

# User Value Based Product Adaptation: A Case of Mobile Products for Chinese Urban Elderly People

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**Abstract.** Mobile user experience in Asia is far from optimal. User interfaces and interactions are just copies of those for Western users. Product designers are not clear about the needs of many user segments in Asia. Products lack creative solutions specific for the Asian market, driving researchers to study users in Asia and create new concepts to improve the mobile user experience. Based upon the Industrial Design Value Innovation Theory developed in the Industrial Design Department of Tsinghua University, this project sponsored by the Nokia Research Center targets the market segment of urban elderly people in China, conducts the user research and concept design for proper mobile products or service systems, and hopes to contribute to the corporate future design strategies and market development plans.

**Keywords:** User value, product development, mobile communication, elderly people.

## 1 Introduction

Mobile user experience in Asia is far from optimal. User interfaces and interactions are just copies of those for Western users. Designers are not clear about the needs of many user segments in Asia, and especially lack of creative solutions specific for Asian markets.

Nokia is a worldwide leading company providing a wide range of mobile communication products, whose business covers mobile phones, multimedia, communication systems and solutions for enterprises.

In the increasingly competitive markets of mobile communications, companies are trying their best to address diverse market segments by adding new functions and features to their products. Nokia also hopes to extend their business in all areas of the segmented markets by taking advantage of its good relations with top universities around the world. This joint project between the Industrial Design Department of Tsinghua University and Nokia Research Center aims at developing concepts for Chinese urban elderly people. A research team comprised of professors, visiting scholars and students in PhD and Masters Programs has been assembled, and a user value based methodology has been proposed for research into the project.

## 2 Process, Methodology and Achievements

### 2.1 Overall Process

The user value based approach for this project is adapted from the methodology of the Industrial Design Value Innovation Theory<sup>1</sup> developed in the Industrial Design Department of Tsinghua University; the process is displayed in Fig. 1.

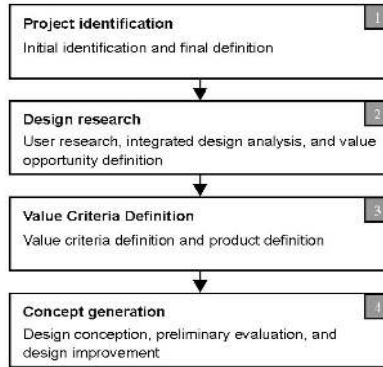


Fig. 1. Overall Research Process

### 2.2 Project Identification

With the help of the Nokia Research Center, the project team identified the present primary target group as the users who have difficulty using mobile products, and further focused on the segment of illiterates and semi-illiterates in Chinese cities.

After literature review, however, the researchers have found that illiterates and semi-illiterates in Chinese cities are fewer and fewer.<sup>2</sup> Therefore, the target of this research should extend to those groups who have physical and cognitive obstacles in using digital products; specifically the urban elderly people that finally becomes the target group to be study in this project, as seen in Fig. 2.

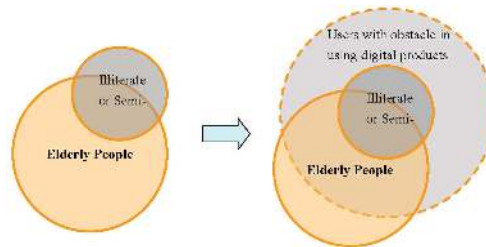


Fig. 2. Repositioning of the target group

<sup>1</sup> Jikun Liu, "From Value Analysis to Value Innovation: A Theoretical Framework of Value Innovation in Industrial Design", Ph.D. dissertation, Tsinghua University, 2007.

<sup>2</sup> According to the government statistics in 2001, there are about 600,000 illiterates in Beijing, 4.23% of the Beijing population, and 70% are the elderly people over 65 age of years.

### 2.3 Design Research

Design research is the most important stage of the project. It includes three steps: user research, integrated analysis and value opportunity identification.

**User research.** User research in this project consists of three perspectives: background study, questionnaire survey and field observation. In the background study, the researchers gathered the related data from books, magazines, research reports, government statistics and Internet resources. The gathered material has been studied and classified, and a conclusion has been achieved.

A questionnaire survey is for further understanding the demand for and usage situation of mobile products, and to select samples for field observation. According to users' types and proportions, the research team selected 60 questionnaire samples, and then conducted informal interviews and statistic analysis. (Samples<sup>3</sup> have been selected according to gender, age, living style, and situations of using a mobile phone. Overlaps of different types are selected in order to make sure the samples are more accurately presented.)

On the basis of analysis of the 60 questionnaires, the researchers filtered 6 typical samples according to samples' ages, living conditions, vocation before retiring and income levels. They then applied field observations with user research approaches of home visits and in-depth interviews; user research technologies of still photography, videotaping, filed notes; and analysis methods of user dairies comparison and scenario analysis.

**Integrated design analysis.** Integrated design analysis follows the background research, questionnaire survey and field observations. In this phase, techniques of classification, comparison, similar items merging, induction, deduction and association are employed, as shown in Fig. 3.



Fig. 3. Process of design analysis and value definition

The key findings are identified after the integrated design analysis sub-stage. Table 1 demonstrates 16 key findings about the target user group of urban elderly people.

**Value (Opportunity) Definition.** The methods of reasoning, deduction, analogy and association are used to transfer key findings into value opportunities. Induction, similar

<sup>3</sup> Credibility of research outcome is determined by sampling methods, the major principle is: the more the samples are, the less the deviation, but the higher the cost. If the amount of the samples is certain, increasing the samples' types and using variety of sampling methods are guarantee factors for high quality and low cost.

**Table 1.** Key Findings by Integrated Design Analysis

No.	KeyFindings
1	For the elderly with degenerating body functions, the mobile phones in the current market have too many features with complex interfaces and sophisticated operations. (For example, unclear screen displays, keys that are too small, etc. which lead to easily made mistakes.)
2	Most of the elderly fear high tech products, and are more used to a manual operation that has definite and direct feedback. And they even have regression emotion in appearance, material and texture.
3	The elderly generally pay special attention to "medical and health care" and "medical rescue (first aid)". They are more frequently in hospital.
4	Most elderly people conduct regular exercise and entertainment activities according to their own conditions, such as walking, dancing, singing, playing ping pong, chatting, listening to storytelling, etc. The most popular is walking.
5	The elderly generally pay attention to news and current events, but often just watch several favorite TV channels. They also like to listen to radio.
6	Many elderly people are unable to use "phone book" and "shortcut keys" in mobile phones, and depend on handwriting and notebooks instead. This is principally because of the sophisticated operation, reduction of their vision, the custom of handwriting, and the complex settings of shortcut keys.
7	Elderly people often have phone calls with their family members, old friends and colleagues. The topics they are concerned about most involve health. The persons they call are relatively fixed, and the number is between 4 and 8.
8	Most of the elderly people cannot remember their own mobile phone number, but they need to exchange their phone number with new friends or doctors now and then.
9	Many elderly people cannot see the display for the amount of the power, and often forget to recharge the phone.
10	Only a few elderly people use the text message. Some are for fun, and they receive more and send less. The ability to write and edit SMS is a matter of show-off and a feeling of achievement!
11	Some of the elderly people check and reply to SMS at a fixed time. They generally check in the evening, just like others may check email, as it is not easy to hear the ring for receiving the SMS message.
12	The phone fee is a concerned issue. They are afraid of being unable to use up the deposit, while they also need to "pinch pennies."
13	Shopping outside is a regular activity for elderly people. (They shop at wet markets every day, and supermarkets once every several days.)
14	Some of the elderly people have a need for studying. (For the consideration of health care and other motivations, they learn English, new computer games, financing knowledge, health protection, etc.)
15	Some elderly people use computers, but few use the internet. They mainly play simple computer games, input text or check their email. The prospective elderly people's habits in the future will significantly change, as the people in the middle age now keep the habit of using computers for when they get older.
16	Some elderly people with healthy bodies and energy tour regularly.

items merging, clustering, and KJ Method are used to classify the value opportunities.<sup>4</sup> The following, Table 2, is the value opportunities, and Table 3 is the classified value opportunities.

In the process of the value opportunity classification, 32 value opportunities become 30,<sup>5</sup> and are classified into 4 value categories of simplifying interactions and

<sup>4</sup> Key finding listing and value definition in integrated design analysis may be conducted and listed together, to see figure 3.

<sup>5</sup> "Clear and direct feedback" is merged into "simplified interaction"; and two "simplified settings for shortcut keys" are combined together.

**Table 2.** Listing of user value opportunities

No.	Key findings	Value Opportunities
1	For the elderly with degenerating body functions, mobile phones in the current market have too many features with complex interfaces and sophisticated operations	<ul style="list-style-type: none"> <li>• Simplified interaction</li> <li>• Automatic adjustment for voice</li> <li>• New communication service system for the elderly</li> </ul>
2	Most of the elderly fear high tech products, and are more used to manual operations that have a definite and direct feedback. And they even have regressive emotions in appearance, material and texture.	<ul style="list-style-type: none"> <li>• Augmented appearance appetency</li> <li>• Clear and direct feedback</li> <li>• Traditional operational ways</li> </ul>
3	The elderly generally pay special attention to "medical and health care" and "medical rescue (first aid)". They are more frequently in hospitals.	<ul style="list-style-type: none"> <li>• Integration with first aid box or medical card</li> <li>• Shortcut button for first aid</li> <li>• New service system of medical &amp; health care for elderly</li> </ul>
4	Most elderly people conduct regular exercise and entertainment activities according to their own conditions.	<ul style="list-style-type: none"> <li>• Functions for exercise aid: measurement for movement</li> </ul>
5	The elderly generally pay attention to news and current events, but often just watch several favorite TV channels and like to listen to radio.	<ul style="list-style-type: none"> <li>• Receiving the voice of TV programs</li> <li>• TV programs forecast in voice</li> <li>• Integration with radio, traditional operational ways</li> </ul>
6	Many elderly people are unable to use the "phone book" and "shortcut keys" in mobile phones, and depend on handwriting and notebook.	<ul style="list-style-type: none"> <li>• Simplified operation of the phone book</li> <li>• Simplified setting for shortcut keys</li> </ul>
7	Elderly people often have phone calls with their family members, old friends and colleagues. The topics they are concerned about most involve health. The persons they call are relatively fixed, and the number is between 4 and 8.	<ul style="list-style-type: none"> <li>• Simplified setting for shortcut keys</li> <li>• Fixed keys for intimates</li> <li>• Display for intimate photos</li> </ul>
8	Most of the elderly people cannot remember their own mobile phone number, but they need to exchange their phone number with new friends or doctors now and then.	<ul style="list-style-type: none"> <li>• Display self phone number on the wallpaper</li> </ul>
9	Many elderly people cannot see the display for the amount of the power, and often forget to recharge the phone.	<ul style="list-style-type: none"> <li>• Augmented display for power</li> <li>• Voice reminding for low power</li> </ul>
10	Only a few elderly people use the text message. Some are for fun, and they receive more and send less. The ability to write and edit SMS is a matter of show-off and a feeling of achievement!	<ul style="list-style-type: none"> <li>• Advanced the level of handwriting function</li> <li>• Augmented the contents of templates for SMS</li> <li>• Symbolic and iconic SMS</li> </ul>
11	Some of the elderly people check and reply to SMS at a fixed time. They generally check in the evening, just like others may check email, as it is not easy to hear the ring for receiving the SMS message.	<ul style="list-style-type: none"> <li>• Augmented reminding of SMS: voice, vibration, flash, etc.</li> </ul>
12	The phone fee is a concerned issue. They are afraid of being unable to use up the deposit, while they also need to "pinch pennies."	<ul style="list-style-type: none"> <li>• Advanced level of checking money balance</li> <li>• Display for balance and time left for calling</li> </ul>
13	Shopping outside is a regular activity for elderly people. (They shop at wet markets every day, and supermarkets once every several days.)	<ul style="list-style-type: none"> <li>• Integration with shopping</li> </ul>
14	Some of the elderly people have a need for studying. (For health care and other motivation, they learn English, new computer games, financing knowledge, etc.)	<ul style="list-style-type: none"> <li>• Customized learning programs</li> </ul>
15	Some elderly people use computers, but few use the internet. This will change, as the people in the middle age now keep the habit of using computers when they get older.	<ul style="list-style-type: none"> <li>• Simplified interaction between phone and computer</li> </ul>
16	Some elderly people with healthy bodies and energy tour regularly. (The demands for tourist maps, information for traveling, hotels, dining and other activities.)	<ul style="list-style-type: none"> <li>• Function for map checking and navigation</li> <li>• New service system of tours for the elderly</li> </ul>

manipulations, medical rescue and health care, touring-exercise-entertainment, as well as emotional values.<sup>6</sup>

<sup>6</sup>Of course, value opportunities can also be classified into small groups, if necessary, to have more structures.

## 2.4 Value Criteria Definition

In this case, after further analysis and discussion with Nokia Research Center, the project team regards all 30 value opportunities in Table 3 as the user value criteria for the starting points of concept generation conducted later on.<sup>7</sup> But in this project, we

**Table 3.** Classification for User Value Opportunities

No.	Value Categories	Value Opportunities
1	<i>Values for Simplifying Operation or Interaction</i>	<p>Simplified interaction (clear and direct feedback merged)</p> <p>Simplified operation with phone book</p> <p>Simplified setting for shortcut keys (2 combine together)</p> <p>Automatic adjustment for voice</p> <p>Augmented display for power</p> <p>Voice reminding for low power</p> <p>Augmented reminding for SMS: voice, vibration, flash</p> <p>Display for balance and time left for calling</p> <p>Advanced level of checking the balance</p> <p>Advanced the level of handwriting function</p> <p>Augmented contents of templates for SMS</p> <p>Display self phone number on the wallpaper</p> <p>Symbolic and iconic SMS content</p> <p>Simplified interaction between phone and computer</p> <p>New service system of communication for the elderly</p>
2	<i>Values for Medical Rescue and Health Care</i>	<p>Integration with first aid box or medical card</p> <p>Shortcut button for first aid</p> <p>New service system of medical &amp; health care for elderly</p>
3	<i>Values for Touring, Exercise and Entertainment</i>	<p>Function for exercise aid: measurement for movement</p> <p>Receiving the voice of TV programs</p> <p>Forecasting TV programs in voice</p> <p>Integration with radio, traditional operational ways</p> <p>Customized learning programs</p> <p>Function for map checking and navigation</p> <p>New service system of tours for the elderly</p>
4	<i>Values for Emotion and Intimateness</i>	<p>Augmented appearance appetency</p> <p>Fixed keys for intimates</p> <p>Display for intimate photos</p> <p>Traditional operational ways</p> <p>Integration with shopping</p>

<sup>7</sup> Generally, during the process of identifying the concept generation starting points and value criteria for evaluating concept solutions, some value opportunities would be filtered out, especially when there are too many value opportunities.

only selected several of them due to the limitations of time and energy. The selected value opportunities are marked with shades of grey color in Table 3.

## 2.5 Concept Development

On the basis of a deeper understanding of selected user value opportunities, the project team has developed several concept solutions described as follows, the main purpose of which is to demonstrate the relationship between the concepts and their related value opportunities.

**New type of comprehensive service system for elderly people.** According to the project user research, it is discovered that the elderly people feel very frustrated with sophisticated operations of mobile phones; they generally pay much attention to “medical and health care,” and “medical rescue,” which show an increase in demands with their increased age. According to these three key findings mentioned above, our project team proposes three value opportunities and value criteria of a new communication service system, a new touring service system, and a new medical and health care service system for the elderly people, as seen in Table 2.

During the stage of concept development, the project team found that these three service systems could be combined together to form a New Comprehensive Service System for the elderly people. Considering the technology advantage of the Nokia Corporation, the system is prepared to use the mode of mobile communication, that is, the ultimate solution will be a “New Type of Mobile Comprehensive Service System for Elderly People,” the functions of which are: a) as a transfer platform providing the elderly people the service of mobile calls and short messages; b) providing the elderly people with services of first aid and health care reminding; c) providing the elderly people with household services; d) providing the elderly people with special featured touring information and traveling services. Afterwards, the project team has designed several home terminals, wearing terminals, and their wearing ways, including the function of one key medical aid switch with them. (Fig. 4).



Fig. 4. 2007 M-care for Nokia

**Intimate Mobile-phone.** It was discovered during the research and observation that the target persons for elderly people's mobile communication is generally limited to 4 to 8, mainly family members and previous intimate friends, and therefore, intimate value is significantly important for them. The proposed Intimate Mobile-phone by the team is principally the consideration to meet this sort of emotional value and demand of the elderly people. In Table 3, emotional values consist of 5 value opportunities of appearance appetencies, fixed intimate keys, displaying intimate person's photos, relatively traditional operating modes, and an integration with purchase demands.

After serious consideration and discussion, the team determines to select the four above mentioned emotional value opportunities (except for integration with purchase demands), plus the value opportunity of simplified user interactions in the simplified operation category as the Value Criteria for concept of Intimate Mobile-phone. After the process of concept generation conducted by drawing on the wisdom of the masses, the mobile phone concept is eventually generated, which includes 12 big keys (each one can display an intimate person's head portrait), operate simply, and have a very appetent appearance. (Fig. 5).



Fig. 5. Intimate Mobile-phone in three different operative ways

### 3 Conclusion

This case is the demonstration for the application of the Value Innovation Theory, which has solved the problems assigned by the corporation. This is not only to make the target group positioning clear, but through background research and trends analysis, has found that sector of elderly people is an increasing proportion among the future consuming markets and is a group with a huge potential purchasing and consuming force which is well worth paying much attention to. The work for the next step is for Nokia itself to make and implement the marketing research and product (service) development plans by understanding the achievements of this project, corporate strategies and abilities within its own developing aims.



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