

A Study of the Factors on Menu Design for Airlines Catering

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Abstract

The purpose of this study was to discuss of the factors on menu design for airlines catering. The method was using in depth semi-structured interview. The result of the study showed that the airlines meal design must consider from the view of production constructs including the cost, production method, food material selects, taste and appearance, the hygienic security, the route and flying time, the tableware limitation, and the management, and consumer surface including . Production surface include eight items: Consumer constructs include fine dining, consumer recognition differences, internationalization guest level, and cabin configuration. The findings may provide the airlines company, the catering service company and the consumer as reference

Keywords: Airlines Meal, Menu Design, Airlines Company, Catering Company

1. Introduction

With the implementation of Open Skies policy, aviation market has also been rapidly developed, and the competitions have been increasingly fierce. The trend of traveling abroad has been popular, and the outbound and inbound populations have increased sharply. In 2015, the number of citizens in Taiwan going abroad is the highest (13,182,976) over the years (Executive Yuan, 2016). In addition to international aviation market, the aviation market in Taiwan has faced rapid decrease in need and growth of air transport, as well as recession, after the implementation of Open Skies policy in 1987 due to environmental changes and Taiwan High Speed Rail's participation in the competitive market.

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Airline companies' operation has been increasingly difficult, and the operational method of cost reduction seems to be the main objective of creating profits and achieving sustainable operation (Wu, 2002). At present, consumers' request for airline meals is not only to fill the stomach, but to enjoy featured and high-quality cuisines as those offered by high-end restaurants on land. Various major airline companies have dedicated to improving catering quality to attract consumers. Moreover, various airline operators in Taiwan have also designed increasingly diversified menus of airline means. In early days, airline meals were usually western cuisines. In recent years, various airline companies have started to provide regional cuisines. For example, China Airlines offers beef noodles, minced pork rice, and pineapple cake; EVA Airways offers Dintaifung's chicken stock noodles; Air China offers Peking-styled "Quanjudu Peking Duck" meal; China Southern offers some Cantonese desserts.

However, under the pressure of soaring oil prices and significant increase in operating costs, how airline companies can offer airline meals which can reduce cost and reflect unique feature to further improve service quality and increase consumers is the issue faced by various major airline companies. Airline catering refers to the meals supplied by civil airplanes to passengers during a voyage. The styles of airline meals are generally determined by airline companies, and supplied by designated airline catering supplier "airline kitchen" (Wikipedia, 2012a).

After airline meals are finished at airline kitchens, they will be delivered to airplane cabin for storage before an airplane takes off, and flight attendants will serve meals during a voyage. The types of meals may vary with departure time, flight time, and route. Sometimes, meals are designed as official meals, such as breakfast, lunch, and lunch, as well as late night snacks or snacks. The taste of cuisines may change with country of destination. In catering industry, food safety is extremely important, and so it that of airline meals. However, in addition to maintaining food safety (Chao, 2010), the main purpose of airline meal design is also to enable airline consumers to be satisfied with the airline catering services provided by airline companies to further increase their willingness to choose to take their airplane. In the fiercely competitive aviation world, provision of high-quality airline catering services has become the primary objective aggressively pursued by various major airline companies. Therefore, the purpose of this study is to investigate the indicators followed by airline meal design and factors affecting it as the basis for future development of airline catering.

2. Literature Review

2.1 Airline Catering and Characteristics

In 1919, the maiden voyage of the first passenger-carrying airline company (KLM Royal Dutch Airlines) was from London, U.K. to Paris, France. During the 2-hour voyage, KLM Royal Dutch Airlines provided services, such as games and milk tea. 4 days later, KLM Royal Dutch Airlines provided pre-prepared meal services, which initiated the history of airline catering services (Wikipedia, 2012b). The types of airline meals can be generally divided into economy class meals, business class meals, first class meals, and special meals. In order to increase consumers' willingness to take airplanes and catering quality, airline companies allow consumers to request for special meal services for personal physiological or religious reasons. International Air Transport Association (IATA) also points out that there are different types of special meals to meet the needs of different consumers.

2.2 Factors to be considered in Menu Design

2.2.1 Production Process

In a production system, the final receivers of products are general consumers. However, when receiving products, consumers usually do not possess professional knowledge, it is very difficult to determine the quality of products, such as hygiene of food and utensils. The operation of catering begins with menu design, procurement, acceptance, storage, shipping, and ends with production preparation to use successful promotion skills to deliver services of outstanding cuisines to customers (Kwong, 2005; Walker, 2007).

Airline kitchens prepare meals in kitchens on land, and then deliver the pre-prepared airline meals to airplane where flight attendants re-heat the meals and provide meal services on the plane. The production operation mode is extremely similar to that of central kitchen. The analysis on various aspects, such as preparation, transportation, management, meal design, marketing, and customers receiving services, found that central kitchen is simpler, while airline kitchen is more complicated (Liu, 2004).

2.2.2 Marketing

Kotler (2000) indicated that, marketing is an art that attracts and maintains consumers. All of the marketing activities are intended to develop and maintain a successful relationship with consumers to exchange for higher commitment and trust, as well as to reduce their intention to leave (Morgan & Hunt, 1994). Consumers are the main source of profit of enterprises, and the new era of customer power has arrived, which has forced enterprises to strengthen relationship marketing and endeavor to develop and adopt marketing strategies to retain consumers (Urban, 2000). Berry and Parasuraman (1991) indicated that, effective service marketing has to be dependent upon trust because consumers mainly purchase services before they have any purchase experiences. The function of enterprises' marketing activities is to facilitate the gatherings of sellers and buyers to create more customers. The stabilization of the relationship with consumers has been regarded as a method for creating competitive advantages (Reichheld and Schefter, 2000).

2.2.3 Professional Abilities

The success of menu design can be accessed from multiple perspectives, such as employees, customers, and profits (Chen and Shih, 2004). Birdir and Pearson (2000) divided chefs' competencies into two categories - competencies for research focused chefs competencies for management focused chefs.

2.2.4 Cost

During menu design, the selection of dishes has to take into account restaurant cost, procurement, menu pricing, and other financial and marketing situations (Ninemeier, 2005; Kotschevar & Withrow, 2008). In addition to determining the types of meals to be offered, menu design should prioritize the price determination (Miller, 1980; Scanlon, 1999).

2.2.5 Quality, Safety, and Hygiene

Catering quality is the most important part of dining experiences (Namkung & Jang, 2007; Sulek & Hensley, 2004). Apparently, quality is one of the factors to which consumers attach the highest importance to (Olsen, Harmsen, & Friis, 2008).

Freshness of food is an important indicator of products themselves (Johns & Tyas, 1996; Kivela, Inbakaran & Reece, 1999; Acebron & Dopico, 2000). Freshness is also one of the methods for testing food quality, such as friability, aroma, and juiciness of food (Peneau, Hoehn, Roth, Escher & Nuessli, 2006). The most important part of catering is the nature of food itself, including various senses, such as smell, taste, and vision. Three features of food, texture, appearance, and taste, are main factors affecting catering quality (Seo & Shanklin, 2005). Catering quality not only has to take into account individuals' nutritional or sensory properties, but also has to take into account stable quality, product categories, R&D reforms, and delivery time to improve innovation and reliability (Sanderson & Uzumeri, 1995; Baldwin & Clark, 1997). Wandel & Bugg (1997) indicated that, during customers' assessment on catering quality, they will particularly take into account the freshness, taste, and nutritional value of ingredients.

Röhr, Lu'ddecke, Drusch, Muller, & Alvensleben (2005) found that, enhanced examinations to confirm food hygiene and safety and ensure food safety can increase consumers' willingness to pay higher price to purchase food. Julie and Joseph (2007) found that, consumers are willing to pay for information concerning food safety and other quality properties. Consumers in the U.S. and Canada are more willing to pay for food safety assurance information, rather than retrospective information alone (Dickinson and Bailey, 2002). With economic development and improvement of national standard of living, safety has become one of the factors taken into account by consumers during purchase of food. During the overall supply chain process, it is more difficult to assess the quality of initial raw materials. ISO 22000 and HACCP (Hazard Analysis and Critical Control Point (Roosen, 2003) were developed for quality assurance system of food and catering industry.

2.2.6 Consumers' Perception

Engel, Blackwell, and Miniard (1995) suggested that, consumers' belief and feeling have a certain influence on overall assessment and attitude toward a certain target, and their attitude will determine their behavioral intention and further affect their subsequent final behaviors. Consumers' decision-making process and outcomes are affected by the difference in information conveyance method (Brown & West, 1997; Puto, 1987).

One of the important factors affecting consumers' choice of airline companies is perceived value, which directly affects consumers' satisfaction (Park, 2007).

2.2.7 Trust and Loyalty

The nature of services is mainly experiences and trust. Therefore, consumers' trust in products has a significant influence on their decision-making process (Zeithamal, 1988). Many studies all attached importance to trust, such as customer loyalty and cooperation (Garbarino and Johnson 1999; Tax, Brown and Chandrashekar 1998). Morgan and Hunt (1994) suggested that: the necessity of trust and commitment is a very important indicator. The empirical study by Reichheld and Scheffer (2000) also indicated that: in order to win customers' loyalty, the priority is to win customers' trust.

Two focuses of relationship marketing are customer recruitment and customer retention (Christopherson, Payne and Ballantyne, 1991). Aviation industry is actually an industry of refined services, and the quality of the services it provides directly affects customers' satisfaction, and even becomes an important factor affecting operating performance of aviation industry. Studying the management of customers' loyalty from the perspective of aviation consumers can help effectively create competitive advantages. Urban, Sultan and Qualls (2000) suggested that: customers' trust is the basic requirement for establishing and enhancing customer relationship and maintaining market share.

3. Research Method

This study used qualitative research methods, and performed in-depth interviews using "interview outlines" to collect data. The inclusion criteria of the interviews for the research subjects were: 1. Experiences in kitchens or airline companies for at least 10 years; 2. Experiences of R&D, production, and marketing; 3. Current job that is associated with airline meals. This study interviewed a total of 6 subjects with experiences of R&D, production, and marketing in airline companies or airline kitchens, in order to understand and investigate the processes of design, manufacture, and production of airline meals. Two of the subjects worked in airline companies, 2 of them worked in airline kitchens, and 2 of them worked in both airline kitchens and airline companies.

After the qualitative in-depth interviews, this study used interview transcripts to code the data for data analysis, fully recorded the transcripts word for word according to the subjects' answers, and performed content analysis. Two evaluation personnel who had studied qualitative research methods and understood encoding method communicated with the researcher to confirm the coding and registration models. For the procedures of text content analysis, this study used open coding, namely, the researcher started to read the transcript text, found out keywords, critical events or themes first, and highlighted them to clarify the items to be investigated in this study. Moreover, the thematic analysis proposed by Neuman (1997) was used to assist the researcher in coding and registration. The so-called thematic analysis is initiated from specific themes, and the data and concepts concerning the research themes were categorized under each theme.

This study used the said data analysis methods and procedures to capture and understand the contexts and complexity of the completed core coding data, and summarized and arranged them. According to the reliability testing formula proposed by Miles and Huberman (1984) (Figure 1), the total mean reliability was 0.808.

$$\text{Reliability} = \frac{\text{Quantity of mutual agreement}}{\text{(Quantity of mutual agreement + quantity of mutual disagreement)}}$$

Figure 1. Formula of Reliability Calculation

This study used triangulation to verify the validity, as well as to check and observe the interviews and collected document data. This study performed comparisons and triangular correction through the subjects to ensure the validity of data. The subjects included production, marketing, and R&D personnel for mutual comparisons.

4. Results and Discussion

4.1 Characteristics of Airline Meals

The characteristics of airline meals are non-freshly cooked foods that have to undergo 5 steps, including rapid freezing & reheating, special airline specifications, supplying passengers according to their needs, stricter hygiene and safety requirements, and diversified catering cross-industry cooperation.

1. Non-freshly cooked foods that require rapid freezing and reheating: due to the limitations on inner space and equipment of airplane, airline meals have to be pre-cooked by professional airline kitchen first, and then reheated and served by flight attendants. Wei (2012) investigated in a study how airline kitchen industry responded to international financial crisis and challenges of soaring oil price, and mentioned that airline meals are prepared in kitchen on land, and then delivered to airplane and reheated and served by flight attendants on the airplane, instead of being freshly cooked in restaurant on land – which is the same as the finding in this study.

2. Special airline specifications: aviation industry is a regulated industry. IATA imposes regulations on the special meals offered by various airline companies.

3. Supplying passengers according to their needs: airline companies provide special meals to meet the needs of consumers for their personal physiological, pathological, and religious reasons, which is consistent with the new idea of the 21st century catering management proposed by Wu (2003) – the biggest competitor is the change in needs of consumers, instead of competitors in the same industry.

4. Stricter hygiene and safety requirements: health-related laws and regulations, such as Hazard Analysis and Critical Control Points (HACCP). It is necessary to be familiar with the handling of raw and cooked foods to prevent food poisoning caused by bacterial infections, which is consistent with the finding of the study on HACCP hygiene management personnel's management ability in airline kitchen industry by Chao (2010) – food safety is the major concern during airline meal design, as well as the finding of the study on HACCP by Liu (2004) – HACCP verification is associated with quality improvement.

5. Diversified catering cross-industry cooperation: airline companies adopt diversified cross-industry cooperation to improve the quality and evaluation of airline meals. With the popularity of trendy and fashionable meal design, airline companies adopt cross-industry cooperation to improve the quality and evaluation of airline companies, which is consistent with the finding of Keller (2000) – product image is one of the four main critical association dimensions to be induced in general public.

4.2 Factors to be taken into consideration in airline meal design

Indicators to be followed for factors to be taken into consideration can be divided into production dimension and consumer dimension. Production dimension includes 8 items, while consumer dimension includes 4 items. The items and meanings of various indicators are shown as follows:

1. Production Dimension

(1) Cost Consideration

In order to save operating cost, strictly implement various cost control plans, and reduce operation cost, ingredient cost calculation and control seem to be particularly important in airline meals. Ninemeier (2005), Kotschevar & Withrow (2008) indicated that, during menu design, it is necessary to take into account catering cost, procurement, menu pricing, and other financial and marketing situations.

(2) Production method

Airline kitchen companies usually provide services to multinational airline companies because their number of passengers is larger and the need for airline meals is huge. In order to meet the needs of different routes, waypoints, and departure time, it is necessary to take into account the storage and cooking methods, as well as delicacy of meal cooking of airline meals.

a. Large daily supply: the supply line of airline kitchens has to irregularly provide tens of thousands of different forms of airline meals in a daily manner.

b. Storage method: airline kitchen companies pre-prepare airline meals on land, and then rapidly freeze them for storage to maintain the freshness of ingredients to wait for the time for flight attendants to take them.

c. Cooking methods: to maintain the color, aroma, flavor, and appearance of ingredients, as well as to take into account the quality after reheating, adequate cooking methods, such as blanching, deep-frying, and steaming, as well as seasoning of various ingredients are very important.

d. Delicacy: due to the differences in cabin classes, the style, amount, and cost of cuisines may be different. The styles of meals of first class and business class are usually more diversified than those of economy class. The selection, plating, and dining procedures of ingredients are also more complicated than those of economy class.

(3) Select in and Procurement of Ingredients:

During the selection of ingredients of airline meals, it is also necessary to take into account the operation of earth ecology.

Use of local ingredients can reduce carbon emission caused by long-distance transport. The most important factors to be considered in airline meal design during selection and cooking are characteristics, production seasons, and nutrition of ingredients.

a. Locality: cuisine features and the locality of styles of cuisines should take into account both environmental protection and health concepts.

b. Characteristics of ingredients: airline meals have to be reheated. It is preferable not to choose ingredients that may easily be oxidized.

c. Season: new cuisines should be developed and recipes should be modified for different reasons.

d. Nutrition: It is necessary to take into account nutritional value to satisfy specific consumers.

(4) Taste and Appearance:

Aesthetic creation, plating, and decoration are important, which is consistent with the finding of Seo & Shanklin (2005) – the nature of food is most important in catering quality. The nature includes various senses, such as smell, taste, and vision. Three parts, texture, appearance, and taste, of food are the main factors reflecting catering quality.

a. Hygiene and Safety: Stricter hygiene and safety consideration are required for airline meals.

b. Routes and Departure Time: The differences in routes and departure time indirectly affect their customer source and meal design.

c. Limitations on Tableware: Plating methods and use of tableware are important. The use of tools for decoration and plating is important.

d. Management Institutionalization: Better management institutionalization and production accuracy are beneficial to the consistency of finished products.

2. Consumer Dimension

(1) Eating full and eating well: Most of the aviation consumers irregularly take planes, and wish to eat well and eat full.

(2) Consumers' cognitive differences: The sense of taste in high-pressure cabin is less sensitive.

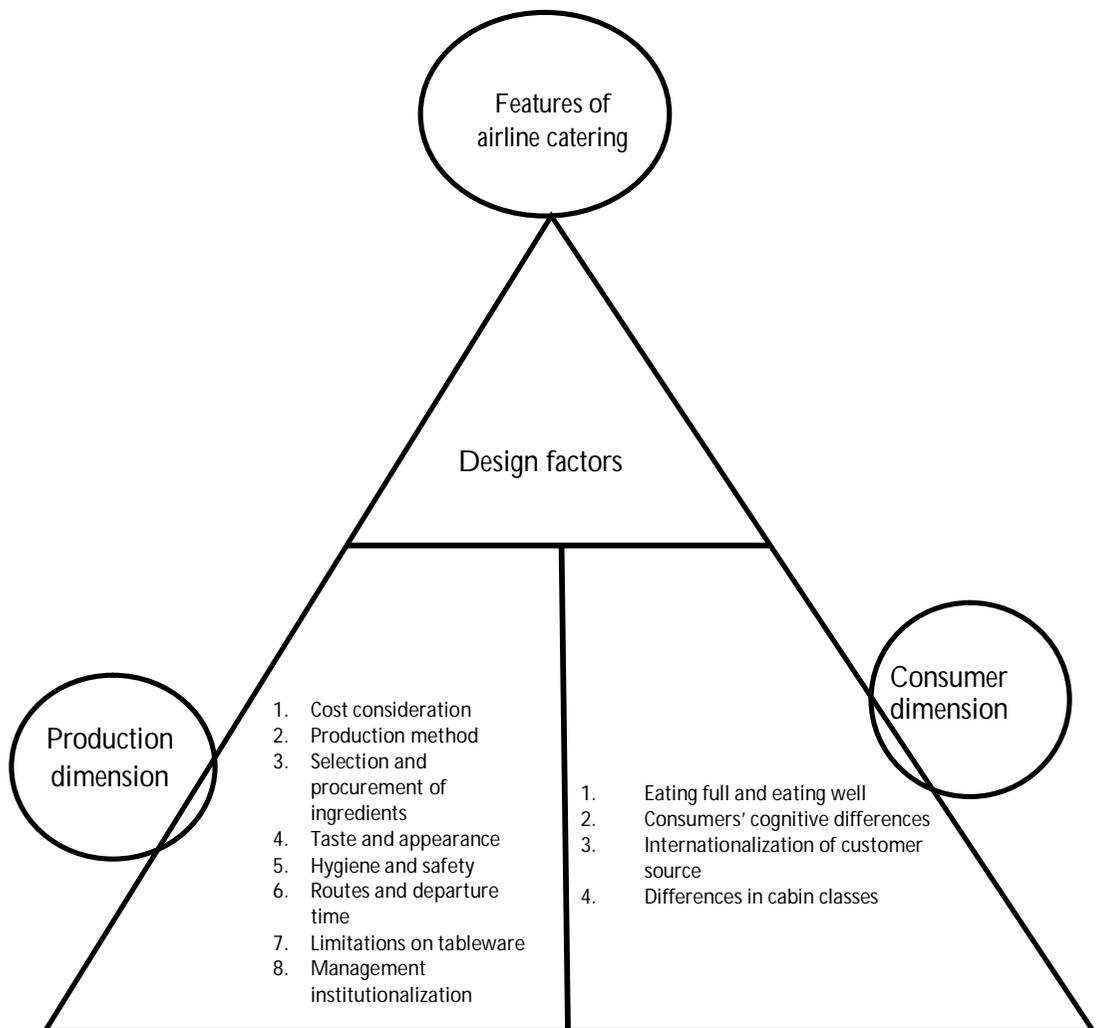
(3) Internationalization of customer source: There are numerous waypoints for international airline companies, and consumers are from various continents around the world. The results of the study by Khan (1991) also showed that, the main factors to be considered in menu design include: customers' needs and enterprise organization. In addition, enterprise organization is also affected by customers' needs.

(4) Differences in cabin classes: Due to operation strategies, different classes are designed in the inner space of airplane.

Table 2 lists the correlation between factors to be considered in airline catering design and subjects' interview content, which shows that each design factor was at least mentioned by two subjects. Figure 1 shows meanings of airline catering design

Table 2. Correlation between Factors to be Considered in Airline Catering Design and Subjects' Interview Content

| Subjects Design Factors | A | B | C | D | E | F |
|--|---|---|---|---|---|---|
| Cost consideration | ✓ | ✓ | | ✓ | ✓ | ✓ |
| Production method | ✓ | | ✓ | ✓ | ✓ | ✓ |
| Selection and procurement of ingredients | ✓ | ✓ | ✓ | ✓ | | ✓ |
| Production dimension | Taste and appearance | ✓ | | ✓ | ✓ | |
| | Hygiene and safety | ✓ | ✓ | ✓ | ✓ | |
| | Routes and departure time | | ✓ | ✓ | ✓ | ✓ |
| | Limitations on tableware | | ✓ | ✓ | ✓ | ✓ |
| | Management institutionalization | | | ✓ | ✓ | |
| Consumer dimension | Eating full and eating well | | ✓ | | ✓ | ✓ |
| | Consumers' cognitive differences | ✓ | ✓ | ✓ | ✓ | ✓ |
| | Internationalization of customer source | | ✓ | ✓ | ✓ | ✓ |
| | Differences in cabin classes | ✓ | ✓ | | | ✓ |



5. Research Suggestions

5.1 Suggestions for Airline Companies:

1. Among the operating value activities of airline companies, the need for airline meals is the largest. If airline companies invest in the establishment of airline kitchens, they can fully control menus and cooking. In addition, the supply line of airline kitchens can be extended to various waypoints abroad to significantly reduce costs. Moreover, the on-time delivery, accuracy, hygiene, and safety of airline meals can be controlled and taken into account.

Furthermore, the airline kitchens affiliated to airline companies can enter airline kitchen markets of other regions through airline companies and alliance with foreign airline companies or further obtain technical transfer to reduce R&D cost and improve their own competitiveness. For example, Swire Group invests in China Pacific Catering Services.

2. For airline meal design and in-flight services, the more unique finding discovered in this study was that – the subjects emphasized that, during the product planning and design of airline meals, the service objects are not only passengers, but also flight attendants who actually offer meal services because they are the first-line and most important users of airline meals. Airline meals are pre-prepared by airline kitchens on land in advance. After being delivered to airplane, the original color, aroma, flavor, and beauty of meals cannot be reflected without the cooperation of flight attendants. Due to the limitations on inner space and cabin equipment of airplane, airline meal plating, tableware, reheating procedure, and service procedures, the success/failure of meals is subject to flight attendants who offer services at the scene. Therefore, in order to reflect the best side of delicious meals, the educational training of flight attendants is important.

3. This study suggested that, in terms of staff of catering service department of airline companies, it is preferable for flight attendants to act as them than for general catering staff to act as them for two reasons:

a. They possess professional aviation knowledge and service skills and they can use professional languages to effectively communicate with flight attendants who actually provide meal services on the plane.

b. They understand the actual operating situation and equipment of airplane and can provide beneficial information on meal design to airline kitchen company personnel, which facilitates the perfect presentation of airline meal design.

4. The subjects in this study generally suggested that, the professional catering knowledge of catering planners in airline companies is insufficient. The lack of expertise in selection and use of ingredients and cooking skills leads to excessive dependence on airline kitchen company personnel during meal design and planning. Airline companies are advised to strengthen the professional training of catering planners to meet the expectations of enterprises and passengers.

5. Airline companies have to adjust the future development of airline meals to facilitate sustainable operation. Airline meals are basically products of western culture. The airline meals in early days were mainly western meals. The airplane equipment is not suitable for non-western airline meal design. It was not until recent years when new cooking devices, such as steam oven and microwave oven, are used, are the styles of cuisines improved.

6. Consumers' opinions and expectations toward airline meals are changing, and more diversified cross-industry cooperation offers passengers more options, which is beneficial to airline companies.

5.2 Suggestions for Airline Kitchen Companies:

1. The research results showed that, the subjects suggested that there is a lack of pipeline for training professional airline meal chefs. The current personnel designing and planning airline meals in airline kitchen companies in aviation market all are chefs from 5-star hotels. Airline kitchen companies are advised to increase future training of aviation professional knowledge, such as airplane model, waypoints, routes, and service procedures, for their chefs, and engage in the investigation of relevant issues to improve the profession of airline meal design.

2. Airline kitchen companies are advised to increase the exchanges with cross-industry and relevant airline kitchen companies to increase innovative vision, control popular trend, and connect with fashion to improve the quality and evaluation of airline meals to attract more different customer sources.

3. Due to the limitations of changes in aviation market, airline kitchens should increase the attention to future development of airline companies and more aggressively overcome the difficulties in catering design, instead of taking a passive stance, in order to achieve the win-win situation between airline companies and airline kitchens.

5.3 Suggestions for future studies

Future studies may include consumer testing and combine quantitative studies of large sample size to further probe into the characteristics of airline meals.

Future studies are also advised to use both qualitative and quantitative methods to develop model for airline meal design to increase the extensive of similar relevant studies.

This study performed qualitative interviews, and mainly enrolled personnel producing, planning, and designing airline meals as the subjects. Due to the limitations on time and manpower, this study only enrolled 6 subjects in Taiwan as the research scope. The subjects answered the questions according to their personal willingness and openness. This study analyzed the answer content according to the perspectives expressed by the subjects' actual experiences, and failed to take into account other personnel producing, planning, and designing airline meals. Therefore, the research results cannot be fully extended. This qualitative study used triangulation to verify the validity. Due to the limitations on time and manpower, this study did not use different methods to test the validity, and only focused on the authenticity of interview transcripts of subjects and rigor of interview process to make up the completeness.

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