Research on the Requirements and Functions of Mobile Applications for Tourism among Disabled Individuals in China

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Abstract: There is a large number of disabled people, and the number of disabled people will continue to grow in the future. With the booming development of the tourism industry, the demand for travel by disabled people is also increasing, but the travel experience of most disabled people is ignored. Developers of tourism mobile applications pay little attention to the travel needs of disabled people. Due to the lack of attention to this group, there is great room for improvement in the travel experience of disabled people. This article focuses on the needs of Chinese disabled people for mobile applications for tourism. Through user interviews and semantic analysis, this group's needs for application functions are studied. Then, through a questionnaire survey based on the Kano model, the priority of application functions is analyzed. This study believes that the psychological needs of disabled people to be respected should be the top priority, followed by the needs for affordability, safe travel, and convenient access to information, and finally, social needs.

Keywords: disabled people, tourism, applications, user survey

1. Introduction

According to the statistics of the World Health Organization, there are currently 1.3 billion people worldwide suffering from severe disabilities, accounting for 16% of the global population. Due to the increase of non-communicable diseases and the extension of human life, the number of disabled people is still growing. According to the statistics of the China Disabled Persons' Federation in 2010, there are about 85 million disabled people in China, and with the increasing degree of aging in China, there is a positive correlation between aging and the number of disabled people [1], so the number of disabled people in China is expected to continue to increase. The needs of disabled people, such as medical care, education, employment, travel and tourism experience, have become a global social issue. As the world's largest developing country, China has paid attention to the social problems of disabled people, made significant progress in improving the quality of life of disabled people, built a large number of barrier-free public service facilities, and launched a series of relevant laws and regulations to protect their employment and education opportunities. However, researchers have paid little attention to the tourism experience of disabled people [2].

In recent years, the booming development of the tourism industry has resulted in a large number of individuals with disabilities, as well as their caregivers, family members, and friends, becoming an important part of the tourism market. The accessible tourism market is continually growing. The needs of individuals with disabilities during travel have attracted great attention from scholars both domestically and abroad, with literature already available investigating the transportation barriers encountered by individuals with disabilities during tourism travel. However, despite the many obstacles faced by individuals with disabilities during travel, there has been little research on the demand for mobile applications related to disability tourism. Previous studies have typically been based on developed countries, and there is a lack of in-depth understanding regarding the satisfaction of marginalized groups (including low-income populations) during travel and the impact of this satisfaction on important areas of life in developing countries. In developing countries, their perspectives are often overlooked by decision-makers, infrastructure developers, and researchers [3].

In defining disabilities, the World Health Organization defines disability as "any restriction or lack of ability to perform an activity in the manner or within the range considered normal for a human being, resulting from impairment" (United Nations, 2008). In China's national standard "Classification and Grading of Disabilities for Persons with Disabilities" (2011), individuals with disabilities are defined as those who have lost some or all their ability to engage in certain activities due to the loss or impairment of certain tissues or functions in their mental, physical, or bodily structures. This study focuses on people with disabilities in China, the world's largest developing country, and therefore adopts the definition in the Chinese national standard "Classification and Grading of Disabilities for Persons with Disabilities" to define the research subjects in this article. In terms of specific research methods, user interviews and questionnaires were conducted to explore the needs of people with disabilities in using mobile applications related to tourism, in order to provide academic researchers and managers with future research and strategic directions.

2. Literature Review

2.1. Tourism Mobile Applications

Tourism mobile applications are one of the main focuses of mobile application development [4]. An increasing number of users are using travel applications to obtain travel-related information and activities [5]. Related studies have shown that tourism companies can establish longer lasting and deeper connections with users through tourism mobile applications, thereby improving communication efficiency between both parties [5]. Tourism mobile applications can better reflect users' needs and provide reference for related tourism companies to launch more perfect services, which is beneficial to improve users' travel experience [6]. Furthermore, because it can provide consumers with personalized and customized tourism service products, tourism mobile applications have completely changed the way tourism-related companies communicate with customers [7].

A high level of user participation in design can promote the development of this mobile application and promote the sales of related travel products [8], but currently, research mainly focuses on the needs of non-disabled people, and users participating in the design of tourism mobile application products are mainly non-disabled people. It is worth noting that there are already literature studies on the needs of disabled people in tourism mobile applications, but mainly focus on the transportation tools for disabled people. For example, overall, compared with mobile app-based ride-hailing services, disabled people rely more on traditional taxis, especially for some older disabled people [9]. Younger disabled people consider ride-hailing services more reliable, convenient, and cost-effective because they are more familiar with using smartphones, so they are more inclined to use ride-hailing services [10]. However, overall, related research still lacks attention to the travel experience of disabled people.

2.2. Disability Tourism

Currently, literature on disability tourism has been increasing and the research mainly focuses on travel barriers [2,11,12] and the diversity of disabilities [13,14]. The research methods mainly include ethnographic observation, questionnaire surveys, and user interviews. The study focuses on the travel of people with disabilities and the obstacles they face. For example, in terms of travel methods, people with disabilities tend to prefer public transportation or taxis [9], which reduces walking and driving and traffic barriers that increase their travel time, thus reducing their travel frequency. Regarding travel preferences, people with disabilities tend to prefer short-distance travel [2]. Some public transportation can hinder the travel of people with disabilities and affect their social welfare [12]. Regarding travel willingness, people with disabilities have the enthusiasm to engage in tourism activities [15], but they will encounter social pressure when traveling, and the need to seek help from others will increase their psychological pressure, leading to a decrease in travel willingness and even an increase in health risks [11]. At the same time, research shows that a good travel experience can improve subjective well-being [16], and accessible tourism can promote the integration of people with disabilities into society and improve their life satisfaction [17].

Applications are an important part of promoting accessible tourism, but relevant research on the travel experiences of people with disabilities is limited, and more research has focused on people with disabilities in developed countries. There is insufficient research on people with disabilities in China. Therefore, this article focuses on people with disabilities in China and studies their needs for travel applications, providing a reference for related research scholars and application developers.

3.   Materials and Methods

3.1.   Research Area

For this article, three online communities for people with disabilities were selected, using the well-known social media platform QQ. The three communities collectively included around 800 members, and the sources of disabled people in the communities covered 34 provincial-level administrative regions in China.

3.2.   Data Collection

Figure 1: High-frequency word network map.

Firstly, user interviews were conducted with three disabled people within the communities who had expressed a desire to travel and had at least three travel experiences. The recorded texts from the interviews were subjected to semantic analysis, generating a high-frequency word network map. (see figure 1)

According to the high-frequency word network diagram, we have summarized the five major needs of users: economic affordability, travel safety, convenient access to information, socialization, and respect. Based on these user needs, we designed 10 functions for subsequent questionnaire design based on the Kano model.

Next, we conducted a questionnaire survey based on the identified needs and designed a closed questionnaire based on user interviews to investigate the preferences of disabled users for travel mobile app functions. The questionnaire consisted of two parts: the first part was a general information survey to investigate the living conditions of disabled people, mainly including gender, age, education level, occupation, and average monthly income. The second part was a survey on the degree of preference for each function of the tourism mobile application based on the Kano model.

This study distributed 40 questionnaires in the online community of people with disabilities, and received 33 effective questionnaires, with an effective rate of 83%. Table 1 summarizes the results.

Table 1: Requirements and functions correspondence table.

Demands	Functionalities	
economic affordability	group buying services	itinerary planning and optimization
travel safety	accessible maps	information on accessible facilities
convenient access to information	recommendations for short-distance travel around the area	recommendations for long-distance travel
social interaction	self-organized group tours	recruiting travel companions for independent tours
gaining respect	off-peak travel	suggestions and complaints

Note: The table is designed based on user demands for a mobile application questionnaire using the Kano model. Group buying service refers to purchasing services as a group. Itinerary arrangement and optimization refer to the mobile application's ability to suggest improvements to users' travel plans and enhance their tourism experience. Accessible maps refer to the mobile application's ability to plan accessible routes for people with disabilities and help them avoid roads that are not suitable for them. Accessible facility information refers to the mobile application's ability to provide users with information on accessible facilities at their travel destinations, such as whether a certain scenic spot provides wheelchair rental services. Self-guided tours refer to the mobile application's provision of a platform for users to form groups online with others. Recruiting travel companions for self-guided tours refers to users being able to post information about recruiting travel companions on the platform and finding others to travel with. Off-peak travel refers to the mobile application's ability to provide users with real-time traffic information and help them avoid crowded routes.

The Kano Model, with its five levels of product functionality, was proposed by Japanese quality management expert Noriaki Kano in 1984, based on the two-factor theory of psychologist Herzberg. Since then, it has been widely applied in user needs research and product function studies. The model categorizes product functionality into five levels:

a. Must-have functionality: features that users consider essential for a product. If the level of perfection for this functionality is high, user satisfaction does not increase significantly. If this functionality is missing, user satisfaction will significantly decrease.

b. Expected functionality: features that users expect from a product. If the level of perfection for this functionality is high, user satisfaction will increase. If this functionality is missing, user satisfaction will decrease.

c. Attractive functionality: features that surprise and delight users. If the level of perfection for this functionality is high, user satisfaction will significantly increase. If this functionality is missing, user satisfaction will not decrease significantly.

d. Indifferent functionality: features that users consider irrelevant to their satisfaction with a product.

e. Reverse functionality: features that users dislike. If the level of perfection for this functionality is high, user satisfaction will actually decrease.

According to the Kano questionnaire design requirements, questions should be designed from both positive and negative perspectives, and survey participants should subjectively select the best answer from five options: "like", "should be", "no preference", "tolerable" and "dislike". The collected questionnaires are analyzed using SPSS and classified using the traditional Kano classification method and the Better-Worse index analysis method.

4.   Results

4.1.   Basic Function Analysis

Table 2: KANO model analysis results summary - numerical results.

Features / Services	A	O	M	I	R	Q	Classification results	Better	Worse
Accessible maps & None	21	3	3	3	0	3	Attractive attributes	80.00%	20.00%
Self-organized group tours & None	15	3	3	9	3	0	Attractive attributes	60.00%	20.00%
Recommendations for short-distance travel around the area & None	12	3	3	12	0	3	Indifferent attributes	50.00%	20.00%
Recruiting travel companions for independent tours & None	12	3	3	12	0	3	Indifferent attributes	50.00%	20.00%
Recommendations for long-distance travel & None	12	12	3	3	0	3	Expected attributes	80.00%	50.00%
Information on accessible facilities & None	27	3	0	0	0	3	Attractive attributes	100.00%	10.00%
Group buying services & None	6	0	16	11	0	0	Must-have attributes	18.18%	48.48%
Off-peak travel & None	21	6	0	3	0	3	Attractive attributes	90.00%	20.00%
Itinerary planning and optimization & None	21	6	0	3	0	3	Attractive attributes	90.00%	20.00%
Suggestions and complaints & None	0	1	21	9	2	0	Must-have attributes	3.23%	70.97%

Through the traditional classification method of the Kano model, it was discovered that there was no reverse function among the 10 surveyed items (see table2), so the Better-Worse index analysis method was used for further analysis (see figure2).
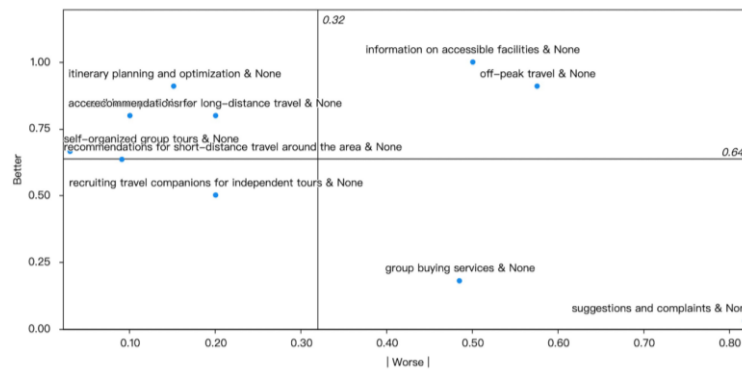
Figure 2: Better-Worse coefficient diagram.

Overall, it is recommended that complaint handling and group buying services are essential functions that must be met, while information on barrier-free facilities and off-peak travel are expected functions. It is recommended that priority be given to meeting expected and attractive functions, such as itinerary planning and optimization, barrier-free maps, recommending short-distance outings, recommending long-distance travel, and organizing self-help tours. The recruitment of travel partners for free travel is an indifferent attribute and does not need to be provided.

4.2. Demand Level Analysis

Table 3: Demand level analysis table.

Demand	Function	Attribute
economic affordability	group buying services	Must-have
	itinerary planning and optimization	Attractive
travel safety	accessible maps	Attractive
	information on accessible facilities	Expected
convenient access to information	recommendations for short-distance travel around the area	Attractive
	recommendations for long-distance travel	Attractive
social interaction	self-organized group tours	Attractive
	recruiting travel companions for independent tours	Indifferent
gaining respect	off-peak travel	Expected
	suggestions and complaints	Must-have

Based on Table 3, it can be inferred that gaining respect is the primary need for people with disabilities while traveling. Due to physiological limitations, people with disabilities often have a lower sense of identity, and they hope to avoid being a burden to others. In addition, the need for affordability is also significant, as disabled individuals tend to have lower incomes than those without disabilities. Furthermore, the need for safety during travel and easy access to information should be met to optimize the travel experience for people with disabilities. Lastly, there is a social need for disabled individuals, as their social circle is often limited. Thus, they hope to make friends or find a life partner during their travels to fulfill their social and marital needs.

5. Conclusion

This study used interview and questionnaire survey data to classify and provide recommendations for the construction of different functions that meet the needs of disabled users using the Kano model. The results show that the construction of travel mobile applications for disabled people should focus

on essential and expected functions, highlight attractive functions to enhance the travel experience for disabled people, and avoid indifferent and reverse functions as much as possible. The user needs in this study were obtained through user interviews with three randomly selected disabled respondents, without further subdivision of the disabled population. Different types of disabled users may have different understandings of the same function's satisfaction. Therefore, there is still room for improvement in user segmentation in this study. Future research should select larger samples for data collection, further subdivide users with disabilities, and conduct more in-depth research on the travel mobile application needs of disabled users.

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