



# **Adapting Airline Food Services to Align with Global Evolution of Traveler Expectations**

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## **ABSTRACT**

Airline food services have come a long way from the humble beginnings of basic sandwiches and snacks. Today, they represent an integral part of the passenger experience during air travel. Airline food services have evolved in response to shifting passenger preferences, technological advancements, and global events, shaping the way we dine above the clouds.

A comprehensive content analysis of 590 online reviews from January 2022 to February 2024 revealed six key themes in passengers' inflight dining experiences: food quality, crew attitude, overall experience, snack offerings, taste perceptions, and tray functionality. Notably, passengers prioritize food quality, emphasizing aspects such as taste, freshness, and variety. The pivotal roles of crew attitude and service interactions in shaping passenger satisfaction were underscored, highlighting the importance of attentive and hospitable cabin crew. Furthermore, the study revealed how emerging technologies present opportunities to enhance the quality, variety, and customization of inflight dining options.

By understanding and addressing these factors, airlines can strategically enhance their inflight dining offerings, fostering greater satisfaction and loyalty among passengers.

**Title:** Adapting Airline Food Services to Align with Global Evolution of Traveler Expectations

**Keywords:** On-board food catering, Inflight meals, expectations, innovation, passenger satisfaction, experience

**Author:** Marine Bugault

## RESUMO

Das simples sandes aos lanches servidos a bordo o serviço de *catering* tem evoluído significativamente. Numa viagem aérea as refeições servidas a bordo representam uma parte significativa da experiência do passageiro. As refeições a bordo das companhias aéreas evoluíram em resposta às preferências dos passageiros, aos avanços tecnológicos e aos eventos globais, moldando a forma como nos alimentamos acima das nuvens.

Este estudo tem por base a análise de 590 avaliações dos passageiros entre janeiro de 2022 e fevereiro de 2024, essa análise revelou seis temas-chave que resumem as experiências gastronômicas dos passageiros durante o voo, nomeadamente: a qualidade da comida, atitude do pessoal de cabine, a experiência global, a oferta de *catering*, a percepção do sabor e funcionalidade da bandeja onde são servidas as refeições. Os passageiros dão prioridade à qualidade da comida, nomeadamente ao sabor, à comida fresca e à variedade. O papel crucial da interação com a tripulação é fundamental para a satisfação do passageiro, em particular a importância de uma tripulação de cabine atenciosa e hospitaleira. Além disso, o estudo indica como as tecnologias emergentes são uma oportunidade para melhorar a qualidade, variedade e personalização das refeições a bordo. O reconhecimento destes resultados permite que as companhias aéreas melhorem estrategicamente a sua oferta de refeições a bordo, promovendo maior satisfação e fidelização dos passageiros.

**Palavras-chave :** Catering a bordo, Refeições durante o voo, expectativas, inovação, satisfação do passageiro, experiência

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## TABLE OF CONTENTS

<i>ABSTRACT</i> .....	2
<i>RESUMO</i> .....	3
<i>LIST OF FIGURES</i> .....	5
<i>LIST OF TABLES</i> .....	6
<b>1. INTRODUCTION</b> .....	7
<b>2. LITERATURE REVIEW</b> .....	9
2.1 The Evolution of Airline Food Services and inflight meals .....	9
2.2 Technology and airline food services .....	10
2.3 Factors influencing the passengers' level of satisfaction and re-flying intention .....	11
2.4 The role of passenger experience with inflight meals and web reviews .....	12
<b>3. METHODOLOGY</b> .....	13
3.1 Data source and collection .....	13
3.2 Data analysis with Leximancer .....	16
<b>4. RESULTS</b> .....	17
<b>5. DISCUSSION</b> .....	20
5.1 Food.....	20
5.2 Service/ Crew.....	21
5.3 Passengers' experience.....	22
5.4 Snacks.....	22
5.5 Taste .....	24
5.6 Tray.....	25
<b>6. CONCLUSION</b> .....	26
6.1 Theoretical implications.....	27
6.2 Practical implications.....	28
6.3 Limitations and Future Research .....	29
<b>BIBLIOGRAPHY</b> .....	30

## **LIST OF FIGURES**

**Figure 1: The extraction process of Leximancer analysis (Byun et al., 2023) 17**

**Figure 2 : General concept map of reviews (Concept map- general reviews- thesis.jpeg)**  
19

## **LIST OF TABLES**

<b>Table 1: Airline Inflight Dining Special Menu Offerings (THESE/Table 1- Airline Inflight Dining Special Menu Offerings.docx) .....</b>	<b>16</b>
<b>Table 2 : Top 6 most relevant themes, concepts, number of hits and percentage relevancy (THESE/Table 2- Top 6 most relevant themes, concepts, number of hits and percentage relevancy.docx) .....</b>	<b>19</b>

## 1. INTRODUCTION

Air travel has become an integral part of modern life, and the in-flight dining experience is a pivotal aspect of the journey. Six million people fly somewhere every day. That's nearly 0.1% of the entire world's population (Michelmann et al., 2023)<sup>23</sup>.

A rise in long-haul and non-stop flights, mainly because of an increase in both leisure and business travel, has increased passenger demand for in-flight catering services (Warnock-Smith et al., 2017)<sup>40</sup>.

However, these numbers do not tell the whole story. The estimated number of regular passengers boarded by the global airline industry amounted to just over 2.2 billion people. This represents a 50 percent loss in global air passenger traffic compared to 2019 (Airline industry Statista, 2023)<sup>7</sup>.

In-flight catering remains a significant aspect of the airline industry that persists despite these challenges. Globally, airlines serve approximately one billion in-flight meals per year to their passengers in normal times (Ahmed, 2022)<sup>6</sup>. Europe represents the largest regional market for In-Flight Catering Services, accounting for an estimated 27.1% share of the global total (Markets, 2022)<sup>22</sup>.

As global events and technological advancements continue to reshape the landscape of travel, the gap lies in the need for airlines to proactively respond to changing traveler expectations (Park et al., 2020)<sup>26</sup>. While airlines have traditionally focused on safety, efficiency, and punctuality, the passenger experience, especially regarding in-flight dining, has often been overlooked. With travelers becoming increasingly discerning and demanding, there is a growing disparity between the expectations of modern passengers and the offerings of airlines (International Airport Review, 2019)<sup>19</sup>. Moreover, global events such as the COVID-19 pandemic have introduced new challenges related to hygiene, health, and social distancing, further emphasizing the need for innovation in airline food services (Afaq et al., 2021)<sup>5</sup>. As technology continues to advance rapidly, there's limited exploration of how airlines can leverage it to enhance their food services and the previous research about this topic need to be developed further (International Airport Review, 2019)<sup>19</sup>. Bridging this gap requires a comprehensive exploration of how airlines can adapt their food services to align with evolving traveler preferences, all while navigating the complexities of a rapidly changing world (Tsafarakis et al., 2018)<sup>38</sup>.

Multiple studies examine the relationship between passengers' level of satisfaction and the in-flight dining experience. As technology rapidly advances and passengers' expectations for in-

flight dining experiences constantly evolve, there's a limited exploration of how airlines can leverage it to enhance their food services.

The main objective of this dissertation is to analyze the Traveler Experiences and Evolving Expectations of in-flight dining services while also exploring opportunities for improvement in the realm of technological innovation.

Through qualitative research surveying worldwide travelers, this research aims to find out which attributes of in-flight services are the most important to drive the passengers' satisfaction and which technological advancements can influence positively their experience.

The results of this research will serve as a roadmap for airlines seeking to improve their food services in an increasingly competitive market. By addressing the root causes of passenger dissatisfaction and leveraging technological advancements to meet evolving expectations, airlines can elevate their dining offerings and foster greater customer satisfaction.

To achieve the objectives of this research, there are two research questions that will need to be answered.

The first research question is

In a world of global events, what specific aspects are most crucial in shaping passengers' satisfaction of airlines inflight meal experience?

The second research question is

In what ways can airlines leverage emerging technologies to enhance the quality, variety, and customization of in-flight dining options?

There will be six chapters in this dissertation. The Introduction is the first chapter and provides background information on the research as well as why it was necessary to undertake this study. The second chapter, "The Literature Review," provides an overview of the major ideas, including "The Evolution of Airline Food Services," "Technological advances and the changing expectations and global events impacts," "the factors influencing the passengers' level of satisfaction and re-flying intention" and "The role of passenger experience with inflight meals and web reviews". The methodology section of Chapter 3 describes the qualitative approach that is employed, as well as how data is gathered and analyzed. In Chapter 4, the results of the data analysis are presented, and the data's significance is explained. 'Finding and Discussion' is Chapter 5.

## **2. LITERATURE REVIEW**

### **2.1 The Evolution of Airline Food Services and inflight meals**

The historical development of airline food services is a captivating narrative that unfolds alongside the growth and evolution of the aviation industry. In the early days of commercial air travel, which can be traced back to the 1920s and 1930s, in-flight meals were practically nonexistent (Fulton, 2014)<sup>16</sup>. Flying was a luxurious and exclusive experience, often reserved for the elite, and passengers brought their own provisions or were served simple snacks (Rahmanan, 2021)<sup>28</sup>.

The real turning point came during the post-World War II era when airlines began to recognize the importance of enhancing the overall travel experience (The Evolution of the Commercial Flying Experience, n.d.)<sup>25</sup>. In the 1950s and 1960s, airlines embraced the concept of offering in-flight meals as a service differentiator (The Evolution of the Commercial Flying Experience, n.d.)<sup>25</sup>. This marked the golden age of airline travel, where elaborate meals served on fine china with silverware became synonymous with the glamour of flying. Airlines collaborated with renowned chefs to design gourmet menus, elevating the culinary experience at 30,000 feet (Rahmanan, 2021)<sup>28</sup>.

During the 1970s and 1980s, the airline industry underwent a transformation in its food services due to economic challenges and heightened competition (Bennaceur, 2014)<sup>12</sup>. To manage expenses, some airlines chose pre-packaged, reheatable meals, resulting in a decline in the quality of in-flight cuisine and a diminishing romanticism associated with airline dining (Rahmanan, 2021)<sup>28</sup>. However, in the 1990s, there was a resurgence of interest in in-flight dining, with airlines acknowledging the significant impact of food on passenger satisfaction (The Evolution of the Commercial Flying Experience, n.d.)<sup>25</sup>.

As we transitioned into the 21st century, there was an increasing awareness of passengers' health and dietary preferences (SIS International, 2023)<sup>32</sup>. In response, airlines diversified their offerings and introduced healthier meal options, catering to various dietary needs such as vegetarian, vegan, and gluten-free. This shift towards healthier choices was not solely prompted by passenger demand but also aligned with broader societal trends promoting wellness and mindful eating. For example, Qatar airways offer 18 different special meals that can be requested before take-off to cater to different dietary requirements (Treacy&Co, 2022)<sup>37</sup>.

In recent years, global events have further transformed airline food services. Adaptations, new regulations, deeper and strengthened expectations from customers are all new aspects that needed to be considered to stay competitive and attractive.

The impact of global events on traveler expectations regarding airline food services is a compelling study that delves into the transformative effects of external factors on the aviation industry. Over the years, various global events, such as pandemics, geopolitical shifts, and environmental crises, have played a pivotal role in shaping and redefining passenger perceptions and demands when it comes to in-flight dining.

The outbreak of the COVID-19 pandemic has significantly influenced traveler expectations, emphasizing a paradigm shift towards hygiene, safety, and individualized service (Pereira et al., 2023)<sup>27</sup>. Passengers now not only seek culinary satisfaction but also prioritize transparent communication regarding the stringent safety measures implemented by airlines (Pereira et al., 2023)<sup>27</sup>. 60% of Americans list hygiene as the most important factor when choosing a travel company (Treacy&Co, 2022)<sup>37</sup>. Moreover, global events have catalyzed a broader reconsideration of sustainability, prompting a growing demand for eco-friendly practices, locally sourced ingredients, and reduced environmental impact in airline food services. In this objective, Alaska airline has replaced 1.8 million pounds of plastic by boxed water and paper cups (Treacy&Co, 2022)<sup>37</sup>.

## **2.2 Technology and airline food services**

The role of technology in modernizing airline food services is a transformative journey that has redefined the culinary experience at 30,000 feet. In recent years, technological advancements have revolutionized various aspects of the aviation industry, and airline catering is no exception. One of the primary ways technology has reshaped in-flight dining is through the introduction of digital platforms that facilitate seamless meal customization and pre-ordering. Passengers now have the convenience of selecting their preferred meals in advance, considering dietary restrictions, preferences, and even cultural considerations. American airlines were the first US airline to offer First and Business Class Passengers the choice to reserve and entrée on flights with scheduled meal service (Treacy&Co, 2022)<sup>37</sup>.

Moreover, technology has played a crucial role in enhancing the efficiency of food production and distribution processes within the airline catering industry. Service efficiency has become a hallmark of airlines embracing technology in their food services. Automated kitchen processes, guided by artificial intelligence (AI), streamline meal preparation, minimizing human error and

maximizing precision. Smart inventory management systems ensure optimal stock levels, preventing shortages and reducing excess inventory (Rajaratnam, 2023)<sup>29</sup>. The result is a more agile and responsive catering operation that can adapt to fluctuating passenger demands and unexpected changes in flight schedules (Rajaratnam, 2023)<sup>29</sup>.

The integration of data analytics has emerged as a game-changer in understanding passenger preferences and trends. Airlines utilize this information to curate menus that resonate with their diverse clientele, offering a variety of culinary experiences that cater to different tastes and cultural backgrounds (SIS International, 2023)<sup>32</sup>. Real-time feedback mechanisms, facilitated through digital interfaces, allow passengers to provide instantaneous input on their dining experience, enabling airlines to make timely adjustments and improvements (SIS International, 2023)<sup>32</sup>.

Augmented reality (AR) and virtual reality (VR) technologies are also making their mark in modernizing airline food services (StartUs Insights, 2023)<sup>35</sup>. These immersive technologies offer passengers a virtual preview of their meals, allowing them to visualize and customize their dining experience before it even arrives on their tray. This is the case of Etihad Airways who also started a similar initiative in partnership with Singapore-based startup Lumitics to trial the use of computer vision and machine learning to reduce food wastage on its flights (Dimitrova, 2020)<sup>14</sup>. This not only adds a novel dimension to the in-flight experience but also contributes to reducing food wastage by ensuring that passengers receive meals they genuinely desire. (Dimitrova, 2020)<sup>14</sup>.

Finally, robots can also be a new tool for airlines seeking to improve their efficiency. One example is KLM Catering Services (KCS), KLM Royal Dutch Airlines' catering services provider, which has adopted a new robot to produce meals for economy class (Dimitrova, 2020)<sup>14</sup>.

### **2.3 Factors influencing the passengers' level of satisfaction and re-flying intention**

In the literature, various factors have been used to measure passengers' level of satisfaction and their re-flying intention.

Khafizah, Salehuddin and Suhaimi discussed in-flight meals attributes such as taste, freshness, appearance, and menu choices, toward passengers' level of satisfaction and re-flying intention (Zahari et al., 2011)<sup>42</sup>. The revealed that passengers' satisfaction, besides being as important

as other factors such as fares, services, safety, comfort, and punctuality, significantly contributes to their re-flying intention and cannot be ignored by airlines. The authors Saadat, Tahani and Mannan has developed a research study in which they tested five hypotheses to assess the impact of service strategy on customer satisfaction in long-haul flight. They disclosed that only Foodservice and Ground staff has a significant impact on customer's satisfaction in and all other factors (online service, tangible features, flight attendants) showed no significant relationship with customer satisfaction (Saadat et al., 2018)<sup>30</sup>.

Similarly, the authors X and X have used a quantitative and qualitative approach to analyze the link between satisfaction and re-flying intention. They tested 16 hypotheses and concluded that on-board meal taste, suitability for all plates, portion size, arrangement, cleanliness, texture, temperature, variety, and overall quality had significant impacts on passengers' satisfaction, increasing their re-flying intention (Abbas & Gamal, 2015)<sup>4</sup>.

Finally, price is an essential factor contributing to the satisfaction, that is what was revealed by the study of Suhartando, it was revealed that the promptness and accuracy of service and the price paid are influencing customer satisfactions whereas the facilities such as the aircraft do not clearly lead to an effect on the satisfaction (Suhartanto D, 2012)<sup>36</sup>.

## **2.4 The role of passenger experience with inflight meals and web reviews**

We live in a digital century, where the online reviews play a major role in service systems. For example, unsatisfied online reviews of airline travelers can be a minus for the airline company and gives them clarity as to which sector should be more developed (Shadiyar et al., 2020)<sup>31</sup>.

There used to be a variety of direct ways to find out what consumers thought of products: surveys, questionnaires, phone calls, emails, and interviews. But with the recent developments in information technology, as well as the growing public usage of the internet, these communication channels have evolved. Social media, messaging apps, online forums, public and private channels, and a variety of websites, for example, can be used to get client feedback on certain subjects or business sectors (Farzadnia & Vanani, 2022)<sup>15</sup>.

Unlike physical products, services are difficult to objectively measure because they are intangible and are difficult to evaluate based on their perceived value (Bebko, 2000; An and Noh, 2009)<sup>8</sup>. Especially in the airline industry, service quality ratings vary considerably between airlines. There are several methods to analyze web reviews regarding passengers' experience with airline services, and particularly inflight meals.

Ban & Kim has conducted a research study analyzing airlines' passengers web review. They have found significant results related to F&B, this evaluation factor had impact on customer satisfaction and recommendation. They method had proved F&B as a critical customer satisfaction factor in the Tourism industry (Ban & Kim, 2019)<sup>11</sup>.

Misopoulos and Mitic have conducted a netnography study in the airline industry, examining the emotional tone of content shared on Web 2.0 platforms. Their objective was to investigate what kind of information Twitter can reveal about customer service experiences and how insights from Twitter feeds can be used to enhance service performance (Misopoulos et al., 2014)<sup>24</sup>. Their results indicate that flight meals were not the first subject of complaint but rather delays, lost luggage, and check-in and boarding problems.

Research conducted thus far underscores the crucial importance of online reviews in the airline sector for understanding the evolving preferences and expectations of travelers. Studies have shown that passengers pay significant attention to online evaluations of airline services, influencing their decision to recommend an airline and their subjective perceptions of it (Sotiriadis & Van Zyl, 2013)<sup>33</sup>. These findings emphasize the importance for airlines to adapt their food services to meet travelers' expectations. However, despite the numerous studies available on airline services in general, there still exists a dearth of detailed information regarding the specific importance of inflight meals for passenger satisfaction compared to other factors.

### **3. METHODOLOGY**

#### **3.1 Data source and collection**

A growing number of studies are finding that the online comments left by passengers on airlines are an abundant source of data for analyzing the experiences of passengers.

The impact of online user-generated material and the worthwhile research opportunities that arise from studying it have both been recognized in recent literature.

The data for this study were obtained from [TripAdvisor.com](https://www.tripadvisor.com), a website where tourists may rate and review lodging facilities, airlines, dining establishments, and destinations while also sharing their experiences (Tsujioka et al., 2020)<sup>39</sup>. [TripAdvisor.com](https://www.tripadvisor.com), a Boston-based firm formed in 2000, pioneered travel-related electronic word-of-mouth (e-WOM) by enabling

passengers to provide feedback on their lodging experience for the first time (Litvin et al., 2018)<sup>21</sup>. In just a few years, TripAdvisor has transformed the travel and tourism sectors by growing to become the biggest online travel reference, with 411 million monthly users browsing over 700 million travel reviews (Tsujioka et al., 2020)<sup>39</sup>.

We have chosen to analyze online reviews from Singapore Airlines, Qatar, Japan airlines, Emirates, Turkish Airlines, Air France and Cathay Pacific, ANA all Nippon airways. The reason justifying the choice of the aforesaid eight airlines is that those airlines were awarded in the top eight airlines based on Skytrax “The World's Best Airlines of 2023” ranking, a website which annually recognizes the world's best airlines.

<b>Airline</b>	<b>Number of Reviews</b>	<b>Word Count</b>	<b>Special menu offer</b>
<b>Emirates</b>	98	2903	<ul style="list-style-type: none"> <li>- Indian Vegetarian Meal</li> <li>- Non-Vegetarian Hindu Meal</li> <li>- Vegetarian Jain Mea</li> <li>- Kosher Meal</li> <li>- Bland meal</li> <li>- Light meals</li> <li>- Non-lactose meal</li> <li>- Low salt meal</li> <li>- Low gluten meal</li> <li>- Low fat meal</li> <li>- Diabetic meal</li> <li>- Vegan meal</li> <li>- Baby and chlidren meals</li> </ul>
<b>Qatar</b>	50	1083	<ul style="list-style-type: none"> <li>- Baby and children meal</li> <li>- Vegetarian meal</li> <li>- Raw vegetarian meals</li> <li>- Fruit platter</li> <li>- Vegetarian Lacto-OVO meal</li> <li>- Vegetarian Oriental Meal</li> <li>- Asian Vegetarian Meal / Veg Hindu Meal</li> </ul>

			<ul style="list-style-type: none"> <li>- Non-Vegetarian Hindu Meal</li> <li>- Vegetarian Jain Meal</li> <li>- Kosher Meal</li> <li>- Diabetic meal</li> <li>- Gluten-free meal</li> <li>- Bland meal</li> <li>- Low-salt meal</li> <li>- Non-lactose mal</li> <li>- Low-calorie meal</li> <li>- Low fat meal</li> </ul>
<b>Singapore Airlines</b>	98	3156	<ul style="list-style-type: none"> <li>- Baby and children's meals</li> <li>- Hindu Non-Vegetarian Meal</li> <li>- Kosher Meal</li> <li>- Muslim Meal</li> <li>- Vegetarian Indian Meal</li> <li>- Vegetarian Jain Meal</li> </ul>
<b>Japan Airlines</b>	16	299	<ul style="list-style-type: none"> <li>- Vegetarian Oriental Meal</li> <li>- Vegetarian Vegan Meal</li> <li>- Vegetarian Lacto-Ovo Meal</li> <li>- Bland Meal</li> </ul>
<b>ANA All Nippon airways</b>	45	810	<ul style="list-style-type: none"> <li>- Diabetic Meal</li> <li>- Fruit Platter</li> <li>- Gluten Intolerant Meal</li> <li>- Low Fat Meal</li> <li>- Low Lactose Meal</li> <li>- Low Salt Meal</li> </ul>
<b>Cathay Pacific</b>	88	3401	<ul style="list-style-type: none"> <li>- Minimal Allergen Meal</li> <li>- Non-Strict Nut Free Meal</li> <li>- Non-Seafood Meal</li> <li>- Seafood Meal</li> </ul>
<b>Airfrance</b>	98	3590	<ul style="list-style-type: none"> <li>- Minimal allergen meal</li> <li>- Low sugar meal</li> <li>- Gluten intolerant meal</li> </ul>

			<ul style="list-style-type: none"> <li>- Low salt meal</li> <li>- Vegan meal</li> <li>- Vegetarian meal</li> <li>- Vegetarian Indian meal</li> <li>- Kosher meal</li> <li>- Muslin meal</li> <li>- Hindu meal</li> <li>- Children and baby meals</li> </ul>
<b>Turkish Airlines</b>	97	2681	<ul style="list-style-type: none"> <li>- Diabetic meal</li> <li>- Gluten intolerant meal</li> <li>- Kosher meal</li> <li>- Vegetarian Hindu meal</li> <li>- Vegetarian Asiatic meal</li> <li>- Hindu non-vegetarian meal</li> <li>- Vegetarian meal</li> <li>- Baby and children’s meals</li> </ul>

Table 1: Airline Inflight Dining Special Menu Offerings (THESE/Table 1- Airline Inflight Dining Special Menu Offerings.docx) <sup>1</sup>

In accordance with the study’s objective, terms such as “meal,” “food,” and “drinks” were entered to scan all TripAdvisor reviews, and other reviews were not taken into consideration. When selecting reviews to scrape, only those written in English were considered, and ones that were too brief were discarded. The period of the reviews is from January 2022 to February 2024. In total, 590 usable passenger reviews were taken into consideration for further analysis.

**3.2 Data analysis with Leximancer**

Leximancer provides statistical analysis and visualization of electronically written documents through text analysis, such as semantic and rational information (Watson et al., 2005)<sup>41</sup>. For each “keyword” identified, Leximancer finds the related concept, which facilitates deeper

---

<sup>1</sup>

analyses and interpretations of the themes. Figure 1 presents an example of the operational method. There are three levels of the extraction process: words, concepts, and themes.

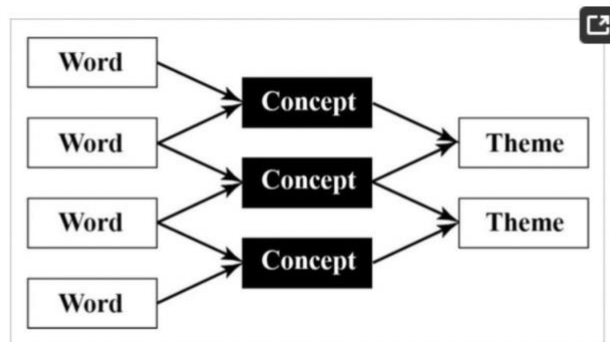


Figure 1: *The extraction process of Leximancer analysis (Byun et al., 2023)*13

As a next step, Leximancer groups essential concepts at the higher levels (themes) based on the frequency occurrence of the concepts (Angus et al., 2013)<sup>9</sup>. Leximancer provides a hot map that visually shows the main concepts contained within the text data and information about how frequently it co-occurred. The relative position and size distance of concepts depend on the strength of the semantics and the connection between concepts. The essential themes are shown as bright circles, and the frequency of the concepts is implied from the circle sizes (Angus et al., 2013)<sup>9</sup>.

#### 4. RESULTS

To identify inflight food characteristics based on passengers' web reviews in a post experience phase as mentioned previously, a general concept map was produced to identify the most common themes and concepts that represent inflight dining passengers' reviews (see Figure 2)<sup>3</sup>.

Leximancer software enabled us to compose this map, which contains concepts (illustrated by the smaller gray nodes) that are grouped into themes (shown by the larger shaded circles). The content analyses revealed the existence of 6 major themes in passengers' review of inflight dining experiences, "food", "service", "Passengers' experience", "snacks", "taste" and "tray" (see Figure 2)<sup>3</sup>.

Table 1<sub>1</sub> shows the abovementioned themes and concepts and their relevancy percentages.

<b>THEMES</b>	<b>NUMBER OF HITS</b>	<b>CONCEPTS</b>	<b>RELEVANCY</b>
<b>Food</b>	631	Horrible	100%
		Comfortable	100%
		Mediocre	100%
		Fine	100%
		Inedible	100%
		Online	100%
		Quality	100%
		Worst	93%
		Cabin	92%
		Onboard	92%
		Average	91%
		Delicious	91%
Awful	91%		
<b>Snacks</b>	137	Sandwich	82%
		Sauce	33%
		Onboard	25%
		Better	22%
		Main	20%
		Large	20%
		Request	20%
		Portions	19%
		Dry	14%
		Visual aspect	14%
<b>Service</b>	535	Onboard	83%
		Mediocre	67%
		Inflight	67%
		Average	61%
		Excellent	61%
		Rude	57%
		Horrible	57%
		Poor	57%
		Passengers' experience	57%
		Alcohol	56%
		Comfortable	56%
		Attentive	52%
<b>Passengers' experience</b>	225	Awful	82%
		Mediocre	47%
		Rude	43%
		Horrible	43%
		Entertainment	43%
		Onboard	43%
		Extremely	42%
		Worst	38%
		Excellent	30%
		Seats	25%
		<b>Taste</b>	109
Couscous	33%		
Ratatouille	33%		
Portions	30%		
Rice	25%		
Box	25%		

			22%
<b>Tray</b>	24	Cheese Cutlery Butter Left Business Hot	17% 17% 14% 13% 13% 12%

Table 2 : *Top 6 most relevant themes, concepts, number of hits and percentage relevancy (THESE/Table 2- Top 6 most relevant themes, concepts, number of hits and percentage relevancy.docx)*<sup>2</sup>

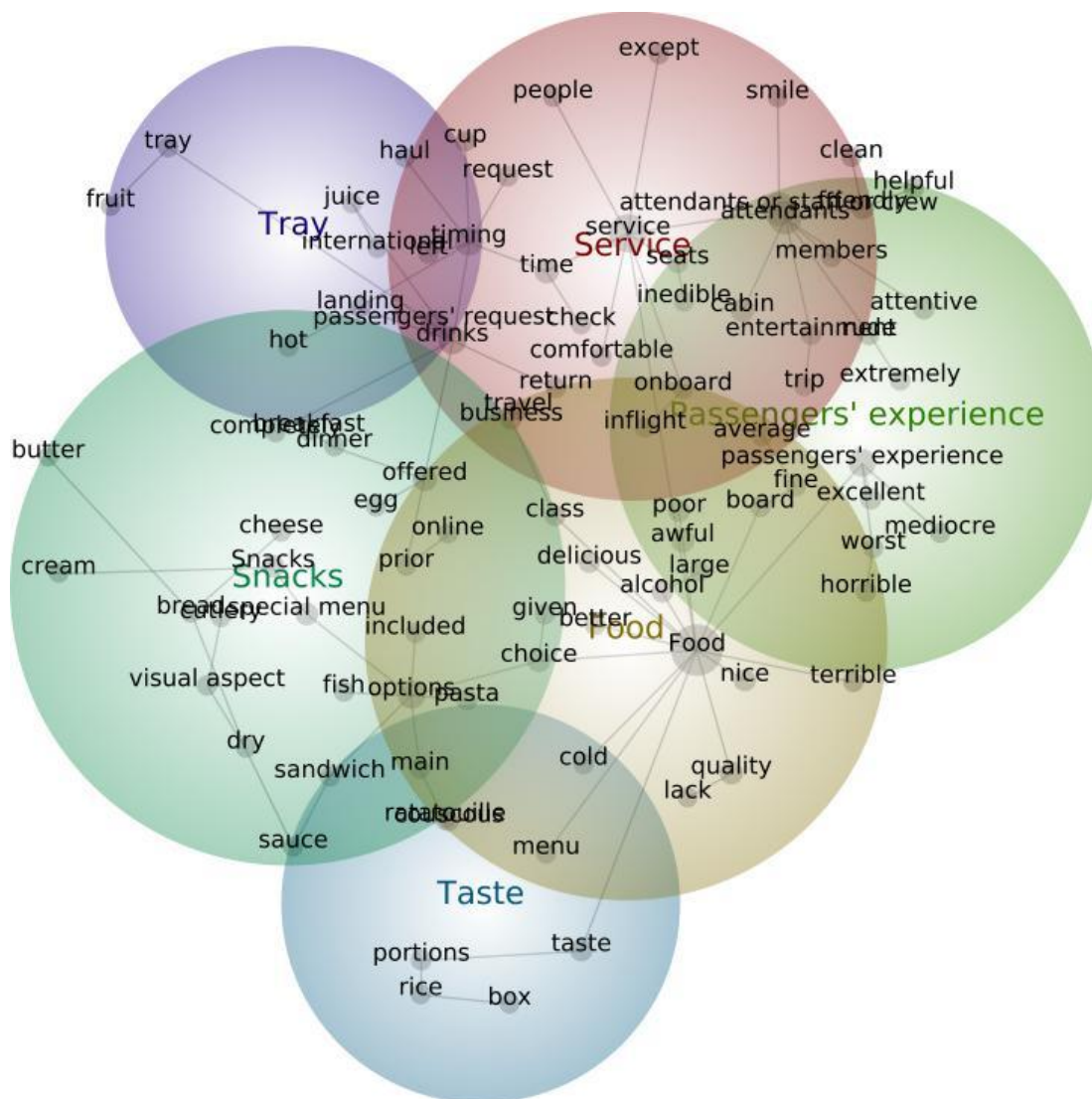


Figure 2 : *General concept map of reviews (Concept map- general reviews- thesis.jpeg)*<sup>3</sup>

## 5. DISCUSSION

### 5.1 Food

The theme of food and meals emerges prominently as the most frequently discussed aspect of inflight dining experiences, evident by its significant representation in the concept map. The size of a concept's node within the map reflects its frequency and interconnectivity with other concepts, portraying the centrality of "food" in passengers' reviews.

Comments regarding food quality vary widely, ranging from outright condemnation to expressions of satisfaction and appreciation. Passengers often express immediate, sometimes harsh judgments regarding the food, typically focusing on one or two aspects. Criticisms such as *"Food was bad, as we flew on midnight schedule and only given cold sandwich"* or *"Poor food choices"* or *"Food was worst food I have ever had on a plane. No regular water service! Only offered a tiny cup of water during two meal services each international leg. Had to ask for four cups of water each time & was still very dehydrated."* highlight instances where passengers perceive their dining options as subpar or limited. Conversely, positive remarks like *"The food was great. Of the two choices they had for the economy class, they did not run out of any"* underscore instances where passengers find the meal offerings satisfactory or even exceptional.

Interestingly, the most associated words with food and meals reflect a spectrum of opinions, from extreme negativity ("horrible," "inedible") to neutrality ("fine," "comfortable") (see Table 1)<sup>1</sup>. This polarity underscores the diverse and subjective nature of passengers' culinary expectations and experiences during air travel.

Based on our findings, it is evident that food plays a central role in shaping passengers' perceptions of the inflight experience. Research by Zahari reinforces the significance of food in predicting passenger satisfaction and influencing their intention to fly again. Its research showed that among four food attributes; taste, appearance and menu choices were the most important in predicting passengers' level of satisfaction (Zahari et al., 2011)<sup>42</sup>. Moreover, as noted by Heide, providing good in-flight meals/food and services generate positive word of mouth communication among the passengers. Passengers who are pleased with the quality of inflight meals/food served by the airlines will recommend the airline to others (Heide et al.,

1999)<sup>17</sup>. Therefore, airlines should prioritize enhancing the quality and variety of inflight dining options to ensure passenger satisfaction and foster loyalty and recommendations.

## 5.2 Service/ Crew

The service theme encompasses the interactions and assistance provided by the onboard crew staff, reflecting a crucial aspect of the passengers' overall inflight experience. It is evident that inflight meal expectations and judgments extend beyond food quality alone to encompass the broader spectrum of service quality.

Passengers' reviews often center around the demeanor and responsiveness of the cabin crew, highlighting their perceptions of professionalism and attentiveness. Positive remarks frequently commend the crew's friendliness and willingness to accommodate passengers' needs, exemplified by comments such as: *"the cabin crew were kind and friendly," "the cabin crew were very friendly and accommodating," and "the cabin crew were friendly, patient, and polite."*

Conversely, instances of dissatisfying service are detailed more extensively by passengers, often focusing on instances where their requests are not met or where interactions with the crew are perceived as cold or indifferent. Complaints such as *"the cabin crew simply ignored my request and left me waiting for an hour," "The reply was rather cold and impersonal, unhelpful and indifferent,"* and *"Cabin crew rude and unhelpful once served food never saw them again down the aisles! Went to look for a drink they were chatting and just pointed to some water then turned their back!"* underscore the significant impact of crew attitude and responsiveness on passengers' perceptions of service quality.

The link between crew attitude, service quality, and meeting passengers' requests is unmistakable. In today's aviation landscape, passengers increasingly seek a holistic experience rather than merely a meal on a tray, thereby elevating the significance of the overall inflight service experience.

### **5.3 Passengers' experience**

The passengers' experience theme is intricately intertwined with the quality of service provided by the onboard crew. A positive service encounter is often a prerequisite for fostering a favorable overall customer experience during air travel. Comments pertaining to this theme predominantly revolve around the quality of service before subsequently evaluating the overall experience.

Instances where passengers perceive a lack of courtesy or helpfulness among the staff contribute to discomfort and dissatisfaction, as evidenced by comments like *"The lack of courtesy and helpfulness of staff on the flight made everyone uncomfortable."* Conversely, positive experiences are characterized by enjoyment of the food and commendation of the staff's performance, such as *"The experience on board was really good: food was really enjoyable, staff were magnificent"*, *"Service on board was excellent and the attention to detail was beyond expectations."* and *"Well in my opinion, it was fantastic, whether it is onboard service, or seat comfortability or even food and beverage, it was excellent! The staff was also nice and good and very friendly."*

Interestingly, despite the prevalence of positive comments, the detailed analysis of associated concepts (see Table 1) reveals a notable prevalence of negative adjectives such as "awful," "mediocre," "rude," and "horrible." This disparity underscores the complexity of passengers' perceptions and the multifaceted nature of their inflight experiences.

To enhance passengers' experiences, airlines should adopt a comprehensive approach that goes beyond merely focusing on service interactions. This entails addressing every aspect of the journey, including comfort, amenities, and overall ambiance. Drawing from the insights of Jager, achieving excellence in passenger experience necessitates a holistic strategy that considers every touchpoint from boarding to disembarkation (Janawade, 2022)<sup>20</sup>.

### **5.4 Snacks**

Snacks represent a crucial component of the inflight dining experience, particularly on long-haul flights, constituting the fourth main theme in passengers' evaluations. This theme encompasses the availability of snack options between main meals, their visual presentation,

special menu offerings, and the treatment of breakfast, often regarded as a snack within the inflight dining context.

Passenger comments frequently underscore the significance of snacks, with remarks such as *"The food was excellent from snacks to main course"* emphasizing the importance of well-curated snack offerings alongside main meals.

However, some passengers express dissatisfaction with the limited snack options provided onboard, leading them to resort to bringing their own snacks to supplement inadequate portions. Comments like *"Eat well before flying and bring snacks, the food is awful, and snacks or drinks are not offered"* highlight instances where airlines fall short in meeting passengers' snack-related expectations.

The availability and quality of snacks are pivotal factors that airlines cannot afford to overlook, as they contribute significantly to passengers' overall satisfaction and comfort during extended flights.

Within the snacks theme, the concept of the "special menu" and accommodation of different dietary regimes is integrated. Comments such as *"I am a vegetarian, and they didn't have any vegetarian appetizers"* and *"Serve meat food when vegetarians order vegetarian food in advance!"*, *"We had asked for Asian Vegetarian Meal on all of our flights. Apparently catering service for Turkish Airline does not have access to external sources to learn what type of simple asian vegetrian dishes can be made! All of our flight's meals were horrible tasting and some not even Asian"* underscore the importance of ensuring consistency and accuracy in fulfilling passengers' dietary preferences and requirements.

When comparing the special meal offerings across the eight airlines, notable variations emerge. Emirates and Qatar Airways lead in terms of the diversity and number of special meal options offered, followed closely by airlines like Singapore Airlines, Cathay Pacific, Japan Airlines, and ANA All Nippon. While Air France and Turkish Airlines provide a slightly smaller range of choices (see Table 1)<sup>1</sup>.

Given the growing significance of special dietary menus, especially among younger generations, airlines should take note of research findings such as those by Hwang et al., which reveal a strong willingness among passengers, particularly younger ones, to reserve meals

online (Hwang et al., 2023b)<sup>18</sup>. In fact, according to Balda and Mora, as much as 72% of younger passengers exhibit this behavior (Balda & Mora, 2011)<sup>10</sup>. This tech-savvy demographic presents an opportunity for airlines to improve both their snack offerings and reservation systems to better align with evolving preferences.

## 5.5 Taste

Taste, a fundamental aspect intertwined with both the "Food" and "Snacks" themes, encompasses not only the flavors and quality of the meals but also considerations of portion size and variety, thus constituting a multifaceted dimension of the inflight dining experience.

Passengers' assessments of taste often intertwine with their perceptions of portion size, creating a holistic evaluation of the meal. Comments frequently highlight the direct correlation between taste satisfaction and portion adequacy. Instances of satisfaction are often associated with generous portions and enjoyable flavors, as exemplified by remarks such as *"The meal services really were impressive though for economy. They tasted great, and were very generous with portions, with great presentation. These meals left me full the whole flight, and I ended up not getting any food at Dubai Airport during my connection, since the first meal was so good."* In contrast, dissatisfaction arises when perceived taste quality fails to compensate for inadequate portion sizes, leading to expressions of discontent such as *"The portions are ridiculously small and the quality just cheap."*, *"The food is pure slop Gross menu, small portions and barely do they ever come around with water during the flight."*

Furthermore, the taste theme demonstrates a close connection with the snacks theme, as passengers expect a consistency in taste experience across all components of their inflight dining, including main meals and snacks. The expectation for larger snack offerings arises in response to perceived deficiencies in meal portions, highlighting the importance of maintaining coherence in taste experiences throughout the journey.

Moreover, given previous studies highlighting the common perception that plane food is often disappointing (Spence, 2017)<sup>34</sup>, understanding the intricate relationship between taste, quality, and portion size becomes paramount. The interconnectedness of these elements underscores their collective influence on passengers' overall dining satisfaction. A disconnect between taste

satisfaction and portion adequacy can significantly diminish the overall enjoyment of the meal, emphasizing the importance of aligning taste experiences with passengers' expectations to enhance their inflight dining experience.

## 5.6 Tray

The tray theme encapsulates passengers' scrutiny of the presentation, organization, and comfortability of dining trays during inflight meals, reflecting their attention to detail and comfort preferences. Within reviews, elements such as the condition of the tray, the adequacy of cutlery, and the overall presentation are commonly mentioned, indicating their significance in shaping the dining experience.

Passengers frequently express dissatisfaction with disorganized or subpar trays, as evidenced by comments highlighting issues such as the use of worn or recycled meal trays lacking anti-slip features. For instance, remarks such as *"The food was provided on used/recycled meal trays that had lost their anti-slip feet"* underscore concerns regarding tray condition and functionality.

Moreover, concerns regarding tray size and layout often emerge, with passengers noting instances where trays are too small to comfortably accommodate meals or are filled incorrectly. Comments such as *"The only slight problem was the food tray table. It was too small to keep food tray on it and eat comfortably"* shed light on passengers' expectations for ergonomically designed and adequately sized trays.

In response to these concerns, the integration of advanced materials and design concepts holds promise for revolutionizing tray aesthetics and functionality. Incorporating features such as anti-slip coatings and ergonomic designs can enhance tray stability and comfort, addressing passengers' preferences for a seamless dining experience. Additionally, the use of eco-friendly materials aligns with passengers' increasing environmental consciousness, reflecting airlines' commitment to sustainability, and enhancing the overall inflight dining experience.

## 6. CONCLUSION

Limited studies have delved into passengers' experiences of inflight services using a text-mining approach. However, as the digital landscape continues to evolve, with an unprecedented surge in online reviews, there arises a pressing need to delve deeper into the intricacies of passengers' inflight dining experiences. Therefore, this study aims to fill this critical gap by embarking on a meticulous examination of passengers' reviews sourced from the ubiquitous platform, TRIPADVISOR. Focusing specifically on inflight dining experiences, we employ the cutting-edge Computer-Assisted Qualitative Data Analysis (CAQDA) software Leximancer to sift through the vast expanse of textual data, unveiling hidden patterns and insights.

In an era where the volume of textual data in online reviews is rapidly expanding, the analysis of such data offers a veritable goldmine of insights into passengers' preferences, perceptions, and expectations regarding inflight dining experiences. By harnessing the power of qualitative analysis techniques, this research endeavors to transcend the surface-level observations, unraveling the nuanced layers that underpin passengers' reviews. Through this holistic approach, we seek to glean actionable insights that can inform airlines' strategies for enhancing inflight dining offerings and, by extension, improving overall passenger satisfaction.

In response to the first research question, "In a world of global events, what specific aspects are most crucial in shaping passengers' satisfaction of airlines inflight meal experience?", our study undertakes a comprehensive examination of the multifaceted factors influencing passengers' satisfaction with inflight dining. These encompass a broad spectrum of dimensions, ranging from the tangible aspects such as food quality and snack offerings to the intangible yet equally impactful elements such as service interactions and tray functionality.

Furthermore, by scrutinizing the interplay between emerging technologies and inflight dining experiences, our research seeks to address the second research question, "In what ways can airlines leverage emerging technologies to enhance the quality, variety, and customization of in-flight dining options?" As technological advancements continue to reshape the aviation landscape, there exists a plethora of untapped opportunities for airlines to revolutionize their inflight dining offerings. From AI-powered menu recommendations to immersive culinary experiences facilitated by virtual reality, the possibilities are as boundless as they are transformative.

In essence, this study serves as a beacon guiding airlines through the complex terrain of inflight dining, offering invaluable insights that transcend the realms of conjecture and speculation. By illuminating the path forward, grounded in empirical evidence and informed analysis, we pave the way for a future where inflight dining transcends mere sustenance, emerging as a cornerstone of the passenger experience in the skies.

### **6.1 Theoretical implications**

Our study contributes significantly to the existing body of literature by delving into the multifaceted nature of passengers' inflight dining experiences. Through meticulous qualitative analysis, we unravel key themes and concepts that offer a nuanced understanding of the factors influencing passenger satisfaction.

A primary finding of our study underscores the paramount importance of food quality in shaping passengers' perceptions of their overall flight experience. Our analysis reveals that passengers hold a high premium on the taste, freshness, and variety of food options available during their journey. Moreover, the presentation and aesthetics of in-flight meals emerged as crucial elements that significantly impact passenger satisfaction levels. By shedding light on these aspects, our research underscores the pivotal role that food quality plays in shaping the overall inflight dining experience.

Furthermore, our study highlights the significance of optimizing service interactions to elevate the inflight dining experience. Our analysis reveals that factors such as the attentiveness of cabin crew, the timeliness of meal service, and overall hospitality play pivotal roles in shaping passengers' perceptions. Airlines that prioritize training their staff to deliver exceptional service and foster a welcoming atmosphere are likely to garner higher levels of passenger satisfaction. By emphasizing the importance of service interactions, our research provides actionable insights for airlines seeking to enhance their inflight dining offerings.

Moreover, our study unveils the vast potential of technology-driven solutions in revolutionizing the way airlines manage inflight dining. Our analysis reveals those advancements in technology, such as advanced meal reservation systems and innovative tray designs, present numerous opportunities for enhancing the overall dining experience. By leveraging technology

effectively, airlines can streamline meal management processes, offer personalized dining options, and enhance overall efficiency. Our research thus underscores the importance of embracing technological innovations to meet the evolving expectations of modern passengers.

In essence, our study offers valuable insights that can inform strategic decision-making within the airline industry. By understanding the intricate dynamics of passengers' inflight dining experiences and prioritizing aspects such as food quality, service interactions, and technological advancements, airlines can position themselves to deliver exceptional dining experiences and foster greater passenger satisfaction and loyalty.

## **6.2 Practical implications**

These findings can help airlines to improve their inflight dining offerings and enhance passenger satisfaction. Aviation industry professionals should prioritize the key attributes and themes identified in this research, directing their efforts towards addressing the pertinent gaps to enhance the actual passenger experience and meet their evolving expectations effectively.

Our results underscore the critical importance of food quality as the most discussed and criticized criterion, closely followed by crew service and attention, and the overall passenger experience. Additionally, aspects such as the variety and taste of snacks, the portion sizes and flavors of meals served, and the design and comfort of tray arrangements significantly influence passenger satisfaction levels. Recognizing and addressing these factors can directly impact passengers' willingness to fly again and foster loyalty to the airline.

Moreover, previous study highlights the power of positive experiences in driving word-of-mouth communication among passengers. Establishing and maintaining favorable online reputations through positive post-travel reviews is paramount, as it confers a competitive advantage in attracting and retaining passengers who rely on online reviews when making flight bookings.

In addition to addressing these key areas, airlines can leverage technology to further enhance the in-flight dining experience. Implementing advanced meal reservation systems, offering personalized dietary options, and incorporating innovative culinary techniques enabled by onboard kitchen automation are avenues worth exploring.

### **6.3 Limitations and Future Research**

While this study provides valuable insights into passengers' satisfaction with inflight meal experiences and the potential impact of technological advancements, several limitations warrant consideration. The reliance on online reviews from a specific set of airlines and the exclusion of non-English reviews may limit the generalizability of the findings to a broader passenger population or other airline contexts.

Moreover, the study's focus on qualitative analysis may overlook nuanced contextual factors or subjective interpretations present in passengers' reviews. Future research endeavors could employ mixed-method approaches, combining qualitative analyses with quantitative surveys or observational studies, to provide a more comprehensive understanding of inflight dining dynamics and passenger preferences.

Additionally, further exploration is needed to assess the long-term implications of technological advancements on inflight dining experiences and passenger satisfaction. Future studies could investigate the adoption rates of technology-driven solutions among airlines, their impact on operational efficiency and cost-effectiveness, and their influence on passenger loyalty and brand perception over time.

In conclusion, this study sheds light on the multifaceted nature of passengers' inflight dining experiences and offers valuable insights for both theoretical understanding and practical applications within the aviation industry. By identifying key factors influencing passenger satisfaction and highlighting the potential of technology-driven solutions, this research provides a foundation for airlines to enhance their inflight dining offerings and improve overall passenger satisfaction. Moving forward, it is imperative for airlines to prioritize the key attributes identified in this study and leverage emerging technologies to adapt to evolving passenger preferences effectively. Additionally, while this study provides a significant contribution to the literature, further research is needed to address the limitations identified and explore new avenues for understanding the ever-evolving landscape of inflight dining experiences. Through continued inquiry and innovation, airlines can continue to elevate the inflight dining experience and enhance the overall journey for passengers worldwide.

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