Research on Factors Affecting Travel Satisfaction of Airport Parent-child Group Based on ISM

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Abstract—With economic development and the improvement of people's living standards, aviation travel has become a common mode of transportation. The parent-child form of travel is getting more and more common. Paying attention to the satisfaction of the parent-child group in the airport will help improve the service quality of the airport. In this paper, the factors affecting travel satisfaction of airport parent-child group are proposed, and the relationship as well as hierarchy is sorted out by using the interpretative structural model method (ISM). The conclusions can provide guiding recommendations for improving the parent-child service at the airport.

Keywords—airport; satisfaction; parent-child group; ISM model; service

I. INTRODUCTION

In 2018, civil aviation in China keeps a steady development. The annual quantity of passenger transport is 610 million, an increase of 10.9%. There are 37 airports reaching a passenger throughput up to 10 million, added 5 [1]. The development of civil aviation puts forward higher requirements for service quality. As a transportation hub and public service facilities, airport should improve its service and pay attention to the experience of special passenger groups, which helps to improve passenger satisfaction and create a good brand image.

On the other hand, the concept of parent-child travel is getting more and more popular. Parent-child travel refers to children traveling with their parents as a family. As a form of travel market segmentation, parent-child travel has its own characteristics which we should pay attention to. Since children above 14 have the ability to travel independently, the definition of children's ages ranges from 0 to 14 in parent-child for a facilitate research [2].

At present, the research on satisfaction of airport service has been paid much attention by more and more scholars. A considerable part of research puts forward the evaluation system or model of airport service satisfaction from the perspective of management and proposes suggestions of improving airport service quality through investigation. The study of parent-child travel, which is a new form of travel market segmentation, is in the process of development and is in the ascendant. However, the study on the travel satisfaction of parent-child groups in the scene of the airport

is still very rare. Therefore, this paper focuses on the parent-child group in the airport and uses the interpretative structural model method (ISM) to sort out the relationship and hierarchy of affecting factors. The conclusions obtained are expected to guide the airport to improve the quality of parent-child services and optimize the service system, which is a better reflection of the people-oriented concept.

II. THE ESTABLISHMENT OF THE ISM

A. The Reason for Using ISM Method

Interpretative structural model method (ISM method), which can reveal the hierarchical and structural relationships of system elements through known relationships. In the scene of airport, factors affecting travel satisfaction of parent-child group are diverse, which interrelate. Hence using ISM method for a comprehensive analysis of these factors is suitable.

B. Identifying the Factors Affecting Travel Satisfaction of the Airport Parent-child Group

In order to identify the factors affecting the travel satisfaction of the airport parent-child group, the relevant literature was consulted [3], [4], [5], [6]. It mainly refers to the ACSI model and the airport evaluation system with high recognition [7] in the civil aviation industry. According to American Consumer Satisfaction Index (ACSI), as shown in "Fig. 1", customer satisfaction is affected by customer expectations, perceived quality, perceived value, and ultimately affects customer complaints and customer loyalty as a result. As a wide-accepted model, ACSI can help to understand the causes of customer satisfaction. The frequently used airport evaluation system referred to includes Airport Service Quality (ASQ) drafted by Airports Council International (ACI), Chinese civil airport service quality evaluation system (MH/T 5114-2017) [8] and the civil passenger service evaluation (CAPSE) [9] in China. The common airport evaluation system helps to sort out the processes and key points of the airport service. After extracting the affecting factors, the airport survey was conducted, and the expert interviews were organized to make the factors hierarchical and classified properly. It finalizes seven affecting factors, including airport traffic, guidance sign, facility and environment, service plan, service skills, time and convenience, and travel status, as explained below.
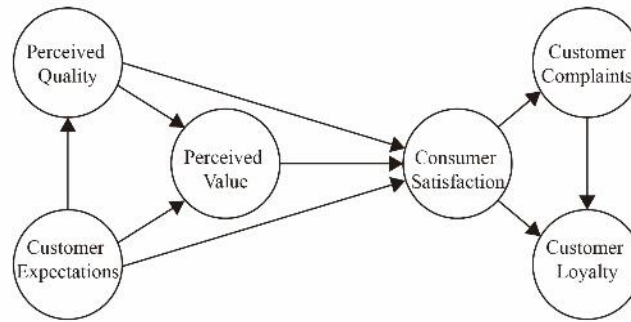
Fig. 1. ACSI model.

- Travel satisfaction of airport parent-child group(S0)

- Airport traffic (S1): Transportation to airport (such as subway, bus, airport bus, private cars, etc.) and transport facilities (such as subway stations, car parks, etc.).

- Guidance sign (S2): Guidance sign in the airport and other form of guidance information such as broadcast, screen display, etc. Specific to the parent-child group, we can focus on the guidance signs for nursery, breastfeeding room, maternal and child rest areas and other related facilities.

- Facility and environment (S3): facilities provided by the airport, environment as well as sanitation. In addition to general facilities such as self-check in terminals, passenger convey belt for all passengers, we can focus on nursery, maternal and child rest areas, maternal and child toilets, children's parks, baby carriages, water dispensers, shops, and other related facilities for parent-child group.

- Service plan (S4): service plan for parent-child group, such as special counters and security channel set, security check for pregnant and carrying infant passengers, route design for parent-child group, staffing, contingency plan and so on. Aware of the pain points encountered by the parent-child group, airport can consciously formulate service plan to standardize, normalize and streamline the services of the parent-child group and ensure a stable service quality.

- Service skills (S5): service skills of airport staff, such as efficiency, attitude, proficiency (whether familiar with service plan on parent-child groups), etc. Service skills raise a claim for airport staff themselves and are directly related to airport's training for staff

- Time and convenience (S6): Time refers to the time which passengers spend in each process. Convenience includes three aspects: convenience of facilities, smoothness of service, the connection of each process.

- Travel status (S7): travel status of parent-child group, such as companion for child, children's age, condition of luggage, trip purpose and so on. If a parent is

traveling alone with a child, he often feels embarrassed in processes of check-in and security check for a lack of energy. If children travel with more than one adult, the processes will get easier because adults can take care of children in turn. On the other hand, children at different ages have different characteristics. For example, infants and young children need to be held or brought along in the pram, while older children need to be taken care of because they are active. Therefore, whether they bring pram into the airport or not will make a difference to security check, consignment, and route. Different travel status of parent-child groups can lead to very different experiences.

C. The Establishment of the ISM

After identifying these 7 factors affecting travel satisfaction of parent-child group in the airport, the adjacency matrix S is determined based on literature review, airport field research, and the opinions of the airport management.

$S = (Sij) \, m \times n \, (\, i,j = 0,1,2 \, ...7; \, m,n=1,2,3 \, ...8)$

$Sij = 1$ or 0

1 indicates that Si has a direct influence on Sj, and 0 indicates that Si has no direct influence on Sj.

The adjacency matrix S ("Fig. 2") is as follows:

$$
S \quad = \quad
\begin{matrix}
0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\
1 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\
1 & 0 & 0 & 0 & 0 & 0 & 1 & 0 \\
1 & 0 & 1 & 0 & 1 & 0 & 1 & 0 \\
1 & 0 & 1 & 1 & 0 & 1 & 1 & 0 \\
1 & 0 & 0 & 0 & 0 & 0 & 1 & 0 \\
1 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\
0 & 0 & 0 & 0 & 0 & 0 & 1 & 0 \\
\end{matrix}
$$

Fig. 2. Adjacency Matrix S.

The reachability matrix A ("Fig. 3") is obtained by calculation as follows:

$$A = \begin{matrix} 1 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 1 & 1 & 0 & 0 & 0 & 0 & 0 & 0 \\ 1 & 0 & 1 & 0 & 0 & 0 & 1 & 0 \\ 1 & 0 & 1 & 1 & 1 & 1 & 1 & 0 \\ 1 & 0 & 1 & 1 & 1 & 1 & 1 & 0 \\ 1 & 0 & 0 & 0 & 0 & 1 & 1 & 0 \\ 1 & 0 & 0 & 0 & 0 & 0 & 1 & 0 \\ 1 & 0 & 0 & 0 & 0 & 0 & 1 & 1 \end{matrix}$$

Fig. 3. Reachability Matrix A.

The affecting factors are layered according to the reachability matrix A. The first layer is S_1, S_3, S_4, S_7, the second layer is S_2, S_5, the third layer is S_6, and the fourth layer is S_0. "Fig. 4" is an ISM hierarchical relationship diagram.
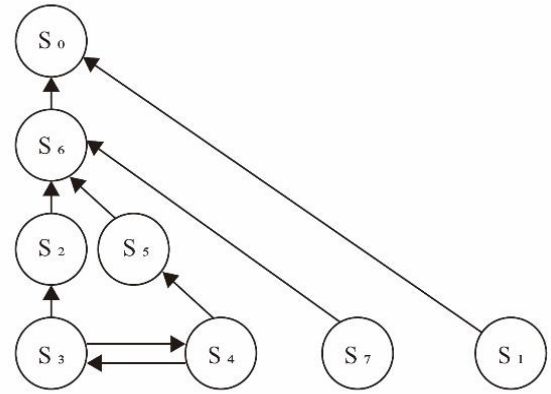

Fig. 4. ISM hierarchical relationship diagram.

Combining "Fig. 4" with the service characteristics of the airport, it is possible to obtain an interpretative structural model as shown in "Fig. 5".
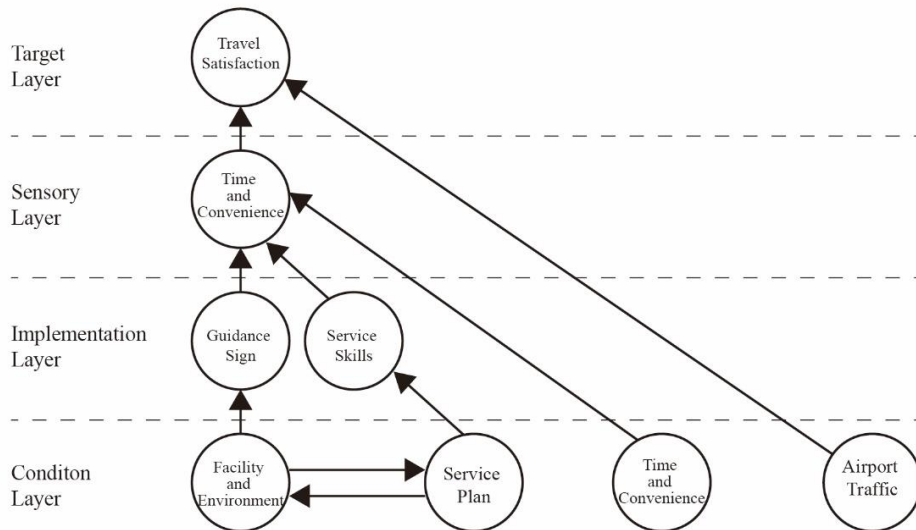

Fig. 5. Interpretative structural model.

III. ISM RESULTS AND ANALYSIS

In order to describe and use the obtained ISM model of travel satisfaction of airport parent-child group conveniently, the four levels in the model are named as the condition layer, the implementation layer, the sensory layer and the target layer.

A. Target Layer

From the structure and level of the whole system, travel satisfaction of airport parent-child group lies in target layer. Because it is our ultimate goal to improve the service level and perfect the service details in order to improve the travel satisfaction of the parent-child group. Increasing travel satisfaction of parent-child group at the airport will help to increase customer loyalty and create a good corporate image for the airport.

B. Conditon Layer

1) Relationship between conditon layer and implementation layer: The condition layer and the implementation layer are the parts that need to be focused on in the ISM model. Touchpoints of the airport facing the parent-child group are located in these two layers in the model. According to the method of service design, it is very important to improve the touchpoints and processes in order to optimize the service. Therefore, it is reasonable to lay special stress on analyzing these two layers. Sometimes there are no clear boundaries between condition layer and implementation layer in the actual operation of the airport. However, we can find that the affecting factors located in condition layer include airport traffic, travel status, service plan, facility and environment. These factors are related to

hardware and facilities or the factors fixed in a certain time period, which airport can hardly make a rapid change. For example, the traffic of an airport often involves the transportation planning of the whole city. Hence, it is difficult to make a great improvement from the perspective of the airport alone. The facilities equipped in the airport are also fixed in a certain period of time. Service plan is also normalized for a period of time and will not be changed at will after proposed based on research. When it comes to the travel status, it is a factor of passengers themselves. It can't be controlled by the airport. What airport can do is offering different service for passengers in different status. In implementation level, there are guidance sign and service skills these 2 factors. These two factors are relatively flexible and more convenient to adjust compared with the factors in condition layer.

2) Analysis of condition layer: Therefore, to improve the travel satisfaction of the parent-child group, the airport should pay attention to and carefully plan the affecting factors of condition layer. Because the factors in condition layer are harder to adjust for relatively inflexibility, it is necessary to carefully consider the characteristics of the parent-child group in the planning. Facilities should be suitable for parent-child groups, while a humanized and easy-to-operate service plan should be developed for the pain points. Service plan and facility & environment are a pair of factors that affect each other. Service plans can affect the procurement and setup of airport facilities, while improvements in facilities can lead to adjustments in service plans in turn. Only with smooth coordination between service plan and facilities will the parent-child get a comfortable experience. What we should pay attention to is the decision error in condition level may bring a greater cost of error correction, due to a more basic and low-level position where the affecting factors of the conditional layer, especially the service plan and the facilities, locate in the entire ISM model. For example, although the baby strollers provided by BaiYun Airport bring convenience for passengers, many passengers reflect that the stroller's sitting posture and material are not comfortable. However, if airport plans to solve this problem, it will bring an extra cost for purchasing new pram.

C. Implementation Layer

The affecting factors in implementation level are guidance sign and service skills. These two factors are relatively more flexible. The affecting factors in implementation layer assist factors in condition layer in function and are able to make up for the deficiency of the condition layer to a certain extent. For example, facilities and environment have requirements for the guidance sign. Even though the airport is well-equipped with parent-child facilities, good guidance signs are needed to guide the parent-child group. Good parent-child facilities with good guidance signs will make the parent-child service even better. On the other hand, service plan formulated by the airport

also has requirement for service skills to help implement it, for example, when the parent-child group undergoes safety checks, whether the staff is skilled and humanized, and when staff meet parent-child group in their work, whether they can display initiative. These will intuitively affect the feelings of the parent-child group. At the same time, the defects in the service plan can also be compensated by the service skills of the staff. Therefore, at the implementation level, the airport can exert subjective initiative as much as possible, offering good guidance sign and paying attention to training staff for parent-child service.

D. Sensory Layer

The factors of the sensory layer are time and convenience. This factor is a combination of time and convenience of facilities and processes. This factor is based on the feelings of the parent-child group and has a direct connection with travel satisfaction. The time which passengers spend in each process determines whether passengers can board the plane on time or not. Therefore, time is the factor that passenger value very much in the airport scene. Common airport evaluation systems all pay attention to the time. Firstly, time is affected by travel status to a certain extent. Secondly, a friendly service plan for the parent-child group implemented with service skills of well-trained staff will help parent-child group save time. Thirdly, well-equipped facilities with clear guidance sign can bring more convenience for fewer detours. Therefore, the main factors that affect the travel satisfaction of parent-child groups in the sensory layer are finally summarized as time and convenience, which is in line with previous research results. On the other hand, the ISM result can also be explained by ACSI. Time and convenience are the most important content of parent-child group's perceived quality as well as perceived value in the airport scene. Travel status is often related to customer expectations because passengers in different status ask for different service. Therefore, the affecting factors in condition layer and implementation layer are concentrated in sensory layer as the factor of time and convenience, and directly affect the final travel satisfaction, which leads to customer complaints and customer loyalty. This result is in line with the classic ACSI satisfaction model.

E. Other Details

Airport traffic is an external factor to a greater extent compared with other factors in the ISM model. Because it plays a role outside the airport, while other factors function in the range of airport. Therefore, in this ISM model, airport traffic directly affects travel satisfaction in target layer skipping condition layer, implementation layer and sensory layer of airport.

IV. CONCLUSION

In summary, by using the ISM model, we analyze the level and relationship of the factors affecting the travel satisfaction of the airport parent-child group. In actual operation, airport can formulate corresponding service plans and purchase appropriate facilities combining the travel status of the parent-child group in condition layer. The

implementation layer airport should optimize guidance sign, strengthen training for service skill improving service awareness. The parent-child group can save time and feel convenience in sensory layer, which means a greater travel satisfaction.

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