[ACI Asia-Pacific Young Executive of the Year Award 2019]

Understanding and Utilizing Passengers' Needs via Information Technology

Ryo Fukuda

IT Development and Planning Department

Corporate Planning Division

Narita International Airport Corporation

Contents

1. Abstract

The transport quantity of the aviation industry has been growing continuously, and this trend is expected to continue in the future. Along with the increase in air traffic volume, the handling capacity of airports has also been expanding. In addition, due to the diversification of travel arrangements and airline companies, passengers visiting the airport have also been varying greatly. In such conditions, it is difficult for airports to understand what the passengers want without changing their conventional methods. There is also a possibility that they will not be able to maintain their current standards. Under such circumstances, airports need to utilize the combination of new technologies in order to understand customer needs and for further development of the airports.

In this paper, we propose an accurate acquisition of the information on customer's locations and to enable chatbots to provide guidance at any time and from anywhere. By using this method, it is possible to obtain the accurate location of a customer, who gets lost and has problems in the airport. Moreover, the use of this information enables an immediate improvement of customer service and the planning of long-term measures, such as the construction and renovation of airport facilities, shop setup, etc., which will also create benefits for airlines.

2. Introduction

Nowadays, the aviation industry has been expanding globally. Demand is expected to expand greatly in the future, particularly in the Asia Pacific region. Along with that, airports in various regions are expanding their capacities, which include the construction of new runways, expansion of terminals, and construction of new terminal buildings. In addition, airports are vital not only as a place to board or leave the airplanes, but also to provide customers with various necessities, such as shopping, food,

and entertainment.

An international airport is a place used by a wide variety of customers. Airport management is required to provide services to customers with different languages, religions, and values. In addition, with the development of LCC, it has become possible for people to fly at a much lower price, which has diversified the income level of airport users. In this way, it can be said that in order to maintain and provide a high level of service to customers with diverse cultures, airport management is required to clearly understand the customers' needs.

Furthermore, it is also required to be able to respond promptly to the changes in needs. With the rapid development of information technology, customers can find information on various trends just using their smartphones. While customers' needs are constantly changing, it can be said that airport management is required to understand and be responsive to the customers' needs and to provide services according to those needs

3. Collecting Customers' Needs and Introducing Information Technology at Narita Airport.

At Narita airport, we are currently collecting information on the customers' needs using four methods. The customers' opinions received using the following methods are collectively managed on the portal website which can be viewed by the company staff as well as by the guidance staff.

3.1. The Way of Collecting Customers' Needs.

3.1.1. Information Counters

In Narita airport there are a total of 20 manned information counters in terminals 1, 2 and 3 and they play a role as contact points not only for informational guidance, but also for receiving complaints and compliments from the customers.

3.1.2. Writing forms for collecting reviews from customers

Stands for writing comments are set up not only at information counters, but also in many places throughout the airport allowing you to fill in the comment form and submit it.

3.1.3. Call center

The staff even collect phone calls from customers to hear their opinions.

3.1.4. The contact form on the airport's website

There is a form on the website that customers can use to write their comments directly and their opinions will too be collected and managed in the same way as the opinions submitted at the counter.

Examples of ICT utilization at Narita Airport

3.2. Introducing Information Technology at Narita Airport.

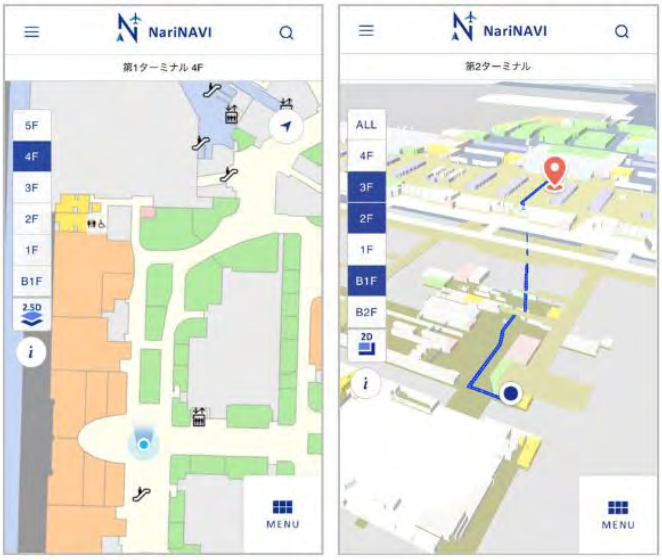
3.2.1. Apps "NariNAVI"

It is an airport guidance and navigation application released in September of 2018. Even in terminals where there is no GPS reception it is possible to display the position information on customers' smartphones in real time as well as routes to boarding gates, shops, etc.

This application has two features, the first being that it can provide very accurate information on one's position inside the airport. This function utilizes radio waves transmitted by BLE beacons installed at approximately 1,500 locations in the airport and performs positioning measurements inside terminals by detecting their signals with the sensor in the smartphone.

The second feature is the ability to register information on flights. With flight information registered in it, the application will send alerts before the departure. It is linked with the airport's flight information, so even when there are changes in times, it will still give timely alerts. In addition, by

using 2-D barcodes it is also possible to display and confirm on one's mobile device the routes retrieved through the interactive digital signage "infotouch" which are installed throughout the airport.



Map of "NariNAVI"

(Source：http://www.nttdata.com/jp/ja/news/release/2018/091900.html)

3.2.2. Chat Concierge Service

It is a service for guiding customers using a chat with AI. It specifically targets customers who come to Japan from abroad and we are currently offering services in English and Chinese. The connection method is easy with the need only to access the relevant page in a web browser, so anyone can use it. Also, when accessing the free Wi-Fi service at the airport, users will be smoothly transferred to this concierge service. As for the guidance service for customers, there is available information on the traffic access from the airport to the city, on facilities inside the airport such as restaurants, informational guidance around the area near the airport, a free transit program, etc. Also, we are accumulating data on the types of questions and the contents of feedback sent to us by customers.

Images of chatting with chatbot

(Source : https://www.newswire.com/news/narita-to-become-first-ai-powered-airport-in-the-world-with-launch-of-20039822)

4. Proposal

The author proposes utilizing information obtained through a combination of chatbot guidance services and location finding of individual passengers within the airport as a way to analyze and capitalize on new customer needs. This proposal is limited to departing passengers as its key target. However, in collecting and analyzing detailed information on the needs of departing passengers as proposed, the results can be utilized for the benefit of all customers who use the airport. First, I will describe the specific content of analysis.

4.1. Understanding Passengers' Needs

4.1.1. Collection of Passenger Data and Location Information

Information about a passenger's time in the airport is collected as detailed data, including current

location, as well as the route and places visited on the way to their final destination, the boarding gate. Boarding passes will serve as the basis for obtaining passenger information; I propose enhancing passenger data by enabling transmission and reception of location information through electronic tagging of boarding passes. In addition, installing beacons within the airport would enable accurate measurement of passenger location inside terminals.

Obtaining passenger location information via boarding passes offers two advantages. First is the ability to acquire independent data on individual passengers. Many airports currently use camera image recognition as a means of analysis in passenger flow management, often measuring and utilizing data on groups of people. Conversely, this proposal is premised on obtaining the location information of individuals. In addition to being used individually, such information can be collated to provide quantitative data on passenger crowding and congestion in airport facilities.

The second advantage is the ability to grasp information about time spent within the airport as a series of events. At present, passenger location information results from boarding pass use, based on purchase data from shops or passage through security screening and Customs. This information is obtained at specific points, making it difficult to aggregate. Although this enables analysis of utilization levels, trends and needs at individual facilities, it is difficult to ascertain correlations between multiple facilities. Combining beacon location positioning and boarding passes, which departing passengers must have, enables the visualization of customer movement throughout the entire airport facility.

4.1.2. Customer Guidance Services via Chatbot

A chatbot is an automated program that converses with users via text or voice. Using a smartphone or other device, passengers can make inquiries at any time or location. This service offers two advantages, the first being the ability to simultaneously handle numerous inquiries. There is a conceivable limit to

the guidance that can be provided by manned counters in the Asia-Pacific region, where passenger numbers and airport facilities alike are forecast to expand.

For simple questions, chatbots are able to provide customers with information on the spot. Handling complex inquiries and requests at manned counters while assigning simple queries to chatbots, such as flight information or facility locations, is likely to contribute to improving overall customer satisfaction. The second advantage is that inquiry data becomes easier to collect. For questions raised through chatbot interaction, accumulating data on solutions, replies and passenger responses is simple.

4.1.3. Utilizing Combined Information from 4.1.1&4.1.2

Combining a chatbot with location positioning via electronic tagging of boarding passes enables the acquisition of a vast amount of useful information that could not be obtained through existing methods. Which points within the airport process cause problems for passengers? Where does confusion arise? This system would allow customer needs to be immediately recognized and analyzed. In addition, cumulative analysis of data from individual passengers would enable the airport to implement precisely targeted measures within short periods of time. The results of such analysis not only enable the provision of short-term exclusive services, such as special products aimed at passengers from specific countries or regions but may also be utilized as passenger movement distribution data when improving or establishing airport facilities. With this method of collecting information on passenger needs, sharing data between airports can also lead to more accurate analysis results. In this way, it can also contribute significantly to improving airport services throughout the Asia-Pacific region.

4.2. Suggestions for Information Utilization

4.2.1. Guidance services for individual customers

Currently, customers searching for specific places within the airport must go through the process of

confirming their present location, checking their destination and searching for an appropriate route. More specifically, in order to understand their own whereabouts, customers must move to check nearby information boards, digital signage or manned counters. By using a chatbot, customers can make these searches from wherever they happen to be at the time. Using location positioning via boarding passes also allows chatbots to guide customers to the nearest facilities, improving convenience for those who are lost. It is also possible to reduce wait times for assistance, as more customers receive information on their own devices instead of crowding manned counters.

Another outstanding feature of guidance via chatbot is the ability to share photos and videos with customers. For customers unfamiliar with vast terminal buildings, it is extremely difficult to explain the long routes needed to reach their destinations with instructions such as ‘turn right in 200m’. In such cases, a chatbot is able to offer more user-friendly guidance by using photos and videos. It can provide customers with specific guidance, such as photos that indicate helpful landmarks en route.

The chatbot can also provide customers with suggestions that are difficult to provide with conventional methods. For example, the chatbot can prompt customers to avoid congested areas by sending information about waiting times at security checkpoints and departure procedures via push notifications.

In addition, the system can send recommendations of shops and popular products according to customer attributes obtained from boarding pass information or the chatbot, and receive instant feedback. By making suggestions rather than simply receiving information on customers, the airport can draw out potential needs, or clarify which needs and demands do not exist. This can immediately be stored as data. For the customer, this presents opportunities to learn about previously undiscovered aspects or attractions at the airport.

The airport can accumulate customer information chronologically (i.e. on timelines). This system enables the collection of detailed path data, consisting of location information from boarding passes,

as well as the content of questions received by the chatbot, information provided in response, and any relevant feedback (whether the information was what the customer required). Instantaneous repetition of these analysis tasks enables constant improvement of accuracy.

4.2.2. The greatest extent of utilization of airport facilities

In an airport it happens so that there are facilities which are used frequently and those which are not used very often. When we take toilets as an example, we can see that visitors may concentrate around facilities on one end or side, which may lead to formation of a crowd, while on the other hand, there are situations when toilets located a bit far away are less used by customers, so they give airports a lonely impression. As a result of congestions and not being able to use a certain facility smoothly, the customers' expectations cannot be lived up to, so the facility does not fully perform its role as it could and it is possible to visualize such a distortion of balance.

In addition, by converting the movements of customers' emotions sent to the chat bot into data, it becomes possible to know how the fact that some facilities are not being fully utilized influences customer satisfaction. By clarifying the differences between assumptions at the time of designing the terminal and the actual results and utilizing them for facility refurbishment plans, we will be able to contribute to creating airports whose designs reflect the needs of customers. In addition, since the customers' actions can be converted into data as series of events, by clarifying places where customers are likely to get lost or stay too long as well as those where many complaints appear, it will be possible to implement measures to improve the facilities in question.

4.3. Other Utilization

In addition to being useful in independent airport measures, this proposal can also yield improvements in analytical accuracy by sharing data between airports, dramatically increasing sample data. The

collected data could be shared with other airports. Using common platforms would enable sharing of data and analysis of trends among airports in the Asia-Pacific region. This makes it possible to understand, analyze and apply regional passenger needs to initiatives within short cycles.

By handling questions anywhere, at any time, the chatbot offers a detailed understanding of places where customers become lost or seek information. In eliminating the need to seek out information counters, it can compensate for personnel shortages. Preloaded with country and flight information, the bot is able to select guidance services optimized for each individual, based on past inquiries and movement data. This provides a service that anticipates the needs of passengers.

For airlines, the benefit is a contribution to on-time departures. At present, the only way to find passengers who have not turned up at their boarding gate is to search around the terminal; as terminals continue to expand, relying on human effort for searches imposes a significant burden on staff. By specifying the location of boarding passes, this proposal can provide precise and immediate knowledge of how many passengers have assembled and where to find those not present.

This can also contribute to improving the efficiency of security and cleaning tasks by measuring the times and locations where people gather. As airports expand, this data can serve as a basis for precise and efficient allocation, which becomes necessary in order to provide better service with limited resources.

5. Closing Remarks

The author believes that one of the main services which airports must provide to their customers is making it possible for customers to get to places where they want to go without getting lost. Reducing such situations as "I can’t find the facility that I want to go to right now" or "I do not know in which direction I should go" is something which adds value to the customers' experience of staying at an airport. The next step will be to provide satisfying stores and shops for food and drinks and the

entertainment experience.

However, as the number of passengers' increases at constantly expanding airport facilities, it becomes extremely difficult to develop environments where customers will not get lost. As facilities become larger and travel distances inside them become correspondingly longer, the more diversified facilities such as stores, etc. will lead customers to make their choices from among many options. It is a very important point that the process of getting the information causes the least amount of stress.

By implementing a combination of electronic tagging of boarding passes and the chat bot it will be possible to understand at which places the customers experience troubles through the use of the customers' location information and the data from their requests - in other words, customer's needs can be understood in detail.

By making it possible to smoothly move inside the airport without feeling stress, the quality of the airport experience will improve, and it will be possible to create more needs. For that, it is important to accurately grasp the needs of customers, especially those which become barriers to enjoying the experience. Airports that meet all of the customers' needs can be created.

Customers' needs do not just appear in fixed numbers but will continue to change from time to time. The most important thing is to use advanced technologies to visualize the needs which are difficult to capture, analyze them quickly and connect them to improvement and further development. By stating that all of this can improve the quality of airports in the Asia-Pacific region we would like to finalize this paper.