

Methods to Achieve Two Objectives at Same Time: Deriving Combinational Model of Process and Cognition for Customer Service by Analyzing Flight Attendants' Empirically Grounded Hospitality

— *Review of* —
**Integrative
Business &
Economics**
— *Research* —

Yasuko Imamura*

ANA Strategic Research Institute Co., Ltd., Tokyo, Japan

Nobuyuki Kobayashi

The System Design and Management Research Institute of Graduate School of System Design and Management, Keio University, Kanagawa, Japan

Seiko Shirasaka

Graduate School of System Design and Management, Keio University, Kanagawa, Japan

ABSTRACT

The problem of this study is that it is not clear how to consider products and services that aim to achieve two objectives at the same time. Therefore, the purpose of this study is to show how to consider products and services that aim to achieve two objectives at the same time. The proposal presents two patterns realized by the time axis. Specifically, to realize products and services that aim to achieve two objectives at the same time under restrictions that cannot be easily enhanced or expanded due to space constraints, this study proposes a pattern to distribute the ability to two roles by ratio and a pattern to switch the ability. The role of the pattern that distributes the ability to two roles by ratio is security and service personnel. The ability of the pattern to switch the ability is the function for a chair armrest and the function for a bed surface. Moreover, considering the hospitality that flight attendants showed in the cases, it was suggested that there was the behavior of “understanding the situation” before “estimation of passenger psychology and request” of the customer service process model.

Keywords: Products, Services, Hospitality, Flight Attendant.

1. INSTRUCTION

Several Previous studies (Nandakamuran, 1998) (Ruo-gui et al., 2008) (Li et al., 2015) (Sang, 2015) describe that it is difficult to achieve two objectives at the same time. The problem of this study is that it is not clear how to consider products and services that aim to achieve two objectives at the same time. Therefore, the purpose of this study is to show how to consider products and services that aim to achieve two objectives at the same time. The proposal presents two patterns realized by the time axis. Specifically, to realize products and services that aim to achieve two objectives at the same time under restrictions that cannot be easily enhanced or expanded due to space constraints, this study proposes two patterns; one pattern is to distribute the ability to two roles by ratio and the other pattern is to switch the ability to two roles. The roles in the pattern to distribute the ability to two roles by ratio are security and service personnel. The two

roles in the pattern to switch the ability to two roles are the role to achieve the function of a chair armrest and the role to achieve the function of a bed surface.

We explain the analysis method with two actual cases. (Seat and flight attendants' in-flight duties). As a result, this study specifically shows how products and services that aim to achieve two objectives at the same time change in two cases. Moreover, this study reveals the flight attendant's hospitality shown in the case study.

Next, we describe the novelty of this study.

Nandakamuran (Nandakamuran, 1998) describes that in general, it is impossible to achieve two objectives at the same time with a single control in one domain. However, this study examines domain control problems and proves the existence of a solution that divide the domain of action of control and minimizes the problem. It is not a study that focuses on showing by the time axis, how products and services can achieve two objectives at the same time.

Ruo-gui et al. (Ruo-gui et al., 2008) describes that it is difficult to achieve two objectives such as the generated summary is as short and informative as possible, at the same time in an automatic video summarization by spatio-temporal analysis and nontrivial repeating pattern detection. To solve the problem, the study is conducting experiments in which customers select summaries of different ratios. However, this is not a study of how to distribute the ability to two roles by ratio by the time axis.

Li et al. (Li et al., 2015) describes that in order to increase the good-put, the packet allocation algorithm is expected to achieve two objectives: low redundancy and high decoding probability. The study also described that it is very hard to achieve two objectives at the same time. However, the study is for the aeronautical multi-path transport protocol (AeroMTP) for airborne networks, it does not assume products and services achieve two objectives at the same time.

Sang (Sang, 2015) examines the relationship between higher academic achievement and better health through schools' actions and suggests that schools can take action to achieve two objectives at the same time. However, the study does not focus on showing how to achieve two objectives at the same time by the time axis.

Maier (Maier, 1998) describes a system of systems is an assemblage of components which individually may be regarded as systems. However, the study does not focus on showing by the time axis how products and services can achieve two objectives at the same time under restrictions that cannot be easily enhanced or expanded due to space constraints.

Stephen et al. (Stephen et al., 2004) at service-dominant-logic describes intangible products that create value on the process of exchange. However, the study does not assume products and services achieve two objectives at the same time.

David et al. (David et al., 2013) describes a real-time scheduling service for parallel tasks. However, the study is for software development, not for products and services that achieve two objectives at the same time under restrictions that cannot be easily enhanced or expanded due to space constraints.

Morishita et al. (Morishita et al., 2017) describes the elements of "Omotenashi" and the management of related skills and knowledge, based on the Japanese inn case. However, it is not a study that focuses on the behavior of the customer service process in which flight attendants show hospitality.

Ehsaneh et al. (Ehsaneh et al., 2013) focuses on the underlying dimensions of airline hospitality and describes the scale to measure the hospitality of flight attendants. However, the study does not focus on the customer service process to show hospitality.

Hara (Hara, 2017) studies the service skills of skilled flight attendants and describes the “customer service process model” when the flight attendants show hospitality. However, the study shows the “customer service process model” for the purpose of teaching materials. In this study, the behavior which the flight attendants actually performed was applied to the “simplified customer service process model based on teaching materials” presented by Hara (Hara, 2017) in order to verify the flight attendants’ hospitality. As a result, the “customer service process model based on teaching materials” has been expanded based on the behavior actually taken by flight attendants.

Therefore, the novelty of this study is to show by the time axis how to consider products and services that aim to achieve two objectives at the same time under restrictions that cannot be easily enhanced or expanded due to space constraints. Moreover, it is to expand the “simplified customer service process model based on teaching materials” when the flight attendants show hospitality.

Section 2 describes previous studies. Section 3 presents the proposal. Section 4 describes the analysis method. Section 5 describes the results of the analysis. Section 6 gives discussion. Section 7 gives conclusions with future research topics.

2. PREVIOUS STUDIES

Maier (Maier, 1998) describes that a system of systems is an assemblage of components which individually may be regarded as systems. Five principal features (Maier, 1996) (Nielsen et al., 2015) of a “system of systems” is as follows:

- Operational Independence. Any system that is part of an SoS is independent and is able to operate serviceably if the SoS is disassembled.
- Managerial Independence. Despite collaborating with the other members of the SoS, the individual systems are self-governing and individually managed so that they “not only can operate independently, they do operate independently.”
- Geographic Distribution. The parties collaborating in an SoS are distributed over a large geographic extent. Although the geographic extent is defined vaguely, it is stressed that the collaborating systems can only exchange information and not considerable quantities of mass or energy.
- Evolutionary Development. An SoS’s existence and development are evolutionary in the sense that objectives and functionality can be under constant change, as they can be added, modified, or removed with experience. Thus, an SoS never appears completely formed.
- Emergent Behaviour. Through the collaboration between the systems in an SoS a synergism is reached in which the system behaviour fulfils a purpose that cannot be achieved by, or attributed to, any of the individual systems.

Service-dominant-logic proposed by Stephen et al. (Stephen et al., 2004) describes that new perspectives are converging to form a new dominant logic for marketing, one in which service provision rather than goods is fundamental to economic exchange.

The Comparison of Hospitality and Japanese Hospitality “*Omotenashi*” has been proposed by Terasaka et al. (Terasaka et al., 2014) described as follows:

Both *Omotenashi* and hospitality are “spiritual” ideas. It means that both of them influence the mind of visitor or guests.

Both *Omotenashi* and hospitality shows relationships between customer and staff are at the same position. It means that staff do not need to obey customers. Both ideas direct places or situations. In other words, both ideas contain the meaning that entertains

customers to create services or arrange environments. The warmth of a person is an important factor of both ideas. Customers expect staff to treat them kindly and to sympathize. The difference between *Omotenashi* and hospitality is that *Omotenashi* contains traditional Japanese rules. The rules based on culture create an elegant and reserved attitude. Moreover, it is a similar idea with manners.

Hara (Hara, 2017) studies what hospitality is in the service of flight attendants. The study, based on service engineering, explored the behavior of flight attendants and proposed a framework of thinking for human resource development teaching materials. Figure 1 shows the simplified customer service process model that is the basis of teaching materials (Hara, 2017).

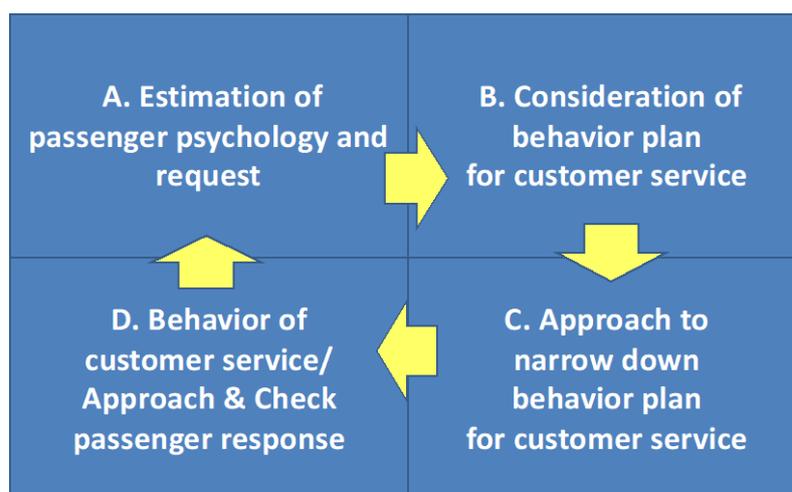


Figure 1. Simplified customer service process model (Hara, 2017).

3. PROPOSAL

The purpose of this study is to show how to consider products and services that aim to achieve two objectives at the same time. The proposal of this study presents two patterns by the time axis under restrictions that cannot be easily enhanced or expanded due to space constraints. One is the “pattern to switch the ability” as shown in Table 1. The other is the “pattern to distribute the ability to two roles by ratio” as shown in Table 2. The following describes how to read the tables. The life cycle of the subject to be handled is defined as boarding, takeoff, meal service, cruise, landing, and disembarking.

The numerical value described in Table 1 has a maximum value of 10. “A” shown in Table 1 is a part of the seat that has the function of a chair armrest in Figure 2 and the function of a bed surface in Figure 3. When A is in the armrest position, it is expressed during “boarding” and “takeoff” at 10. This shows that A is the position of the armrest. The same applies to “meal service”. Secondly, regarding “cruise”, it is showed at 10 that A is integrated with the seating surface. Finally, “landing” and “disembarking” show that A is at the armrest position. The “pattern to switch the ability” specifically shows a first-class seat that achieves both a comfortable chair with armrests for working, eating and watching movies on an airplane as well as a wide bed for sleeping.

The numerical value described in Table 2 has a maximum value of 10. “6” at security personnel and “4” at service personnel are expressed during “boarding”. The above explanation shows that during landing, the flight attendants are distributing their ability

to security personnel at a ratio of “6” and service personnel at a ratio of “4” to achieve two roles at the same time. We explain the flight attendants are distributing their ability to security and service personnel to the following ratios: 9:1 during takeoff, 2:8 during meal service, 5:5 during cruise, 9:1 during landing, and 6:4 during disembarking.

Next, we describe the reasons to need two patterns. When it is not necessary to perform processing at the same time temporarily, it is the “pattern to switch the ability to two roles”. When it is not necessary to set to achieve two operations by the maximum ability of one person at the same time, it is a “pattern that distributes abilities to two roles by ratio”. In other words, when manipulating the time axis, the way to switch the roles of products and services is to switch the roles every time or to adjust the increase or decrease of the roles every time.



Figure 2. A is the role to achieve the function of a chair armrest.

(<https://www.aviationwire.jp/archives/57725>)



Figure 3. A is the role to achieve the function of a bed surface.

(<https://www.aviationwire.jp/archives/57725>)

Table 1. Pattern is to switch the ability to two roles.

| | Boarding | Takeoff | Meal service | Cruise | Landing | Disembarking |
|---|----------|---------|--------------|--------|---------|--------------|
| A is the role to achieve the function of a chair armrest. | 10 | 10 | 10 | | 10 | 10 |
| A is the role to achieve the function of a bed surface. | | | | 10 | | |

Table 2. Pattern to distribute the ability to two roles by ratio.

| | Boarding | Takeoff | Meal service | Cruise | Landing | Disembarking |
|--------------------|----------|---------|--------------|--------|---------|--------------|
| Security Personnel | 6 | 9 | 2 | 5 | 9 | 6 |
| Service Personnel | 4 | 1 | 8 | 5 | 1 | 4 |

4. ANALYSIS METHOD

This section presents cases of the “pattern to switch the ability to two roles” and the “pattern to distribute the ability to two roles by ratio” applied to this study, and then shows how to interview flight attendants and how to analyze the interview results.

4.1 Pattern to switch the ability

In the analysis method, cases of actual application in this study are shown, and the thinking of the “pattern to switch the ability” under restrictions that cannot be easily enhanced or expanded due to space constraints are explained using Figure 2 and Figure 3.

In airplanes, passengers spend a variety of ways in one seating space, such as eating, working, watching a movie, or sleeping. However, increasing the occupied area of one seat in an airplane leads to a decrease in the number of seats that can be installed, so that space cannot be easily expanded. Under that limitation, the first-class seat shown in Figures 2 and 3 realizes both a comfortable chair with armrests and a wide bed for sleeping. The method is that when the seat-back is up (Figure 2), A is at a position and height that can be used as an armrest that serves to put arms and elbows in a comfortable position. When the seat-back is level with the seat surface (Figure 3), A is lowered from the position of an armrest to a horizontal position with the seat surface, and is integrated with the seat surface to create a wide bed.

4.2 Pattern to distribute the ability to two roles by ratio

Next, we confirmed how the “pattern to distribute the ability to two roles by ratio” is actually achieved under restrictions that cannot be easily enhanced or expanded due to space constraints.

In Japan, flight attendants are required to have completed qualification training and pass screening in order to perform their duties as stipulated in Article 104 of the Civil Aeronautics Act and Article 214 of the Ordinance for Enforcement of the Civil Aeronautics Act. Each airline must develop operating rules requiring the approval of the Minister of Land, Infrastructure, Transportation and Tourism. In order to perform

the duties described in the operating rules, airlines create manuals describing the operational procedures for security and in-flight services. Based on the manuals, the flight attendants achieve the roles of both security and service personnel. We confirm how the flight attendant achieves the two roles of security and service personnel in the cabin by using actual examples of the flight attendant's duties.

We show Figure 4 to explain the duties of the flight attendant during passenger boarding.



Figure 4. Passenger boarding.

The flight attendants are assigned beside the doors opened for boarding or at various positions in the cabin and perform their duties while passengers are boarding.

Security personnel: The flight attendants check whether there are any suspicious people among the passengers boarding or suspicious objects with them. The reason is that it is difficult to remove suspicious people or suspicious objects out of the airplane after takeoff from the isolated cabin. Therefore, the flight attendants thoroughly eliminate unsafe factors before the airplane door is closed for takeoff. In particular, the flight attendants located beside the doors for boarding need to pay particular attention to detect unsafe factors at an early stage and cooperate with the ground staff in charge of passenger handling to respond promptly when an unsafe event occurs. Moreover, assuming the emergency situation in which it is necessary to evacuate from the airplane, it is checked whether there are passengers who need assistance such as difficulty walking or those traveling with infants, as well as their seating positions. The reason is that in case of an emergency evacuation, the flight attendants are prepared for the appropriate guidance and instructions in order to safely evacuate all passengers on board from the airplane.

Service personnel: The flight attendants greet passengers, help passengers to their seats and stow baggage, etc. The reason is that as Bonnie (Bonnie, 1988) described "Make a positive first impression" as one of "Ten Laws of Customer Satisfaction". The first impression is intended to enhance the first impression and improve passenger satisfaction by actively giving a welcome greeting during boarding since this impression has a high influence on customer satisfaction. The flight attendants improve passenger satisfaction by actively providing passengers with necessary assistance such as guidance towards seats and storage of baggage. Moreover, guiding passengers' seats and helping them with baggage storage will lead to quick seating and completion of baggage storage, which will keep operations on-time. Service contents vary by airline, and at some airlines, the flight attendants distribute service goods such as blankets and newspapers to passengers. The reason is to meet customer needs and to acquire

customer satisfaction, so that they would choose to fly with the airline again through the experience of comfort and pleasure.

We show Figure 5 and explain the duties of the flight attendant before takeoff.



Figure 5. Before takeoff.

Each flight attendant is assigned a section responsible for security duties as well as a section responsible for service duties.

Security personnel: The flight attendants will conduct safety checks for takeoff and landing in the assigned section prior to takeoff to ensure passenger and airplane safety. The safety checks for takeoff and landing is the act of confirming that airplane and passengers are secured to take off and land safely. The manual defines the items to be checked in the safety check for takeoff and landing and the completion of the safety checks before takeoff and landing. The reason is to ensure the safety of airplane and passengers during takeoff and landing. Moreover, the manual defines items that flight attendants must be constantly on alert for a safe flight, such as unusual sounds, unusual smells, suspicious objects, and passengers behaving suspiciously. The flight attendants monitor the passengers and the cabin with the awareness that there is the possibility that an anomaly may occur, and make concrete assumptions about what to do if an anomaly occurs, as well as preparations to take immediate action. The reason is that the items that flight attendants need to be alert for are likely to damage the airplane or threaten passenger safety, therefore the flight attendants need to respond quickly and appropriately to minimize the impact on flight safety.

Service personnel: The flight attendants observe the passengers and respond to the passenger's request immediately. The flight attendants consider not only verbal requests but also potential passenger needs, consider the possible measures and act accordingly. The flight attendants consider the method of drink and meal services after takeoff, taking into account passenger status, flight times and turbulence during the flight. In airlines that seek high customer satisfaction, flight attendants understand the ever-changing needs of passengers and provide passengers with personalized service. The reason is to make customers comfortable during the flight and to provide drinks and meals smoothly. Airlines that seek competitiveness with other companies are focusing on providing personalized services through their flight attendants, in addition to services such as drinks and meals, to achieve high customer satisfaction and increase passengers' intention to fly with the airline again.

We show Figure 6 and explain the duties of the flight attendant during meal service.



Figure 6. During meal service.

The in-flight service varies by the services provided by airlines. However, many airlines provide drinks and meals after takeoff.

Service personnel: The flight attendants prepare, serve and clear drinks and meals. The reason is to provide drinks and meals presented as an in-flight service included in the fare. Full-service carriers differentiate themselves from competitors in drink and meal menus and service methods to achieve customer satisfaction.

Security personnel: The flight attendants decide how to serve drinks and meals, assuming the risk of burns or injuries to the passengers. When handling the service cart, the flight attendants should pay attention to the feet and arms of the passengers in the aisle and always apply the brakes when not moving to prevent the service cart from moving on its own. The reason is to prevent injuries to passengers and damage to the airplane. The flight attendants always monitor the items defined in the manual that the flight attendants must be alert for during flight: the same as the items in the description of Figure 5. The reason is that the items to be on alert for during flight by the flight attendants are likely to damage the airplane or threaten passenger safety. Additionally, the reason is that the flight attendants need to respond quickly and appropriately to minimize the impact on flight safety.

We show Figure 7 and explain the duties of the flight attendant during cruise after meal service.



Figure 7. During cruise after meal service.

After a meal service has been completed, the duties of flight attendants during cruise are described.

Service personnel: The flight attendants respond to requests for drinks and food, answer passengers' questions, have conversations with passengers, clean cabins and toilets, and prepare for the next service. Each airline has different service standards

however, the flight attendants try to meet passenger requests and ensure passenger comfort. The reason is to increase customer satisfaction and reuse intentions and to increase competitiveness with other companies.

Security personnel: The flight attendants always monitor the items defined in the manual that the flight attendants must be alert for during flight: the same as the items in the description of Figure 5. The reason is also the same as the reason in the description of Figure 5.

4.3 Interview and analysis methods

The interviewees are five people who have more than 20 years of experience as flight attendants and have a wealth of experience managing flight attendants as the in-flight manager: chief purser. The reason is that five people have a wealth of experience as flight attendants and manage all the flight attendant duties as an in-flight manager. Additionally, Fukushima et al. (Fukushima et al., 2020) describe that senior flight attendants with more than 10 years of experience consider safety and the physical condition of passengers more than juniors do. Therefore, they are considered to be conscious of distributing the ability to two roles by ratio, in their business. The interview questions are as follows:

Q1. Does the distribution of the ability for security and service personnel shown in Table 2 match your opinion? If not, please tell us about the difference.

Q2. Figures 4, 5, 6, and 7 describe the duties and reasons when security and service personnel are achieved at the same time. Please give us your opinions about the differences and additions.

Q3. Please tell us your efforts, ingenuity, and other opinions to achieve security and service personnel at the same time?

The reason for Q3 is to collect information on what flight attendants are currently doing in order to achieve security and service personnel at the same time. Therefore, we show what flight attendants are actually doing.

Open coding (Kobayashi et al., 2017) was used to analyze interview results. We performed the open coding procedure for Q1 and Q2 as follows.

Step 1: View the free answers for Q1 and Q2, set the viewpoint for Affinity Diagram grouping (Step 2). It was set in this study as a “pattern to switch the ability to two roles or pattern to distribute the ability to two roles by ratio”, in order to verify achievement of two objectives at the same time by using products or services under restrictions that cannot be easily enhanced or expanded due to space constraints.

Step 2: Look for, from the aforementioned viewpoint, the descriptions for the pattern to switch the ability to two roles or pattern to distribute the ability to two roles by ratio, and sort them into groups.

Step 3: Write titles for each group that summarize the essence of the group, at a slightly higher level of abstraction (called “Open coding results of Q1, Q2” in this study).

In addition, we performed the open coding procedure for Q3 as follows.

Step 1: View the free answers for Q3, set the viewpoint for Affinity Diagram grouping (Step 2). It was set in this study as “what the flight attendants are currently doing from boarding to disembarking,” in order to confirm the achievement of both the roles of security and service personnel.

Step 2: Look for, from the aforementioned viewpoint, the descriptions for what the flight attendants are currently doing from boarding to disembarking, and sort them into groups.

Step 3: Write titles for each group that summarize the essence of the group, at a slightly higher level of abstraction (called “Open coding results of Q3” in this study).

5. RESULTS OF ANALYSIS

We show the results of the interview analysis in Tables 3, 4 and 5.

Table 3. Analysis results of interview on Q1.

| Comments | Number of occurrences |
|--|-----------------------|
| Immediately before takeoff, flight attendants concentrate on deliberately performing as security personnel. | 4 |
| I think that you can add the phase of “preparations for takeoff” and “preparation for landing” before “takeoff” and “landing”. | 3 |
| I think the ratio of security personnel is a little higher than while boarding. | 1 |

Table 4. Analysis results of interview results on Q2.

| Comments | Number of occurrences |
|---|-----------------------|
| (Security) Immediately before takeoff, flight attendants are deliberately focused on acting as security personnel. | 4 |
| (Security) We check the seating position and condition of passengers who need assistance during an emergency evacuation, while boarding. | 1 |
| (Security) I think that you can add the check for the seating position. Such as checking for any passengers assigned to exit seats who are not allowed to be assigned there and that the number of infants seated does not exceed the total number of oxygen masks in a certain row of seats. | 1 |

Table 5. Analysis results of interview results on Q3.

| No. | Comments | Number of occurrences |
|-----|---|-----------------------|
| 1 | We use our five senses to gather what is going on in the cabin and act while deciding which one to choose at the moment from both a security and service perspective. | 5 |
| 2 | If we need to act as the security personnel, we switch immediately, even during service. | 5 |
| 3 | We always assume that something will happen at any time and we will consider what risks there are. | 7 |
| 4 | The flight attendants share information with each other and alert each other to increase certainty. | 6 |
| 5 | We achieve two roles on our own, however, in addition, we can achieve these two roles by sharing duties with other members. | 3 |
| 6 | (Service) We adjust services according to customer segment, time of day, and route as well as consider the service method and timing according to the passengers. The timing at which passengers want to have meals differs depending on the passengers. We consider the timing of the | 4 |

| | | |
|----|---|---|
| | service, while taking into account how passengers want to spend their time. | |
| 7 | (Service) We try to detect the hidden needs that passengers do not verbally request and consider then act to make the passengers more comfortable. | 2 |
| 8 | (Service) We observe the passengers continuously and consider when and how to approach the passengers. | 1 |
| 9 | (Service) While trying to understand the passenger's service needs, we need to pay attention to the passenger's signs of physical condition as seen by conversation and behavior. | 2 |
| 10 | (Service) We observe the passengers, understand the passenger needs, talk to the passengers and confirm their needs. | 1 |
| 11 | (Service) We always act in consideration of passengers' emotions as well as our own duties. | 1 |
| 12 | (Service) The flight attendants not only provide products and services to passengers but sometimes do nothing in order to provide undisturbed time and space. | 1 |
| 13 | As both security and service personnel, we try to perform our duties so that passengers can feel safe and relieved. | 2 |
| 14 | A smile is essential for customer service. | 2 |
| 15 | I enjoy meeting passengers and expressing my appreciation and hospitality to the passengers. | 1 |

We assured the reliability of the open coding analysis results in Tables 3, 4, and 5 was assured by confirming with the subject again. (Golafshani, 2003)

6. DISCUSSION

6.1 The discussion of the “pattern to switch the ability to two roles”.

Regarding the “pattern to switch the ability to two roles”, we discuss its effectiveness in a first-class seat. The first-class seat in the case described in 4.1 achieves two roles of a comfortable chair with armrests as well as a wide bed for sleeping by switching the ability of the part of seat surface into two roles. Previously, the seats had fixed armrests by dividing the space to armrests and seat width. Taking advantage of the fact that the seats do not need to achieve two objectives at the same time, this case shows that the seats under spatial restrictions can be realized as both a chair with armrests and a wide bed for sleeping by switching the ability to two roles.

6.2 The discussion of “Pattern to distribute the ability to two roles by ratio”.

Regarding the “pattern to distribute the ability to two roles by ratio”, we discuss the effectiveness in flight attendants' actual duties based on the contents of interviews.

Regarding the comments in Table 3 in response to the Q1 question for “Immediately before takeoff, flight attendants concentrate on deliberately acting as security personnel.” and “I think that you can add the phase of preparations for takeoff and preparation for landing before takeoff and landing.” have pointed out that the takeoff scene includes the phase of preparing for takeoff as well as the phase of takeoff with the flight attendants seated and ready for takeoff. In addition, the above comments have

pointed out the ratio of security personnel varies between the stage of preparing for takeoff and takeoff. Statistical Summary of Commercial Jet Airplane Accidents Worldwide Operations 1959-2016 published by Aviation Safety Boeing Commercial Airplanes reported the incidence of serious accidents over the 10-year period from 2007 to 2016, with 13% at takeoff and 48% at approach and landing. Therefore, the flight attendants are educated that the takeoff and landing phases are the most frequent phase of serious accidents. These comments above suggest that we need to divide “takeoff” into two phases: “preparation for takeoff” and “takeoff” which is concentrated on security personnel. The same applies to “landing” and we also need to subdivide into “preparation for landing” and “landing”.

The comment in Table 4 “I think the ratio of security personnel is a little higher than while boarding.” shows that the ratio during boarding is different from the interviewee's opinion and suggests that cabin attendants perform their duties by distributing their abilities to security and service personnel. The comment suggests that the “pattern to distribute the ability to two roles by ratio” proposed in this study is actually being performed as part of the flight attendant's duties.

Table 5, “Immediately before takeoff, flight attendants concentrate on deliberately acting as security personnel.” is a comment on the “takeoff” phase, which was subdivided from the results of Q1. The above comment shows during “takeoff”, the flight attendants reduce the distribution to service personnel to 0 in preparation for an occurrence of an emergency and switch all focus to security personnel. “Landing” the same as “takeoff” is a phase in which the flight attendants are educated as the most frequent phase of serious accidents. In addition, the comment in Table 4 “I think that you can add the phase of “preparations for takeoff” and “preparation for landing” before takeoff and landing.” suggests that flight attendants distribute the same ratio to “takeoff” and “landing”. The flight attendants perform their duties according to the “pattern to distribute the ability to two roles by ratio”. However, the flight attendants intentionally switch their abilities from 10 to 0 as necessary. Therefore the “pattern to distribute the ability to two roles by ratio” sometimes include the “pattern to switch the ability”.

The comments in Table 4 “We are checking the seating position and condition of passengers who need assistance during an emergency evacuation, while boarding.” and “I think that you can add the check for the seating position. Such as to check for any passengers assigned to exit seats who are not allowed to be assigned there and that the number of infants seated does not exceed the total number of oxygen masks in a certain row of seats.” show that we need additions based on the flight attendant's manual and suggests that the interviewees answered the questions in Q2 in accordance with their manuals. This study revealed that the duty of both security and service personnel in the case (Figure 4, 5, 6, 7) was actually carried out on board by the flight attendant in order to comply with the manual.

6.3 The discussion of skills to achieve both security and service personnel at the same time.

In order to achieve both security and service personnel at the same time, we show what the flight attendants are actually doing by collecting what they are currently doing from boarding to disembarkation.

The comment in Table 5 in response to the Q3 question, “We use our five senses to gather what is going on in the cabin and act while deciding which one to choose at the moment from both a security and service perspective.” shows that the flight attendants use their five senses to gather the situation and consider their own distribution of

security and service personnel. The comment in Table 5 “If we need to act as security personnel, we switch immediately, even during service.”, shows that the flight attendant determines the distribution of the ratios and switches according to the situation. Therefore, this study revealed that flight attendants not only routinely perform their duties defined by the manual but also perform duties with flexible ratio adjustments according to the situation.

The comment in Table 5 “We always assume that something will happen at any time and we will consider what the risks are.”, shows that the flight attendants make predictions and anticipate risks in order to detect various things easily and to prepare for a quick response.

The comment in Table 5 “The flight attendants share information with each other and alert each other to increase certainty.” shows that the flight attendants not only act on their own discretion but also share information and alert each other to improve certainty.

The comment in Table 5, “We achieve two roles on our own, however, in addition, we can achieve these two roles by sharing duties with other members.”, shows that the flight attendants achieve both security and service personnel by sharing roles in the case of serious incidents or labor-intensive events that cannot be handled by themselves.

Next, we discuss opinions regarding the service on Q3. The comments in Table 5, “We adjust services according to customer stratum, time of day, and route as well as considering the service method and timing according to the passengers. The timing at which passengers want to have meals differs depending on the passengers. We consider the timing of the service, while taking into account how passengers want to spend their time.”, suggests that flight attendants do not only provide services according to the procedures stipulated in the manual. In addition, the above comment shows the flight attendants try to provide services tailored to the way the passengers spend their time, taking into account the timing and considerations of services, such as a speedy meal service when flying late at night, considering that many passengers want to sleep.

The comment “We try to detect the hidden needs that the passengers do not verbally request then consider and act to make the passengers more comfortable.”, shows that the flight attendants try to observe the passengers closely and recognize the passenger's individual needs. In addition, the above comment shows that the flight attendants are trying to understand even the unspoken requests of passengers and meet them. Kishida (Kishida, 2012) describes “Manual services address universal, mass and duplicate needs, while hospitality addresses individual, special, personal and accidental needs. Therefore, the flight attendant's behavior of the above comment is consistent with hospitality described in Kishida (Kishida, 2012).

The comment “We observe the passengers continuously and consider when and how to approach the passengers”, shows that the flight attendants consider when to provide services and what services the passenger wants by continuously observing each passenger in order to realize the passenger's requests. In other words, by continuously observing the passengers, the flight attendants consider how the passengers spend their time in the cabin and what the passengers want now, and try to provide the passengers with a comfortable time.

The comment “While trying to understand the passenger's service needs, we need to pay attention to the passenger's signs of physical condition as seen by conversation and behavior.”, shows that while also performing service personnel to understand the needs of the passengers, the flight attendants are acting as security personnel with attention to detect passengers' signs of poor health in conversations and behavior. Therefore, this study suggests that flight attendants show hospitality to passengers by detecting

individual needs and confirming passengers from the perspective of both security and service personnel.

The comment “We observe the passengers, understand the passenger needs, talk to the passengers and confirm their needs.”, shows that the flight attendants not only observe passengers but also talk to them to make sure if the flight attendants are aware of the passenger's needs correctly. In other words, the above shows that the flight attendants consider the customer wants and feelings before taking into account the flight attendant's own emotions and judgments, and then the flight attendants consider and act on what they can do for passenger comfort.

The comment, “Flight attendants not only provide products and services to passengers but sometimes do nothing in order to provide undisturbed time and space,” shows that flight attendants only provide products. In addition, the above comment suggests that flight attendants show hospitality by observing the passengers carefully and acting in consideration of what the passengers really want. Therefore, this comment reveals that flight attendants not only provide passengers with products and services directly but also show hospitality by choosing quiet actions to provide quiet time according to passenger needs. Fukushima et al. (Fukushima et al., 2020) describe as follows: Even when customers think a service is not being provided, employees (flight attendants) intendedly decide not to serve customers based on contextual awareness. The research of Fukushima et al. contributes to the understanding of the concept of hospitality by clarifying the concept of "serving not to serve" using cognition. Therefore, the flight attendant's behavior of the above comment is consistent with hospitality described in Fukushima et al. (Fukushima et al., 2020).

The comment “As both security and service personnel, we try to perform our duties so that passengers can feel safe and relieved.”, shows that the flight attendants not only satisfy passengers but also try to perform both security and service personnel to a level where the passengers feel safe and relieved. The comment “A smile is essential for customer service.”, shows that the flight attendants need to be smiling during the flight to make a good impression. Therefore, it shows that the flight attendants decide what to do after considering how the flight attendant's behavior affects the passengers and act in consideration of the passenger's feelings about the flight attendant's own behavior.

The comment “I enjoy meeting passengers and expressing my appreciation and hospitality to the passengers.”, shows that the flight attendant enjoys serving the passengers with appreciation and intimacy to the passengers. This comment suggests that providing hospitality to passengers is increasing the motivation of flight attendants.

The discussion of the comments related to service shows that the flight attendants are striving to show hospitality. However, we do not show whether the flight attendants perform all customer service behavior according to the customer service process model when realizing the hospitality described in Hara (Hara, 2017). Therefore, to show whether the results of this discussion cover all customer service behaviors that realize hospitality, we use the customer service process model of Hara (Hara, 2017) and apply the comments to the model. The customer service process model is the model that shows hospitality in terms of the relationship between customer service behavior and cognition during service, and is a confirmation of “from A. Estimation of passenger psychology and request to B. Consideration of behavior plan for customer service to C. Approach to narrow down behavior plan for customer service to D. Behavior of customer service/Approach & Check passenger response” and passenger response.

In fact, the result of the discussion reveals “In addition, the above comment shows the flight attendants try to provide services tailored to the way in which the passengers

spend time, taking into account the timing and considerations of services, such as a speedy meal service when flying late at night, considering that many passengers want to sleep.” Applying this result to the customer service process model, A. Estimation of passenger psychology and request corresponds to “when flying late at night, considering that many passengers want to sleep.” B. Consideration of behavior plan for customer service corresponds to “the flight attendants try to provide services tailored to the way the passengers spend time, taking into account the timing and considerations of services, such as a speedy meal service”.

We apply “by continuously observing the passengers, the flight attendants consider how the passengers spend their time in the cabin and what the passengers want now, and try to provide the passengers with a comfortable time.” to the service process model. “The flight attendants consider how the passengers spend their time in the cabin and what the passengers want now” corresponds to A. Estimation of passenger psychology and request. Therefore, if this behavior follows the customer service process model, we suggest that the flight attendant performs “by continuously observing the passengers” before A. Estimation of passenger psychology and request. We show the results of applying the comments to the customer service process model in Table 6.

Table 6 shows that the flight attendant behavior in the comments corresponds to any of the customer service behavior of the model described in Hara (Hara, 2017), and cover all the customer service behaviors that realize hospitality.

In addition, the comments in No.6,7,8,9,10 shows the behavior performed before the customer service behavior “A. Estimation of passenger psychology and request “in the customer service process model.

We describe No.6 “according to customer segment, time of day, and route” in an example. First of all, we describe the customer segment. Flight attendants can estimate the drinks requested by passengers depending on the age group. The reason is that adults enjoy drinking alcoholic beverages, but children do not. Therefore, flight attendants place many soft drinks on the service cart and provide in-flight meals, on flights with many children. Next, we describe the time of the day. In general, people do not sleep during the day but sleep at night and flight attendants can estimate that on late-night departure flights, the passengers may want to sleep immediately after takeoff. Therefore, flight attendants try to provide in-flight meals shortly after takeoff on late-night departures so that passengers can have meals and sleep as soon as possible. Moreover, we describe the route. Flight attendants can estimate whether there are many passengers who are familiar or unaccustomed depending on the route. The purpose of passenger use, such as business and sightseeing, differs depending on the destination. On business routes, there are many passengers who frequently use airplanes for business trips. On the other hand, tourist routes tend to have many passengers who do not fly often. Therefore, flight attendants try to explain immigration documents and explain in-flight equipment carefully, on the routes where many passengers are unfamiliar with flying. The above description shows that “customer segment, time of the day, route” is information that corresponds to “understanding the situation” performed in advance to “A. Estimation of passenger psychology and request”.

We describe No.7 “We try to detect the hidden needs that the passengers do not verbally request” with an example. Flight attendants can estimate that if the passenger is holding his arms, the passenger feels cold and if the medicine is on the table after the meal, the passenger needs a glass of water. The reason is that by observing the behavior of the passenger and the surrounding objects, flight attendants try to estimate what the passenger needs even if not asked. Therefore, we describe that “We try to detect the

hidden needs that the passengers do not verbally request” is information that corresponds to “understanding the situation” performed in advance to “A. Estimation of passenger psychology and request”.

Table 6. The comments to the customer service process model.

| No. | Understanding the situation | A. Estimation of passenger psychology and request | B. Consideration of behavior plan for customer service | C. Approach to narrow down behavior plan for customer service | D. Behavior of customer service/Approach & Check passenger response |
|-----|---|---|---|---|---|
| 6 | according to customer stratum, time of day, and route | | consider the service method and timing according to the passengers. | We adjust services | |
| 7 | We try to detect the hidden needs that the passengers do not verbally request | consider and act to make the passengers more comfortable. | | | act to make the passengers more comfortable. |
| 8 | We observe the passengers continuously | | consider when and how to approach the passengers. | | |
| 9 | While trying to understand the passenger's service needs | we need to pay attention to the passenger's signs of physical condition as seen by conversation and behavior. | | | |
| 10 | We observe the passengers | understand the passenger needs | | talk to the passengers and confirm their needs. | |
| 11 | | in consideration of passengers' emotions | | We always act in consideration of passengers' emotions as well as our own duties. | |
| 12 | | to provide undisturbed time and space. | | | the flight attendants not only provide products and services to passengers but sometimes do nothing |
| 13 | | As both security and service personnel, we strive to perform our duties that passengers can feel safe and relieved. | | | |
| 14 | | | | | A smile is essential for customer service. |

No.8 “We observe the passengers continuously” shows that flight attendants are always observing the passengers even when the flight attendants do not take a direct approach to the passengers. The reason is that flight attendants estimate when to provide services and what services the passenger wants by understanding how the passenger has spent their time in the cabin and what he / she is doing now. Therefore, we describe that “We observe the passengers continuously” is information that corresponds to “understanding the situation” performed in advance to “A. Estimation of passenger psychology and request”.

No.9 “While trying to understand the passenger's service needs”, shows flight attendants observe and understand the passenger's behavior and surrounding conditions to estimate the passenger's needs, as in the above case of No.7.

No.10 “We observe the passengers” shows that flight attendants are observing the passenger before “A. Estimation of passenger psychology and request”. The reason is the same as that described in the above case of No.7.

The above discussion reveals that flight attendants observe the passengers and understand the situation before estimating passenger needs. As a result, the flight attendants achieve personalized hospitality based on the perceived situation. Therefore, this study suggests that flight attendants take an “understand the situation” action before “A. Estimation of passenger psychology and request” in order to implement the “customer service process model”.

Figure 8 shows the cognition model during service of flight attendants presented by Fukushima et al. (Fukushima et al., 2020).

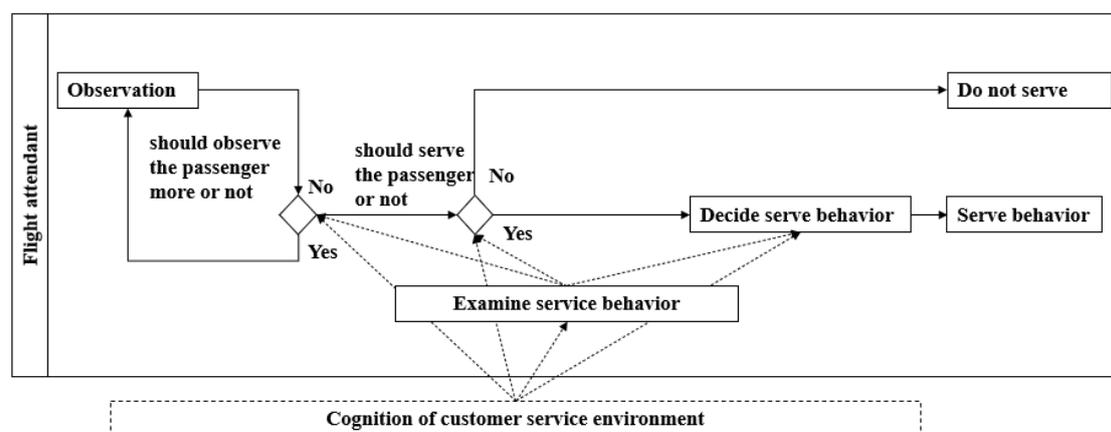


Figure 8. Cognition model during service (Fukushima et al., 2020)

This study applies the comments which are applied to the service process model of Hara (2017) in Table 6 to the cognition model during service of Fukushima et al. (Fukushima et al., 2020). The results are shown in Table 7.

Table 7 shows that the flight attendant behavior in the comments which corresponds to the customer service model of Hara (2017) in Table 6, corresponds to the cognition model during service of Fukushima et al. (Fukushima et al., 2020).

No.6 "according to customer segment, time of day, and route" shows the behavior to observe the passenger situation such as whether there are many children on board, daytime or nighttime, routes that are used for business purposes, routes that have many tourists. Therefore, we suggest that "according to customer segment, time of day, and route" corresponds to (1) *Observation*. “Consider the service method and timing according to the passengers” shows the behavior to examine whether or not to provide the service and if so, to examine how to provide the service. Therefore, we suggest that “service method and timing according to the passengers” corresponds to (3) *should serve the passenger or not*. “We adjust services” shows the behavior that the flight attendant adjusts the service method and timing according to the passengers. Therefore, we suggest that “We adjust services” corresponds to (4)-2 *Decide service behavior*.

No.7 “We try to detect the hidden needs that the passengers do not verbally request” shows the behavior to observe passengers and to examine whether the passenger needs any assistance without verbal request. Therefore, we suggest “We try to detect the

hidden needs that the passengers do not verbally request” corresponds to both (1) *Observation* and (2) *should observe more or not*. “consider and act to make the passengers more comfortable” shows the behavior to examine whether there is a service that improves passenger comfort. Therefore, we suggest “consider and act to make the passengers more comfortable” corresponds to (3) *should serve the passenger or not*. “act to make the passengers more comfortable” shows that the flight attendant provides any service. Therefore, we suggest “act to make the passengers more comfortable” corresponds to (5) *service behavior*.

No.8 “We observe the passengers continuously” shows the behavior of continuously observing passengers. Therefore, we suggest that “We observe the passengers continuously” corresponds to both (1) *Observation* and (2) *should observe more or not*. “consider when and how to approach the passengers” shows the behavior of examination whether or not to provide a service. Therefore, we suggest that “consider when and how to approach the passengers” corresponds to (3) *should serve the passenger or not*.

No.9 “While trying to understand the passenger's service needs” shows the behavior of observing passengers and understanding their needs. Therefore, we suggest that “While trying to understand the passenger's service needs” corresponds to be (1) *Observation*. “We need to pay attention to the passenger's signs of physical condition as seen by conversation and behavior” shows that the flight attendant senses passengers' changes in the physical condition and examines whether passenger needs any assistance or whether needs to provide service. Therefore, we suggest that “we need to pay attention to the passenger's signs of physical condition as seen by conversation and behavior” corresponds to both (2) *should observe more or not* and (3) *should serve the passenger or not*.

No.10 “We observe the passengers” shows that the flight attendant observes the passengers. Therefore, we suggest that “We observe the passengers” corresponds to (1) *Observation*. “understand the passenger needs” shows that the flight attendant examines whether passenger needs any assistance or whether needs to provide service. Therefore, we suggest that “understand the passenger needs” corresponds to both (2) *should observe more or not* and (3) *should serve the passenger or not*. “talk to the passengers and confirm their needs” shows the behavior in which is the flight attendant examines how to provide the service and shows the flight attendant communicates with passengers. Therefore, we suggest that “talk to the passengers and confirm their needs” corresponds to both (4)-2 *Decide service behavior* and (5) *service behavior*.

No.11 “In consideration of passengers' emotions” shows the behaviors that are taken when examining (3) *should serve the passenger or not*. “We always act in consideration of passengers' emotions as well as our own duties” shows the behavior that determines the service behavior by giving the passenger's emotions the highest priority. Therefore, we suggest that “In consideration of passengers' emotions” corresponds to (3) *should serve the passenger or not*, and “We always act in consideration of passengers' emotions as well as our own duties” corresponds to (4)-2 *Decide service behavior*.

No.12 “To provide undisturbed time and space” shows the behavior that the flight attendant determines not to disturb the passenger's time and space. Therefore, we suggest that “to provide undisturbed time and space” corresponds to (3) *should serve the passenger or not*. “The flight attendants not only provide products and services to passengers but sometimes do nothing” shows the behavior of providing time and space that does not interfere with passengers without providing services. Therefore, we

suggest that “The flight attendants not only provide products and services to passengers but sometimes do nothing” corresponds to (4)-1 *Do not service*.

Table 7. Results of applying comments to cognition model during service of Fukushima et al. (Fukushima et al., 2020)

| No. | (1) Observation | (2) should observe the passenger more or not | (3) should serve the passenger or not | (4)-1 Do not service | (4)-2 Decide service behavior | (5) service behavior |
|-----|---|---|---|---|---|---|
| 6 | according to customer stratum, time of day, and route | | consider the service method and timing according to the passengers. | | We adjust services | |
| 7 | We try to detect the hidden needs that the passengers do not verbally request | | consider and act to make the passengers more comfortable. | | . | act to make the passengers more comfortable |
| 8 | We observe the passengers continuously | | consider when and how to approach the passengers. | | | |
| 9 | While trying to understand the passenger's service needs | we need to pay attention to the passenger's signs of physical condition as seen by conversation and behavior. | | | | |
| 10 | We observe the passengers | understand the passenger needs | | | talk to the passengers and confirm their needs. | |
| 11 | | | in consideration of passengers' emotions | | We always act in consideration of passengers' emotions as well as our own duties. | |
| 12 | | | to provide undisturbed time and space. | the flight attendants not only provide products and services to passengers but sometimes do nothing | | |
| 13 | | As both security and service personnel, we strive to perform our duties that passengers can feel safe and relieved. | | | | |
| 14 | | | | | | A smile is essential for customer service. |

No.13 “As both security and service personnel, we try to perform our duties that passengers can feel safe and relieved” shows the behavior in which (2) *should observe more or not* and (3) *should serve the passenger or not* are examined as a factor to judge whether or not to give passengers a sense of security. Therefore, “As both security and service personnel, we try to perform our duties that passengers can feel safe and relieved” corresponds to (2) *should observe more or not*, and (3) *should serve the passenger or not*.

No.14 “A smile is essential for customer service” shows that the flight attendant provides a smile as a behavior. Therefore, we suggest that “A smile is essential for customer service” corresponds to (5) *service behavior*.

We show the comments for the cognition of customer service environment as follows. No.11 “In consideration of passengers' emotions” shows that the flight attendant is examining the service behavior based on the cognition of customer service environment when perform (3) *should serve the passenger or not*. Additionally, No.13 “As both security and service personnel, we try to perform our duties that passengers can feel safe and relieved” shows that the flight attendant examines whether the flight attendant's own behavior gives passengers feel safe based on the cognition of customer service environment when the flight attendant performs (2) *should observe more or not* and (3) *should serve the passenger or not*. Therefore, this study suggests that flight attendants perform service behavior while repeating the examination of service behavior based on the cognition of customer service environment in each scene.

From the above, the comments show the flight attendant's customer service behavior can be assigned to both the customer service process model of Hara (2017) and the flight attendant's cognition model during service of Fukushima et al. (Fukushima et al., 2020). Therefore, this study suggests the integration of the customer service process model of Hara (2017) with the cognition model during service of flight attendants of Fukushima et al. (Fukushima et al., 2020). Figure 9, which is a combinational model of process and cognition for customer service by analyzing flight attendants' empirically grounded hospitality, shows the result of integration based on the assignment of comments within Table 7 and Table 8. However, some comments could not be divided into (2) *should observe the passenger more or not*, and (3) *should serve the passenger or not*. Concretely, in No.9, No.10, and No.13, to separate (2) *should observe the passenger more or not* and (3) *should serve the passenger or not* is difficult such as “we need to pay attention to the passenger's signs”, “understand the passenger needs”, “we strive to perform our duties” by having judged both (2) *should observe the passenger more or not* and (3) *should serve the passenger or not* almost simultaneously. In order to solve the above, future research needs to separate and collect comments when receiving comments from respondents.

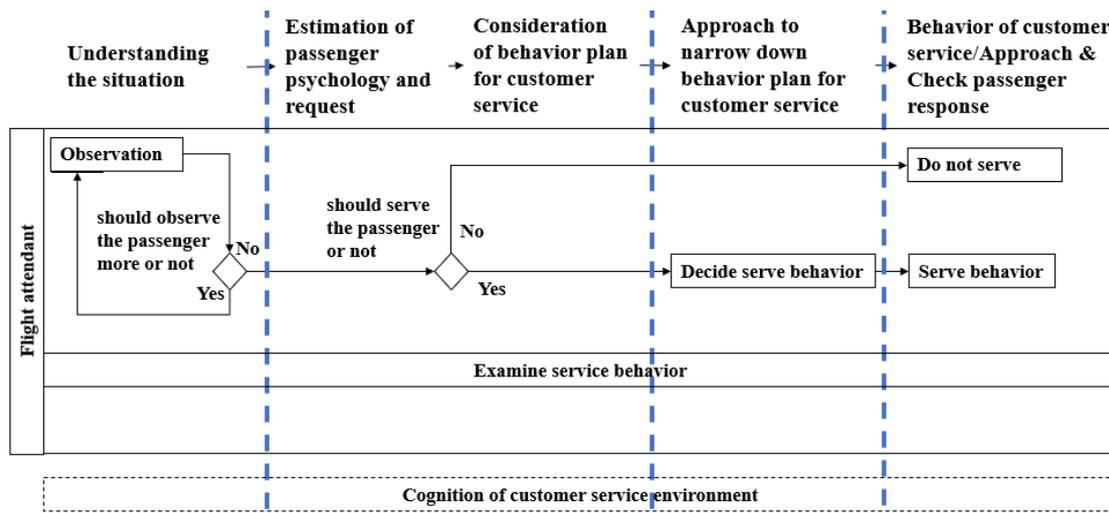


Figure 9. Integrated model

6.4 The discussion of cases reflecting interview results.

We explain the cases pointed out through interviews and confirm the distribution image of the “pattern to distribute the ability to two roles by ratio” reflecting the discussion described in 6.1. We describe the case in which the ability is allocated to only one role in Figure 10.



Figure 10. Takeoff.

The flight attendants have been educated that the takeoff and landing phases are the most frequent phases of serious accidents as described in 6.2. Therefore, during takeoff, flight attendants allocate all ability to the role of security personnel.

Security personnel: Flight attendants concentrate on their duties as security personnel and gather information from the cabin, passengers, outside conditions and weather, and consider possible risks to passengers and airplane in the event of an emergency during takeoff, and consider specific measures. The reason is that flight attendants prioritize airplane and passenger safety and make every effort to prepare for emergencies during times when the risk of accidents is highest. Flight attendants do the same during approach and landing.

Service personnel: In these phases, flight attendants do not distribute their ability to service personnel and perform them at times that are not related to takeoff, approach, and landing.

This study revealed that during takeoff, approach, and landing with a high incidence of serious accidents, flight attendants do not distribute the ability to be service personnel and concentrate all their ability to be security personnel.

We show the “patterns to distribute the ability to two roles by ratio” reflecting the results of the interview, again in Table 8.

Table 8. The distribution image reflecting interview results.

| | Boarding | Takeoff preparation | Takeoff | Meal service | Cruise | Landing | Landing preparation | Disembarking |
|--------------------|----------|---------------------|---------|--------------|--------|---------|---------------------|--------------|
| Security Personnel | 6 | 9 | 10 | 2 | 5 | 9 | 10 | 6 |
| Service Personnel | 4 | 1 | 0 | 8 | 5 | 1 | 0 | 4 |

7. CONCLUSION

The purpose of this study was to show how to consider products and services that aim to achieve two objectives at the same time. The proposal presented two patterns realized by the time axis. As a result, this study specifically showed how products and services that aimed to achieve two objectives at the same time changed in two cases. Moreover, the discussion of the hospitality that flight attendants showed in the cases, suggested that there was the behavior of “understanding the situation” before “Estimation of passenger psychology and request “of the customer service process model. This study deals with flight attendants engaged in the hospitality business. Therefore, we suggest that the integrated model is effective in achieving similar hospitality in other businesses as well. we summarize future researches as follows:

- Future research needs to create an evaluation method and of hospitality using the integrated model, in order to evaluate hospitality in other businesses.
- Future research needs to create a design method and of hospitality using the integrated model, in order to create hospitality in other businesses.
- Future research needs an evaluation of the customer service process model to show hospitality.
- Future research needs to evaluate the quality of hospitality shown by flight attendants.
- Future research needs to reveal the relationship between showing hospitality and improving motivation by showing hospitality.
- Future research needs to reveal the relationship between understanding the situation and the five senses.
- Future research needs to reveal that the subdivision of the distribution of the flight attendants' ability to be both security and service personnel and the assessment of the distribution ratio.
- Future research needs to reveal how the flight attendant behaves in every scene of the integration model.

REFERENCES

- [1] (Bonnie, 1988) Bonnie J. Knutson: Ten Laws of Customer Satisfaction: Cornell Hotel and Restaurant Administration Quarterly, Volume: 29 issue: 3, page(s): 14-17, Issue published: November 1, 1988

- [2] (David et al., 2013) David Ferry, Jing Li, Mahesh Mahadevan, Kunal Agrawal, Christopher Gill, Chenyang Lu: A Real-Time Scheduling Service for Parallel Tasks: Published in: 2013 IEEE 19th Real-Time and Embedded Technology and Applications Symposium (RTAS)
- [3] (Ehsaneh et al., 2013) Ehsaneh N.M. Nameghi, Ahmad Azmi M. Ariffin: The measurement scale for airline hospitality: Cabin crew's performance perspective: *Journal of Air Transport Management* 30, 2013, 1-9
- [4] (Fukushima et al., 2020) Ryo Fukushima, Bach Quang Ho, Tatsunori Hara, Jun Ota, Rena Kawada and Narito Arimitsu: Cognitive Competencies of Front-Line Employees in the Hospitality Industry: The Concept of "Serving not to Serve". In: Takenaka T., Han S., Minami C. (eds) *Serviceology for Services*. ICServ 2020. *Communications in Computer and Information Science*, vol 1189. Springer, Singapore, 2020, 3-19
- [5] (Golafshani, 2003) N.Golafshani : Understanding Reliability and Validity in Qualitative Research, *The Qualitative Report* Volume 8 Number 4 December 2003, 597-607
- [6] (Hara, 2017) T.Hara: What is hospitality in the cabin service: Exploring the behavior and inside of cabin attendant based on service engineering and utilizing for human resource development: *Take off* (147), 32-39, 2017; ANA Holdings 1977-
- [7] (Kishida, 2012) S.Kishida: The Classification and Modern Significance of Hospitality Concept: *Konan Women's University research bulletin* No. 48 Literature & Culture, March 2012
- [8] (Kobayashi et al., 2017) N.Kobayashi, A.Nakamoto, M.Kawase, F.Sussan, S.Shirasaka : "What Model(s) of Assurance Cases Will Increase the Feasibility of Accomplishing Both Vision and Strategy?": *Review of Integrative Business and Economics Research*, Vol. 7, No.2, 2017, 1-17.
- [9] (Li et al., 2015) Li Jie, Gong Erling, Sun Zhiqiang, Liu Wei, Xie Hongwei: AeroMTP: A fountain code-based multipath transport protocol for airborne networks: *Chinese Journal of Aeronautics* Volume 28, Issue 4, August 2015, Pages 1147-1162
- [10] (Maier, 1996) Mark W. Maier: Architecting principles for systems-of-systems. In *INCOSE 1996 6th Annual International Symposium of the International Council on Systems Engineering*. INCOSE, 1996
- [11] (Maier, 1998) Mark W. Maier: Architecting principles for system-of-systems, *Systems Engineering*, Volume 1, Issue 4, 1998, 267-284.
- [12] (Morishita et al., 2017) S.Morishita , M.Kosaka: Service management for co-creating Omotenashi with customers: A case study of the traditional Japanese 'Kagaya' Inn: *Journal of Global Tourism Research*, Volume 2, Number 2, 2017
- [13] (Nandakamuran, 1998) A.K. Nandakamuran: Stackelberg's Optimization with Microstructure and Homogenization: *Differential Equations and Dynamical Systems*, Volume 6, Number 1/2, January/April 1998, pp. 113-123.

- [14] (Nielsen et al., 2015) C. B. Nielsen, P. G. Larsen, J. Fitzgerald, J. Woodcock, J. Peleska: Systems of systems engineering: basic concepts, model-based techniques, and research directions, *ACM Computing Surveys*, Volume 48, Issue 2, 2015, 1–41.
- [15] (Ruo-gui et al., 2008) Ruo-gui XIAO, Yan-yun WANG, Hong PAN, Fei WU: Automatic Video Summarization by Spatio-temporal Analysis and Non-trivial Repeating Pattern Detection, 2008 Congress on Image and Signal Processing, 2008
- [16] (Sang, 2015) Sang Min Kim: A MULTILEVEL ANALYSIS OF TRELATIONSHIP BETWEEN PHYSICAL EDUCATION REQUIREMENTS AND STUDENT ACADEMIC ACHIEVEMENT IN HIGH SCHOOL: Thesis for Doctor of Philosophy in the Graduate School of the University of Maryland, 2015
- [17] Statistical Summary of Commercial Jet Airplane Accidents Worldwide Operations 1959 -2016: 2017 STATISTICAL SUMMARY, OCTOBER 2018: Published by Aviation Safety Boeing Commercial Airplanes.
- [18] (Stephen et al., 2004) Stephen L. Vargo & Robert F. Lusch: Evolving to a New Dominant Logic for Marketing: *Journal of Marketing* Vol. 68, January 2004, 1–17
- [19] (Terasaka et al., 2014) K.Terasaka, Y.Inaba: The Comparison of Hospitality and Japanese Hospitality “Omotenashi”: Characteristics and Management of Omotenashi: *The Journal of Social Science* 78, 2014, pp. 85-120