchild: 7%; professional career: 1%; spouse or companion: 5.77%; brother or sister: 4%; others: 2.88%

Table 11. Primary career distribution of the respondents

		Number of people	Percentage
Primary career	act freely and need no career	163	81%
	child or grandchild	15	7%
	professional career	2	1%
	spouse or companion	10	5%
	brother or sister	8	4%
	other	4	2%

(11) Use of mobility aids -- not use: 89%; yes: 11%

Table 12. Mobility aids distribution of the respondents

		Number of people	Percentage
Use of mobility aids	yes	23	11%
	no	179	89%

4.2 Factor Analysis

This study conducts factor analysis to 40 AIO lifestyle variables, 37 emotion factors, and 32 design condition variables. Before the factor analysis, KMO measure of sampling adequacy and Bartlett's test of sphericity are conducted first, so as to determine whether or not the results of data analysis are appropriate for the factor analysis. The more KMO value, the better results of the factor analysis will represent (data with value more than 0.7 is considered as an effective one).

After conducting KMO measure of sampling adequacy and Bartlett's test of sphericity, the result data is shown below as table13:

Table 13. Subsidy Programme for People with Disabilities

LifeStyle Factors		
Kaiser-Meyer-Okin Measure of Sampling Adquacy		0.741
bartlett's sphericity test	Approx. Chi-Square	424.385
	df	171
	Sig.	0
Emotional Factors		
Kaiser-Meyer-Okin Measure of Sampling Adquacy		0.811
bartlett's sphericity test	Approx. Chi-Square	2884.05
	df	666
	Sig.	0
Design conditions Factors		
Kaiser-Meyer-Okin Measure of Sampling Adquacy		0.738
bartlett's sphericity test	Approx. Chi-Square	764.284
	df	171
	Sig.	0

4.3 Lifestyle factors

This study uses factor analysis with 40 AIO lifestyle variables, and divides the variables into five factors in terms of factor loadings: (note: the numbers in quotations indicate factor loadings)

Factor 1:

15. I have the willingness to attend a community college.	.799
12. I often do volunteer works in the hospital or service group in my own will.	.701
37. I often participate in arts and cultural activities to enhance the quality of life.	.673
31. I will properly arrange my life after retirement.	.593
40. Every time I go to different places, I get lots of harvest.	.566
13. I am quite enthusiastic about my neighborhood and local community.	.539
8. I like to participate in social or outdoor activities to stay healthy.	.528
38. I can get information very quickly.	.501

Factor 2:

18. I think an eldest son should live with his parents.	.781
20. To have a successful career, luck is more important than hard working.	.657
16. I think life is fated, cannot be changed.	.626
5. I think the boys to play the role of family line.	.604
17. I think that girls don't need much education.	.583
21. I think the investment is risky. Deposit in the bank is better.	.537

Factor 3:

6. I am very clear about every family member's situation.	.741
7. I like to share life experience with my family.	.630
33. I often read papers and magazines in order to get more new knowledge.	.567
25. I like to increase body's immunity by exercise regularly.	.454

Factor 4:

24. I think my physical condition is healthier than other people in the same age.	.800
30. I rarely consult with doctors.	.706
26. I think people can handle their own physical health by their own.	.582

Factor 5:

9. I like to find someone to chat with.	.792
10. I have a huge influence on my colleagues.	.725
11. I will take the initiative to chat even the first time we met each other.	.664

Factor 6:

23. I often pray at the temple or church	.797
29. I once praying to the god for a healthy body.	.508
36. I am very care about how other people think of me.	.500
22. I believe in what expert or authority said.	.475
14. I would be willing to share good things with my friends.	.464

Factor 7:

4. I hope I can help raising my own grandchildren.	.751
3. I would like to have many children and grandchildren.	.750

Factor 8:

2. Family is the haven of life.	.786
32. I think poor health will drag their children.	.735

Factor 9:

39. I usually compare prices while shopping.	.860
34. My friends will ask for my advice on shopping or products.	.655

Factor 10:

35. I like to pursue popular fashion and novelty.	.624
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Consequently, each factor listed above are named as: factor 1 “Positive & enthusiastic”, factor 2 “Traditional conservative”, factor 3 “Active communication”, factor 4 “focus on Health”, factor 5 “Outgoing and lively”, factor 6 “Heartfelt beliefs”, factor 7 “Focus on grandchildren”, factor 8 “Focus on family”, factor 9 “Careful planning”, and factor 10 “Popular fashionable”, factor10 has only one item, so it is dismissed.

4.4 Emotional factors

Reduce the dimension of the 37 design condition variables of mobility aid and conduct factor analysis, then the nine emotion factors will be gotten:

Emotional factor1: tasteful and lightweight; includes seven of the mobility emotion words: tasteful, practical, clean, gentle, light, and novel.

Emotional factor2: high-class and elegant; includes four of the mobility emotion words: high-class, quiet, durable, and elegant.

Emotional factor3: plain and low-key; includes five of the mobility emotion words: plain, relaxed, low-key, vintage, and fashion.

Emotional factor4: simple and familiar; includes five of the mobility emotion words: gorgeous, quality, safe, familiar, and simple.

Emotional factor5: relieved and vital; includes four of the mobility emotion words: relieved, vital, easy-to-use, and bright.

Emotional factor6: warm and comfortable; includes four of the mobility emotion words: firm, comfortable, warm, and refreshing.

Emotional factor7: handmade and steady; includes two of the mobility emotion words: handmade and steady.

Emotional factor8: technological and aesthetic; includes two of the mobility emotion words: technological and aesthetic.

Emotional factor9: considerate and natural; includes three words of the mobility emotion words: calm, considerate, and natural.

Table 14. Clusters of emotional factors ANOVA

Factor	Cluster			F	Significant	< α	
	Group1 - Knowledge Positive	Group2 - Actively Trendy	Group3 - Conservative Faith				
Emotional factors	1	.0587381	-.1655597	.2636024	3.020	.050	*
	2	-.0420948	.0792126	-.1065335	.604	.548	
	3	.3028160	.0124208	-.4498880	7.966	.000	*
	4	.0616548	.2316294	-.5701648	10.941	.000	*
	5	-.0051757	.0142401	-.0225000	.022	.979	
	6	.2199730	.1258109	-.5707672	10.506	.000	*
Design condition factors	1	-.1729932	-.1145709	.4815164	7.233	.001	*
	2	-.2346150	.0610283	.2009795	2.885	.058	
	3	-.2369255	.1600805	-.0026947	3.049	.050	*
	4	-.1012783	-.0162670	.1757695	1.036	.357	
	5	-.1046362	.1131576	-.0898829	1.136	.323	

Design condition factor: reduce the dimension of the 32 design condition variables of mobility aid and conduct factor analysis, then the five design condition factors will be gotten:

Design condition factor 1: “Modern Metropolis”: metal, paper, gray, warm tone, and geometry.

Design condition factor 2: “Natural Glass”: plastic, glass, and biological imitation.

Design condition factor 3: “Cool Black”: black,

Design condition factor 4: “Golden Luxury”: leather, gold, and silver.

Design condition factor 5: “Casual Mature”: cement, white, and deep tone.

From the Table14, there are significant differences between Emotional factor 1, Emotion factional 3, Emotional factor 4 and Emotional factor 6. In design condition part, there are significant differences between Design condition factor 1 and Design condition factor 3.

4.5 Observation results

After consulting with 14 seniors, 4 of them are willing to be observed. Four seniors have using mobility aids for a period of time. Case B strongly suggests that she doesn't want to be observed and interviews in the beginning. This shows that the image of mobility aids is negative in most of seniors. (Table15.)

Table 15. Basic information of observed object

No	Gender	Age	Rasons for using assistive devices
A	Female	66	Knee degeneration, cannot walk long. Must go out to work (temple reciting).

B	Female	78	Degenerative arthritis. Take turns using crutches, walking aid wheelchairs according to physical condition. Retired from the post office.
C	Male	62	Had a spine surgery a month ago. Occupation was forced to transfer to the office work.
D	Female	69	Had a car accident during 30 to 40 years old. Waist injury makes her mobility limited while getting old. Had surgeries several times. Need to take care of farm and family.

IMAGE

A	B	C	D
			

After observing the behavior of seniors using mobility aids, we can get the actual problems about mobility aids. This study has found the function and appearance which are users look forward to improve. Cases observed are listed in Table 16.

Table 16. Observation results

No	Improve demand
A	Go out of work Usability of rainy days Reducing noise Extended the area of activities
B	Cannot be symbol of aging. Convenient option Portable and easy to move
C	The convenience of moving upstairs and downstairs Reduce exclusion. Not stylish, not ergonomic. Too huge to be stored, not portable
D	Lower prices Lightweight Interactive features between seniors and preschool children, security Demands for farm work

4.6 Industry's demands survey

This study adopts six interviews of the experts and the scholars, and two interviews of the elderly users -- one positive, the other passive -- assorted by the lifestyle. Then the grounded theory was used for the interviews, and through the coding process, the innovative product-design factors and the key factors of mobility aid can both be gotten. Based on these design elements and key factors, the future demands of the industry will be explored. In order to improve the willingness to be interviewed, this study writes a question outline in advance, but completely records their responses without interfering the orientation. There are eight respondents, and their general information is shown as Table 17.

Table 17. The respondent's general information

NO.	Category	Respondent	General information
1	Scholar	Mr. Lin	54 years/ University professor/ Male
2	Scholar	Mr. Sung	55 years/ University professor/ Male
3	Business	Mr. Tseng	50 years/ Mobility aid industry/ Male
4	Business	Mr. Lee	50 years/ Mobility aid industry/ Male
5	Business	Mr. Chen	42 years/ Mobility aid industry/ Male
6	Medical staff	Ms. Lee	36 years/ Occupational therapist/ Female
7	Elderly user (positive)	Mr. Wu	64 years/ Retired civil servant/ Male
8	Elderly user (passive)	Mr. Ho	56 years/ Retired water-and-electricity technician/ Male

This study selects 105 sentences in these in-depth reviews through open coding method, and summarizes them in eight axial coding design elements: “independence”, “healthcare”, “vitality”, “usefulness”, “comfort”, “lightweight”, “relationship”, and “taste”. Therefore, the four key factors -- “health”, “material”, “interaction”, and “form” -- will be gotten.

4.6.1 The key factor 1 of future design strategy: “Health”

The design elements in the senior-related fields are nothing more than improving health and reducing the decline of both physical and psychological functions. Thus the prior elements are the ones correspond to the factor -- “health”, including the following three: “independence”, “healthcare”, and “vitality”.

4.6.2 The key factor 2 of future design strategy: “Material”

A product can be various in function and form through its material property. The traditional mobility aids are made mainly by aluminum, iron and wood. In recent years, non-slip rubber heads and grips have added to them. However, there will be more materials which can be used to improve the mobility aids in the future. The elements of material which can assist the product's performance are as follows: “usefulness”, “comfort”, and “lightweight”.

4.6.3 The key factor 3 of future design strategy: “Interactive”

In traditional thinking, a mobility aid is a product just for assisting the user's mobility. If we want to

enhance the applicability of a mobility aid, we should increase the interaction between the mobility aid and its user by putting the people involved in the user's daily life into consideration of design condition. The seniors may interact with their children, grandchildren, friends, medical staff, and social work groups; each relationship will probably need new functions to be fulfilled. Therefore, the future mobility aids should have the following two interactive features: "healthcare" and "relationship"

4.6.4 The key factor 4 of future design strategy: "Form"

When a product meets the needs of basic functions and psychological aspects, what comes next is the presentation of style. The "form" is the last factor for which the design strategy considers. It will be more common when a user not only pursue the products' substantive functions, but also the modeling differences between them. The function elements of "form" -- except for "attractive" -- are as follows: "comfort", "lightweight", and "taste".

The investigation of the future demands of the mobility aids industry is shown in Figure2. In the basic function level of mobility aids, the first design factor needs to be fulfilled is Social Interaction, then Functional Satisfaction, and the third is Lightweight. In the psychological level, the products need to have the image of Ease and Comfort to let seniors want to keep using them. Moreover, we have to bring Health Rejuvenation into mobility aids, and increase the user confidence by Healthcare. Meanwhile, Fashion Sense between seniors should be considered in the demand of design.

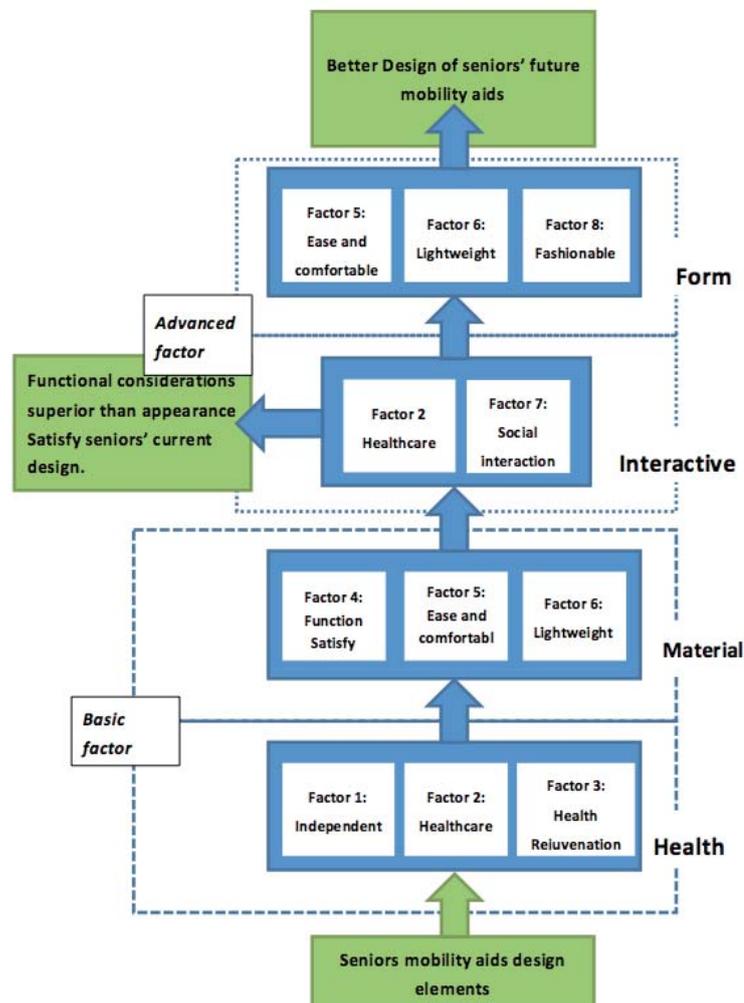


Fig 2. The diagram of future design strategy steps

5. Conclusion

Based on the present situation of the mobility aid consumers, and the results of the surveys of future industry's demands, this study takes health and material as basic elements. In other words, the improvement of the user's health and the product's material should be in top priority in the process of design and promotion of a good mobility aid product. In order to design a better mobility aid for senior, a designer has to consider the design factors of interaction and form. The current seniors' mobility aids can be improved by being poured into the consideration of their material. Furthermore, the key factor in making them better and getting closer to the consumers' demands is their form with emotion factors.

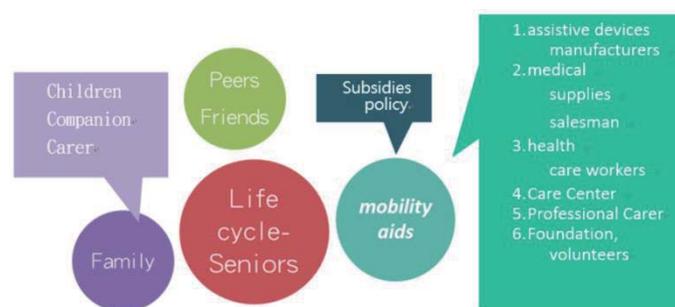


Fig 3. Life Cycle-Seniors

The results show that design will affect the marketing and "service" is the key of marketing. The critical factor of advanced services is "Interactive". The feedback from service they received will be back again into design-oriented. The future of homecare industry needs to have a complete business model; the entire design team must have noticed the importance of seniors' interpersonal networks.

According to the design elements, the key emotional factors and the interviews of experts and scholars, this study aggregated the following six practical design recommendations:

1. Record: mobility aids can be developed with record functions about walking paths and other health conditions.
2. Communication: Seniors health status can be regularly convey to the medical staff or family. It can also be easily linked with family and friends.
3. Modularization: Customized have been unable to meet consumer's demand, modularization is the future production processes.
4. Lightweight: Existing products are generally expensive if it is lightweight. Owners should develop a lightness mobility aid which is good to carry. They can cost down by widely promoting and manufacturing.
5. Marketing and service: Among commercial chain, the industry never lack of design talent, but lack of good marketing and service side.
6. Government regulations and subsidies: Implementing regulations and subsidies education and publicity. Influence product development and sales.

6. Recommendations for future research

The usefulness of questionnaire in detection has been noticed in the researches related to seniors. We believe that the full potential of lifestyle research in robust object detection and recognition together is yet to be uncovered. Therefore, we propose to improve the method of investigation, the use of "in-depth, open-ended interviewing" belongs to our future plan, for recognizing more general activity patterns.

We plan to implement scenario simulation for diverse selections of the views in the future. In addition to writing and oral narrative, provide cartographic information will improve the accuracy of survey.

We strongly suggest researchers to cooperate with medical institutions in the field of mobility aid to improve study procedures, as appropriate, and to refine key concepts, hypotheses, and measures of outcomes and exposures.

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從銀髮族生活型態探討行動輔具感性因子

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摘要

本研究根據文獻中整理出銀髮族相關之生活型態 AIO 量表與感性因子，進行問卷調查，瞭解銀髮族生活型態，歸納銀髮族族群對行動輔具偏好感性因子。經個案觀察，探討銀髮族消費行為與產品使用情境。第二階段為專家訪談，使用紮根理論歸納訪談資料，並導出行動輔具產業未來關鍵設計因子。

研究結果透過生活型態趨勢研究，可分為三個族群而偏好的行動輔具感性特質代表詞彙如新奇的、時尚的、華麗的、典雅的、復古的等等 21 個詞彙，其中偏好的材料與顏色特性有「淺色調、暖色調、透明的、銀色、金色、白色」。分析後建立關鍵設計因子為「社會互動、機能滿足、輕量化、安心舒適、醫療保健、健康回春、流行品味」，希望能幫助未來設計師開發出符合需求的創新輔具產品。

關鍵詞：感性工學、生活型態、行動輔具、銀髮族