# THE IMPACT OF FLIGHT CATERING SUPPLY CHAIN PRACTICES ON FOOD AND BEVERAGE QUALITY IN EGYPTAIR COMPANY

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## ABSTRACT

*The current research aims to assess the implementation of flight catering Supply Chain Practices (SCPs) and their effects on food and beverages quality in EgyptAir. The population of this study comprises the managers and employees who work in production and catering management in operation sector at In-flight Service EgyptAir Company. A stratified random sample was applied in the current research. A quantitative method was used to collect the data. A self-administered questionnaire was conducted. A total of 220 questionnaire forms were distributed to managers and employees. The valid forms were 180 forms, which represent 81.8% from the distributed forms. SPSS V. 25 was used to analyze the data. The results showed that the SCPs and F&B quality were applied less than standard levels. The supply chain practices as strategic alliance, customer focus, information sharing, information quality, information technology, lean system, logistics integration had a significant effect on food and beverages quality. The implication of these findings for the industry and future researches are being deliberated. Finally, this study intends to fill the research gap and evaluate how applying SCPs have a potential to provide contributions to F&B quality at In-Flight Service Egypt Air Company.*

**KEYWORDS:** Flight Catering, Supply Chain Practices, Food & Beverages Quality, Egypt Air

## 1. INTRODUCTION

Flight catering began in 1919, when the Handley Page Transport Company served the first in-flight meal aboard from London to Paris to both the crew and passengers (Jones, 2012). Airlines companies depended on airline catering service providers to manage the catering and logistics of

these complex operations (Sundarakani *et al.*, 2018). The passenger has received a final product that could consist not only of well-seasoned food but one that is made up of many different product procured from many different places and through many different processes (Jones, 2007).

James (2012) illustrated that supply chain and supply chain management have played a significant role in corporate efficiency and have attracted the attention of numerous academicians over the last few years. Supply chain management and distribution management characteristics have contributed to the Supply chain integration. Ivanov *et al.* (2019) declared that a Supply Chain (SC) is a network of organizations and processes wherein a number of various enterprises (suppliers, manufacturers, distributors and retailers) have collaborated along the entire value chain to acquire raw materials, to convert these raw materials into specified final products, and to deliver these final products to customers. Kutsikos and Sakas (2014) agreed with Tan *et al.* (2002) that Supply Chain Management Practices (SCMPs) consisted of materials flow, information flow and postponement strategy, supply chain integration, information sharing, supply chain characteristics, customer service management, geography proximity and just in time. Furthermore, a study conducted by Li *et al.* (2006) confirmed that enhanced competitive advantage and improved organizational performance could be achieved by employing higher levels of SCM practices.

Nyberg and Wiklund (2017) suggested that the aviation industry has faced a number of challenges such as flight services during the travel experience, media perception regarding quality of meals, logistics, and supply chain issues such as circulation of goods. . It is difficult for the airline industry to prioritize supply chain issues while developing relevant strategies that reinforce its fundamental competencies by which catering operations were driven.

The research aims to investigate the implementation of flight catering supply chain practices and their effects on food and beverages quality at In-Flight Service EgyptAir Company. This aim can be divided into two objectives: (1) Assessing the implementation of flight catering supply chain practices, (2) Investigating the impact of implementing flight catering supply chain practices on food and beverages quality.

Despite the increasing interests in Supply Chain Management (SCM) within the academy and industrial environment, there is still a lack of academic literature concerning topics such as methodologies to guide and support SCM evaluation. The author also added that it can be used by both academics and practitioners to develop complementary researches in this area (Simon *et al.*, 2006).

Most of the literature reviewed in the past has analyzed the impact of supply chain management on business performance only. However, the

ways to improve catering quality in order to exceed consumers' needs have been required to study (Hsieh *et al., 2018;* Nataraja and Al-Aali 2011; Law 2011).

## 2. LITERATURE REVIEW

### 2.1. INFLIGHT CATERING INDUSTRY

Van der Walt and Bean (2022) illustrated that the flight catering industry has been a very large and global activity. The total market size was estimated to be around 12 billion euros. More than 1 billion passengers were served each year. Furthermore, Bahraini *et al.* (2013) declared that a large-scale flight catering production unit might employ over 800 staff to produce as many as 25,000 meals per day during peak periods. Rajaratnam and Sunmola (2021) declared that the meal served on board was more complex interactions has involved numerous parties in the supply chain, including governments, airlines, logistics service providers, caterers, meal suppliers, and customers. Fawzy *et al.* (2016) reported that preparing meals for every passenger on every flight has been a challenging task, making it very important for the flight catering company to plan, control and design its supply chain.

Sundarakani *et al.* (2018) declared that the airline catering industry provided both passengers and airlines on board with a wide variety of meals that ranged from modest meals in short haul _economy class‘ to _five-star gourmet meals‘ within _long-haul first class‘. Modern airline catering companies also provided comprehensive logistic solutions and other in-flight services today; in-flight catering is a key aspect for the success of airline industries **(**Kumar *et al.*, 2015).

### 2.2. EGYPTAIR IN-FLIGHT SERVICES COMPANY

EgyptAir In-Flight Services Company started its business as a catering service section at 1948. It became a subsidiary company of EgyptAir Company. When EgyptAir foundation transformed into EgyptAir Holding Company in 2002, it continued to provide in-flight catering services for all passengers and crew members. It has offered its services to EgyptAir Airlines, domestic flights, Cargo flights, and several foreign carriers. Moreover, EgyptAir In-Flight Services Company has prepared F&B according to the menus agreed with the airlines, and needs and desires of passengers. It is recognized as the first and only company to cater royal, presidency, and VIPs flights. Cairo catering complex has provided more than 30,000 meals per day for all classes. While the production of Hurghada and Sharm El-Sheikh Catering units mounts to more than 7,000 meals per day. EgyptAir In-Flight Services Company has managed and operated several cafeterias, restaurants and lounges in different airports. It

also has hosted conferences, seminars, training courses, and provided event catering services whether in-house or out-houses (Egypt Air Company, 2022; Abd Elmoaty & Soliman, 2022).

### 2.3. AIRLINE CATERING SERVICE STRATEGY

The success of an airline catering company hinged on consistently providing high-quality service in ever-shrinking amounts of time. To improve their competitive position, airline catering organizations must focus on two key service goals: flexibility and perfection (Rajaratnam & Sunmola, 2021). On the other hand, the logistics role has been strengthened by the involvement of airline catering in the complex food supply chain for the demanding operations of airlines. The supply chains for airline catering had to not only conformed to the regulations for food production but also to the unique requirements of airline operations, such as flight duration, class designations, flight destinations, route sectors, aircraft types, storage restrictions, serving conditions, and passenger dietary requirements and preferences (Jones, 2012). The strategy for the airline catering service must be understood by the airline catering organization. An aircraft catering company must maintain a specific level of product quality while keeping meal expenses as low as feasible (Rajaratnam and Sunmola, 2021).

### 2.4. SUPPLY CHAIN AND SUPPLY CHAIN MANAGEMENT DEFINITIONS

Pienaar (2010:3) defined supply chain as ―a general description of the process integration involving organizations to transform raw materials into finished goods and to transport them to the end-user‖. Bridgefield Group (2006) defined that the supply chain management is also defined as the integration of the main processes that manage materials and information bi-directional flows, within the ambit of the enterprise and between the companies that take part into the supply chain, until reaching the end consumers, and having as main goal to aggregate value to the stakeholders and to the clients along these processes. Furthermore, Langley (2008) stated that an important objective of supply chain management is to improve a corporate‘s competitiveness in the global marketplace in spite of hard competitive forces and promptly changing customer needs.

### 2.5. SUPPLY CHAIN MANAGEMENT PRACTICES (SCMPS)

Li *et al.* (2005) declared that SCMPs included five aspects as strategic alliance, customer focus, information sharing, information quality and lean system. Furthermore, Prajogo and Olhager (2012) explained that these practices also included information technology and logistics integration. These practices will be illustrated as follows:

### 2.5.1. STRATEGIC ALLIANCE

A strategic alliance has aimed to leverage the strategic and operational capabilities of individual participating organizations to help them achieve significant ongoing benefits (Braziotis and Tannock, 2011). Strategic alliance between suppliers, manufacturers, logistics service providers and customer is a significant source of competitive advantage and also the key for efficient operations and value creation (Holweg *et al.*, 2005). Barratt (2004) suggested the form of strategic alliance fall into two categories: vertical (between customers internally and suppliers) and horizontal (between competitors and non-competitors). Thus, the current research investigates whether strategic alliance can have a positive or negative impact on F&B quality at inflight service EgyptAir Company.

### 2.5.2. CUSTOMER FOCUS

Ding *et al.* (2014) explained that Customer Relationships Management (CRM) has referred to the process of identifying, establishing, maintaining, enhancing, and when necessary terminating relationships with customers and other stakeholders. CRM is an essential component of many supply chains and has the object of maintaining and delivering consistent quality. The central point of a successful CRM system is information. This foundation of information is then utilized to deliver relevant services to the customer (Barratt, 2004). The information for each customer can then be shared within industry providing a full 360-degree view of the customer (Moore, 2006). As a result, the information within the CRM system must be kept up to date and relevant to the business (McGarry, 2006).

### 2.5.3. INFORMATION SHARING

Ding *et al.* (2014) stated that information sharing paradigm is the widespread belief that achieving a high degree of cooperative behavior has required that supply chain participants voluntarily have shared operating information and jointly plan strategies. Information sharing has enabled companies to access and share data along the supply chain, making the fulfill supply chain processes more efficient and cost effective. Prajogo and Olhager (2012) found information sharing has a significant effect on operations performance. They also found that information technologies capabilities and information sharing both have significant effects on logistics integration. Zhou (2007) also found that information sharing significant impact on SCPs including planning, production and delivery practices and has a significant effect on delivery performance. Hence, the researchers expected that information sharing has a significant impact on F&B quality at inflight service EgyptAir Company.

### 2.5.4. INFORMATION QUALITY

The significance of information sharing impact on supply chain performance also depended on the quality of information sharing. The determinants of information quality are accuracy, timeliness and proper formatting of information. Supplier uncertainty and inter-organizational relationships (trust, commitment and shared vision) are most critical factors in determining the level of information sharing and information quality in supply chain management (Li and Lin, 2006). Therefore, it is expected that information quality has a positive influence on F&B quality at inflight service Egypt Air Company.

### 2.5.5. LEAN SYSTEM

Ding *et al.* (2014) indicated that leanness system is the practice of driving out the unnecessary costs, and other wastes from the entire supply chain. The term ―lean‖ has represented a system that used less of all inputs to create outputs similar to the mass production system, but has offered an increased choice to the end customer. The logic behind lean thinking in supply chain management was that organizations jointly identified the value stream for each product from concept to consumption and optimized this value stream regardless of traditional functional or corporate boundaries. Zarei *et al.* (2011) illustrated that the adoption of lean practices might be appropriate for all participants in the red meat industry in UK, but the inter-organizational aspects of lean may not be easy to apply in practice, not appropriate, for many participants.

### 2.5.6. INFORMATION TECHNOLOGY

Prajogo and Olhager (2012) declared that information technology has played a central role in supply chain management. First, IT has allowed firms to increase the volume and complexity of information which needs to be communicated with their trading partners. Second, IT has allowed firms to provide real-time supply chain information, including inventory level, delivery status, and production planning which enables firms to manage and control its supply chain activities. Third, IT also has facilitated the alignment of forecasting and scheduling of operations between firms and suppliers, allowing better inter-firms coordination.

### 2.5.7. LOGISTICS INTEGRATION

Prajogo and Olhager (2012) illustrated that the increasing competition has driven firms to not only improve their internal operations, but also focus on integrating their suppliers and customers into the overall value chain processes. The contribution of suppliers in delivering values to customers, hence, building competitive capabilities has been well recognized.

Integrated logistics also have allowed firms to adopt lean production systems which are characterized by reliable order cycles and inventory reduction (Schonberger, 2007). The majority of empirical surveys on supply chain integration report a positive relationship between integration and performance (Van der Vaart and van Donk, 2008).

### 2.6. QUALITY OF FOOD AND BEVERAGE IN AIRLINE COMPANIES

Maintaining high food quality is important for supply chain performance (Rong *et al.*, 2011). F&B were regarded as a crucial element for passengers to choose an airline (Giritlioglu *et al.*, 2014; Messner, 2016). Airlines have realized the importance of F&B in flights to attract more customers (Messner, 2016).

Byun and Jang (2018) indicated that there were three elements for F&B quality on a plane. (1) Internal quality included aspect of F&B like nutrition values, safety, and temperature of the food, quality, and freshness. Mouawad (2012) also added that (2) external quality was the second dimension. It represented the tangible characteristics of the F&B. (3) The service quality of F&B on board included many aspects like: professional performance, care for the passengers, timing, and fast service of the flight attendants. This would side by side with the cleanliness of the tools and the sanitation (Giritlioglu *et al.*, 2014; Messner, 2016).

### 2.7. RESEARCH HYPOTHESES

Based on the comprehensive literature review the research hypotheses are supposed as follows:

**H1:** There is no statistically significant influence of food supply chain practices on food and beverages quality at In-flight Service EgyptAir Company.

**H1a:** There is no statistically significant influence of strategic alliance on F&B quality at In-flight Service EgyptAir Company.

**H1b:** There is no statistically significant influence of customer focus on F&B quality at In-flight Service EgyptAir Company.

**H1c:** There is no statistically significant influence of information sharing on F&B quality at In-flight Service EgyptAir Company.

**H1d:** There is no statistically significant influence of information quality on F&B quality at In-flight Service EgyptAir Company.

**H1e**: There is no statistically significant influence of information technology on F&B quality at In-flight Service EgyptAir Company.

**H1f**: There is no statistically significant influence of lean system on F&B quality at In-flight Service EgyptAir Company.

**H1g**: There is no statistically significant influence of logistics integration on F&B quality at In-flight Service EgyptAir Company.

### 2.8. A PROPOSED MODEL

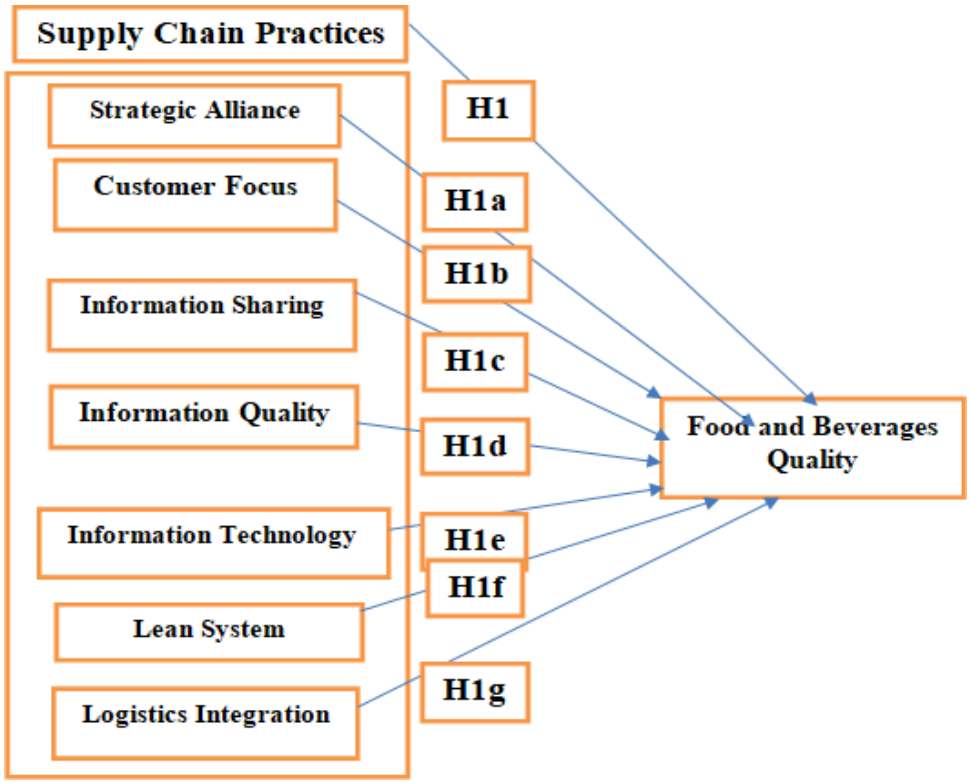


**Figure 1: Supply Chain Practices Influences on Food and Beverage Quality**

**Adopted from: Prajogo and Olhager (2012); Ding *et al.* (2014)**

## 3. METHODOLOGY

### 3.1. RESEARCH POPULATION AND SAMPLING

The population of the current research was the managers and employees who work in production and catering management in operation sector at In-flight Service Egypt Air Company. A stratified random sample was applied in the current research to divide the target population into two or more relevant and significant strata. To obtain a statistically representative sample size of the infinite population, Cochran's formula was used (Singh and Masuku, 2014). $\mathbf{n}= \frac{z^2 \sigma^2}{e^2}$

Where (n) represents required sample size, (z) is the value corresponds to the level of confidence (1.96 at the confidence level of 95 %), (σ) is the variance of the population, and (e) represents the maximum allowed error

(margin of error 5%) (Saunders *et al.*, 2012; Taherdoost, 2017). Pilot study results one of the most effective ways in estimating population variance (Bartlett *et al.*, 2001). The researchers conducted a pilot study consisting of 30 questionnaire forms to obtain the estimated variance value of the population. The researcher relied on the strategic alliance variable as one of the most important variables of the study. The variance value of the supply chain practices variable was 0.34.

$$\boldsymbol{n} = \frac{1.96^2 \times .0.34^2}{5\%^2}$$

$$\boldsymbol{n} = \frac{3.8416 \times 0.1156}{0.0025}$$

**n**=177.6356 → the suitable sample size was 178 participant

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### 3.2. RESEARCH TOOL

A quantitative method was used to collect the data. A self-administered questionnaire was conducted, because it was the most effective and convenient data collection tool for achieving research aim and objectives (Saunders *et al.*, 2016). The final questionnaire was divided into two sections. Section one contained demographic information. In section two, the main constructs were represented to seven independent variables and one dependent variable. They consisted of 35 statements. The independent variables were strategic alliance that involved four statements, customer focus that comprised three statements, and information sharing encompassed five statements, and information quality that included three statements. These independent variables were conducted from Ding *et al.* (2014) In addition, information technology involved six statements, lean system comprised three statements, and logistics integration encompassed five statements. These variables were conducted from Prajogo and Olhager (2012). Furthermore, F&B quality as dependent variable consisted of six statements. All main variables were measured by asking respondents to express their experience using a five-point Likert-style rating scale, where (1= strongly disagree, 2= disagree, 3= neutral, 4= agree, 5= strongly agree).

### 3.3. DATA COLLECTION

The printed questionnaires were distributed in Arabic to the respondents. The respondent finished it on the spot and returned it to the researchers. These questionnaires were distributed from November 2022 and February 2023. A total of 220 questionnaires were distributed. The returned forms (response rate) were 192 (87.27%) from the distributed forms. The valid forms were 180, which represent (81.8%) from the distributed forms, and the non-valid forms were 12 forms, which represented (5.45%).

### 3.4. DATA ANALYSIS

The Statistical Package for the Social Sciences (SPSS) V. 25 was used to analyze the data. These questionnaires were coded, entered and analyzed. Appropriate statistical analyses were performed such as means, standard deviation, Cronbach's Alpha to measure internal consistency, factor analysis, and linear regression coefficients to detect the influence of SCPs on F&B quality.

### 3.5. RELIABILITY AND VALIDITY

#### 3.5.1. RELIABILITY

**Table 1: Reliability of the Scale**

| The Dimensions | No. of Statements | Cronbach's Alpha |
|---|---|---|
| Strategic Alliance | 4 | 0.893 |
| Customer Focus | 3 | 0.806 |
| Information Sharing | 5 | 0.961 |
| Information Quality | 3 | 0.833 |
| Information Technology | 6 | 0.911 |
| Lean System | 3 | 0.872 |
| Logistics Integration | 5 | 0.881 |
| Supply Chain Practices | 29 | 0.961 |
| Food and Beverages Quality | 6 | 0.915 |
| **Overall scale** | **35** | **0.967** |

Damon *et al.* (2011) explained that the reliability testing was leaded to ensure the consistency and stability of the measurement across various items in the questionnaire. Cronbach‘s Alpha is one of the most frequently applied metrics to measure a scale‘s reliability, in which its index has ranged from 0.0 to 1.0. Researchers should target a value closer to 1.0, as Alpha value has proved that the instrument of the study is strong and consistent.

However, in social sciences the threshold value of 0.7 is considered acceptable. Table 1 indicated that each variable has more than 0.7 Cronbach‘s Alpha, which means that all variables are valid (Henson, 2001; Kottala and Herbert, 2020).

#### 3.5.2. VALIDITY

The initial questionnaire has been given to five referees to judge its content validity and the clarity of its items‘ meaning to avoid misunderstanding and to assure its linkage with the research aim. The experts recommended

deleting, modifying words, and clarifying the meanings of some statements. The experts were experienced academic professors and lecturers in the field of the hospitality management. In addition, factor analysis was applied to measure the validity of questionnaire statements.

**Table 2: Factor Analysis of Supply Chain Practices**

| **Strategic Alliance** | **Loadings** |
|---|---|
| We and our suppliers regularly work together to solve problems | 0.73 |
| We and our key suppliers have continuous improvement programs | 0.77 |
| We assist our suppliers to improve their product quality | 0.79 |
| Our key suppliers are involved in our planning and goal-setting activities | 0.74 |
| **Sums of squared loadings** | **0.98** |
| **Customer Focus** | |
| We frequently interact with customers to set reliability, responsiveness, and other standards for us | 0.70 |
| We facilitate customer‘s ability to seek assistance from us | 0.72 |
| We regularly evaluate the importance of our relationship with our customers | 0.74 |
| **Sums of squared loadings** | **0.99** |
| **Information Sharing** | |
| We share sensitive information (financial, production, design, research, and/or competition) | 0.79 |
| Suppliers are provided with any information that might help them | 0.86 |
| The exchange of information takes place frequently, informally, and/or timely | 0.86 |
| We keep each other informed about events or changes that may affect the other party | 0.95 |
| We have frequent face-to-face planning/communication with our suppliers | 0.86 |
| **Sums of squared loadings** | **0.98** |
| **Information Quality** | |
| Information exchange between our trading partners and us is reliable | 0.72 |
| Information exchange between our trading partners and us is adequate | 0.81 |
| Information exchange between our trading partners and us is timely | 0.72 |

| | |
|---|---|
| **Sums of squared loadings** | **0.97** |
| **Information Technology** | |
| There are direct computer-to-computer links with key suppliers | 0.95 |
| Inter-organizational coordination is achieved using electronic links | 0.94 |
| We use information technology-enabled transaction processing | 0.69 |
| We have electronic mailing capabilities with our key suppliers | 0.72 |
| We use electronic transfer of purchase orders, invoices, and/or funds | 0.95 |
| We use advanced information systems to track and/or expedite shipments | 0.94 |
| **Sums of squared loadings** | **0.96** |
| **Lean System** | |
| Our firm has continuous quality improvement | 0.80 |
| Our firm drives suppliers for shorter lead-times | 0.82 |
| Our firm continuously streamlines ordering, receiving and other paperwork from suppliers | 0.76 |
| **Sums of squared loadings** | **0.99** |
| **Logistics Integration** | |
| Inter-organizational logistic activities are closely coordinated | 0.64 |
| Our logistics activities are well integrated with suppliers' logistics activities | 0.65 |
| We have a seamless integration of logistics activities with our key suppliers | 0.71 |
| Our logistics integration is characterized by excellent distribution, transportation, and/or warehousing facilities | 0.74 |
| The inbound and outbound distribution of goods with our suppliers is well integrated | 0.64 |
| **Sums of squared loadings** | **0.97** |

Factor analysis shown in table 2 attempted to identify key variables or factors that explain the pattern of correlations within a set of observed variables. Statistical loading should not be less than 0.6 (Fabrigar *et al.*, 1999). Factor analysis of strategic alliance showed that all four statements were loaded on one factor explained 98 % of the variation in the primary variable. Moreover, factor analysis customer focus displayed that all three statements were responsible for changing in the variable of customer focus with a percentage of 99 %. Furthermore, factor analysis of information

sharing stated that all five statements were loaded on one factor explained 98 % of the variation in the primary variable.

Furthermore, factor analysis of information quality stated that all three statements were loaded on one factor explained 97 % of the variation in the primary variable. Moreover, all six statements were responsible for changing in the variable of information technology with a percentage of 96 %. Furthermore, all five statements were responsible for changing in the variable of lean system with a percentage of 99 %. Finally, factor analysis of logistic integration declared that all five statements were loaded on one factor explained 97 % of the variation in the primary variable. Therefore, the researchers found that the levels of loading values of SCPs were suitable due to they were more than 0.60.

**Table 3: Factor Analysis of Food and Beverages Quality**

| Food Quality | Loadings |
|---|---|
| The food was nutritious | 0.68 |
| The In-flight catering company offered a variety of menu items | 0.81 |
| The In-flight catering company offered fresh food | 0.66 |
| The smell of the food was enticing | 0.69 |
| The food was provided in a suitable quantity | 0.66 |
| The food was offered in a right cooking temperature | 0.69 |
| **Sums of squared loadings** | **0.96** |

Table 3 indicated that factor analysis of F&B quality of all six statements were loaded on one factor explained 96 % of the variation in the primary variable. The level of loading value of food quality was suitable due to they were more than 0.60 (Fabrigar *et al.*, 1999).

**Table 4: Demographic Characteristics of the Respondents**

| Demographic Characteristics | | Frequency | Percentage % |
|---|---|---|---|
| **Gender** | Male | 121 | 67.2% |
| | Female | 59 | 32.8% |
| **Age** | 20 - 30 Years | 17 | 9.4% |
| | > 30 - 40 Years | 115 | 63.9% |
| | > 40 - 50 Years | 48 | 26.7% |
| | > 50 - 60 Years | 0 | 0 % |
| | **Total** | **180** | **100%** |
| **Education Levels** | High School | 3 | 1.7% |
| | Bachelor | 117 | 65% |
| | Diploma | 31 | 17.2% |
| | Master /PhD | 29 | 16.1% |

| | | | |
|---|---|---|---|
| | **Total** | **180** | **100%** |
| **Experience** | 1-3 Years | 1 | 0.6% |
| | More than 3 – 5 Years | 16 | 8.9% |
| | More than 5 - 10 Years | 57 | 31.7% |
| | More than 10 -15 Years | 106 | 58.9% |
| | **Total** | **180** | **100%** |

Table 4 showed that the percentage of males (67.2 %) was more than females (32.8 %) in the investigated sample. The respondents' ages ranged from 20 to over 60 years old. The majority of the respondents were between >30 and 40 years old (63.9 %), followed by > 40 - 50 years old (26.7 %), then from 20-30 years old (9.4 %), while there were not respondents > 50 - 60 years in the sample. Regarding education levels, 65 % of the respondents had a Bachelor, while 17.2 %, and 16.1 % of them got Diploma and Master /PhD degrees respectively. Finally, only 1.7 % of the respondents had high school. Concerning employees' experience, almost 59 % of the respondents had an experience ranged from >10-15 years, followed by 31.7 % of them had an experience between >5-10 years. Only 8.9 %, and 0.6 % of them had an experience between >3-5 years, and between 1-3 years respectively. It referred to the variety of demographic characteristics of the respondents in the investigated sample.

**Table 5: The Respondents' Position**

| Position | Frequency | Percentage % |
|---|---|---|
| Administration Manager | 2 | 1.11% |
| Head of Department | 10 | 5.55% |
| General Manager | 10 | 5.55% |
| Assistant Manager | 20 | 11.11 % |
| Supervisor | 8 | 4.44% |
| Quartermaster officer | 30 | 16.66% |
| Operation staff | 100 | 55.55% |
| **Total** | **180** | **100%** |

As shown in table 5, the results found that more than half (55.5 %) of the respondents were operation staff, followed by quartermaster officers (16.6 %), then Assistant Manager (11.11 %). In addition, Head of Department, and General Manager represented 5.55 % for each one, then Supervisor, and Administration Manager represented 4.4 %, 1.11 % of the respondents respectively. It means that the majority of the job titles at Inflight Service EgyptAir Company were represented in the investigated sample.

## 4. RESULTS AND DISCUSSION

**Table 6: Descriptive Statistics of Supply Chain Practices Dimensions**

| Supply Chain Practices | Mean | SD | Sig. |
|---|---|---|---|
| Strategic Alliance | 1.87 | 0.83 | 0.00 |
| Customer Focus | 1.89 | 0.73 | 0.00 |
| Information Sharing (Communication) | 1.87 | 0.82 | 0.00 |
| Information Quality | 1.78 | 0.71 | 0.00 |
| Information Technology | 1.92 | 0.72 | 0.00 |
| Lean System (Improvement System) | 1.71 | 0.74 | 0.00 |
| Logistics Integration | 1.79 | 0.69 | 0.00 |

Mean of supply chain practices dimensions, SD = Standard Deviation, and Sig. = significance degree of one-sample T-Test.

Table 6 indicated that the mean of all variables of supply chain practices ranged from 1.71 to 1.92. it means that the respondents disagreed with these dimensions. The p-value of the one-sample T-test was (0.00) of all variables, which indicated that there were statistically significant differences between food supply chain practices and the test value 4. This value was selected because it was a suitable value that refers to agreement. All dimensions were less than the test value. This result indicated that strategic alliance, customer focus, information sharing, information quality, information technology, lean system, and logistics integration were applied less than the standard level at Inflight Service EgyptAir Company. The current result disagreed with Ding *et al.* (2014) and Prajogo and Olhager (2012) who found that the supply chain practices were effectively applied in their studies.

**Table 7: Descriptive Statistics of Food and Beverages Quality Dimension**

| Food Quality | Mean | SD | Rank | Sig. |
|---|---|---|---|---|
| The food was nutritious | 1.81 | 0.78 | 6 | |
| The flight catering company offered a variety of menu items | 1.88 | 0.91 | 4 | |
| The flight catering company offered fresh food | 1.92 | 0.84 | 3 | |
| The smell of the food was enticing | 1.95 | 0.91 | 2 | |
| The food was provided in a suitable quantity | 1.96 | 0.91 | 1 | |
| The food was offered in a right cooking temperature | 1.86 | 0.90 | 5 | |
| **Overall** | **1.90** | **0.74** | | **0.00** |

As shown in table 7, the overall score of F&B quality variable was (M= 1.90; SD= 0.74), that means the respondents disagreed with this dimension. The respondents disagreed with "The food was provided in a suitable quantity" which was ranked first (M= 1.96; SD= 0.91). The last ranked item was "The food was offered in a right cooking temperature" (M= 1.86; SD= 0.90).

Moreover, the p-value of the one-sample T-test was (0.00) of F&B quality, which indicated that there were statistically significant differences between mean of food quality and the test value 4. This value was selected because it was a suitable value that means agreement. All statements were less than the test value. This result indicated that F&B quality was less than the standard level at Inflight Service EgyptAir Company.

**Table 8: Linear Regression Coefficients for the Influence of Strategic Alliance on Food and Beverages Quality**

| Dependent Variable | | Independent Variable |
|---|---|---|
| | | Strategic Alliance |
| Food and Beverages Quality | R | 0.572 |
| | $R^2$ | 0.328 |
| | Sig. | 0.000 |
| | Constant | 0.950 |
| | β | 0.505 |

Table 8 showed that there was a moderate statistically significant correlation between strategic alliance and F&B quality (R=0.572). $R^2$ refers to the determination coefficient (0.328), suggesting that 32.8 % of the variation of F&B quality was explained by the strategic alliance. Moreover, Sig. value was 0.000 (less than 0.05). The statistical constant (α) has equaled 0.950, and whereas (β) has equaled 0.505 with a significance level less than 0.05. From the previous result, the following equation was suggested:

Food and Beverages Quality = 0.950 + (0.505 * Strategic Alliance).

Thus, the null hypothesis (H1a) was rejected and alternative hypothesis was accepted. There was a significant impact of the strategic alliance on F&B quality at In-Flight Service EgyptAir. This finding revealed that building strategic alliance with key partners is essential for inflight catering to improve supply chain performance.

The current result agreed with Ding *et al.* (2014) who found that strategic alliance was significantly related to food quality. It also concurred with Prajogo and Olhager (2012) who found that long-term supplier relationships have both direct and indirect significant effects on performance; the indirect effect via the effect on information integration and logistics integration.

**Table 9: Linear Regression Coefficients for the Influence of Customer Focus on Food and Beverages Quality**

| Dependent Variable | | Independent Variable |
|---|---|---|
| | | Customer Focus |
| Food and Beverages Quality | R | 0.630 |
| | $R^2$ | 0.396 |
| | Sig. | 0.000 |
| | Constant | 0.698 |
| | β | 0.634 |

Table 9 displayed that there was a strong statistically significant correlation between customer focus and F&B quality (R=0.630). $R^2$ refers to the determination coefficient (0.396), suggesting that 39.6% of the variation of F&B quality was explained by customer focus. The Sig. value was 0.000, which was less than 0.05. The statistical constant (α) has equaled 0.698, and (β) has equaled 0.634, with a significance level less than 0.05. From the previous result, the following equation was suggested:
Food and Beverages Quality = 0.698 + (0.634 * Customer Focus)
Therefore, the null hypothesis (H1b) was rejected and the alternative hypothesis was accepted. There was a statistically significant influence of customer focus on F&B quality at In-flight Service EgyptAir.
The current result disagreed with Ding *et al.* (2014) who found that according to p-value in stepwise regression model, customer focus was not < 0.05 level of significant; therefore it had not significant impact on SCPs performance – food quality. On the other hand, the current results was in line with Gronroos (2004) who stated that Customer Relationship Management (CRM) is an essential component of many supply chains and has the object of maintaining and delivering consistent quality.

**Table 10: Linear Regression Coefficients for the Influence of Information Sharing on Food and Beverages Quality**

| Dependent Variable | | Independent Variable |
|---|---|---|
| | | Information Sharing |
| Food and Beverages Quality | R | 0.441 |
| | $R^2$ | 0.195 |
| | Sig. | 0.000 |
| | Constant | 1.157 |
| | β | 0.398 |

From table 10, there was a moderate statistically significant correlation between information sharing and F&B quality (R=0.441). $R^2$ refers to the determination coefficient (0.195), suggesting that 19.5 % of the variation of F&B quality was explained by the information sharing. Furthermore,

the statistical constant (α) has equaled 1.157, and (β) has equaled 0.398, with a significance level less than 0.05. From the previous result, the following equation was suggested: Food and Beverages Quality=1.157 + (0.398 * Information Sharing)

Thus, the null hypothesis (H1c) was rejected and the alternative hypothesis was supported. There was statistically significant influence of information sharing on F&B quality at In-flight Service EgyptAir Company.

The previous result agreed with Prajogo and Olhager (2012) who found that long-term supplier relationships have both direct and indirect significant effects on performance; the indirect effect via the effect on information integration and logistics integration. Furthermore, the current result was in line with Li and Lin (2006) who stated that the efficiency in supply chains is influenced by both the level of information sharing and the quality of information sharing.

In addition, the current result concurred with Fawcett *et al.* (2007) who stated that connectivity and willingness as distinct dimensions in information sharing were found to impact operational performance and to be critical to the development of a real information sharing capability.

On the other hand, the current result disagreed with Ding *et al.* (2014) who found that according to p-value in stepwise regression model, the information sharing was not < 0.05 level of significant, therefore this variable had not significant influence on SCPs performance- food quality.

**Table 11: Linear Regression Coefficients for the Influence of Information Quality on Food Quality**

| **Dependent Variable** | | **Independent Variable** |
|---|---|---|
| | | **Information Quality** |
| Food and Beverages Quality | R | 0.588 |
| | $R^2$ | 0.346 |
| | Sig. | 0.000 |
| | Constant | 0.810 |
| | β | 0.612 |

Table 11 revealed that there was a moderate statistically significant correlation between information quality and F&B quality (R=0.588). $R^2$ refers to the determination coefficient (0.346), suggesting that 34.6 % of the variation of F&B quality was explained by the information quality. The statistical constant (α) has equaled 0.810, and (β) has equaled 0.612, with a significance level less than 0.05. From the previous result, the following equation was suggested: Food and Beverages Quality = 0.810 + (0.612 * Information Quality)

Therefore, the null hypothesis (H1d) was rejected and the alternative hypothesis was accepted. There was statistically significant influence of information quality on F&B quality at In-flight Service EgyptAir Company.

This finding suggested that increasing information quality should be considered one of key innovative SCPs for inflight catering to improve performance and F&B quality.

The previous result concurred with Ding *et al.* (2014) who revealed that information quality has a significant positive relationship with food quality.

Moreover, the current research agreed with Li and Lin (2006) and Moberg *et al.* (2002) which revealed several criteria measuring quality of information sharing in Australian beef industry and retailing accuracy, timeliness, adequacy, credibility and reliability. Furthermore, Information quality is important to supply chain performance, because it provides the facts that supply chain participants use to make decisions. (Li *et al.*, 2005).

**Table 12: Linear Regression Coefficients for the Influence of Information Technology on Food and Beverages Quality**

| Dependent Variable | | Independent Variable |
|---|---|---|
| | | Information Technology |
| Food and Beverages Quality | R | 0.644 |
| | $R^2$ | 0.415 |
| | Sig. | 0.000 |
| | Constant | 0.630 |
| | β | 0.659 |

Table 12 found that there was a strong statistically significant correlation between information technology and F&B quality (R=0.644). $R^2$ refers to the determination coefficient (0.415), suggesting that 41.5 % of the variation of F&B quality was explained by the information technology. The statistical constant (α) has equaled 0.630, and whereas (β) has equaled 0.659, with a significance level less than 0.05. The previous result suggested the following equation: Food and Beverages Quality = 0.630 + (0.659 * Information Technology)

Hence, the null hypothesis (H1e) was rejected and the alternative hypothesis was supported. There was statistically significant influence of information technology on F&B quality at In-flight Service EgyptAir Company.

The current result disagreed with Li *et al.* (2009) who mentioned that IT implementation has no direct effect on supply chain performance, but instead that it enhances supply chain performance through its positive effect on supply chain integration.

**Table 13: Linear Regression Coefficients for the Influence of Lean System on Food and Beverages Quality**

| Dependent Variable | | Independent Variable |
|---|---|---|
| | | Lean System |
| Food and Beverages Quality | R | 0.668 |
| | $R^2$ | 0.447 |
| | Sig. | 0.000 |
| | Constant | 0.756 |
| | β | 0.667 |

Table 13 showed that there was a strong statistically significant correlation between lean system and F&B quality (R=0.668). $R^2$ refers to the determination coefficient (0.447), suggesting that 44.7 % of the variation of F&B quality was explained by the lean system. The statistical constant (α) has equaled 0.756, and (β) has equaled 0.667, with a significance level less than 0.05. From the previous result, the following equation was suggested:

Food and Beverages Quality = 0.756 + (0.667 * Lean System

Therefore, the null hypothesis (H1f) was rejected and the alternative hypothesis was accepted. There was statistically significant influence of lean system on F&B quality at In-flight Service EgyptAir Company.

The current result disagreed with Ding *et al.* (2014) who found that according to p-value in stepwise regression model, lean system was not < 0.05 level of significant, therefore this variable had not significant influence on SCPs performance- food quality. On the other hand, the current result agreed with Simons and Taylor (2007) who applied food value chain analysis based on lean thinking to analyze eight value chain in the UK red meat industry. The results revealed that all supply chain partners' work collaboratively to support supply chain performance.

**Table 14: Linear Regression Coefficients for the Influence of Logistics Integration on Food and Beverages Quality**

| Dependent Variable | | Independent Variable |
|---|---|---|
| | | Logistics Integration |
| Food and Beverages Quality | R | 0.632 |
| | $R^2$ | 0.399 |
| | Sig. | 0.000 |
| | Constant | 0.697 |
| | β | 0.670 |

The results of table 14 revealed that there was a strong statistically significant correlation between logistics integration and food quality (R=0.632). $R^2$ refers to the determination coefficient (0.399), suggesting that 39.9 % of the variation of F&B quality was explained by the logistics integration. The statistical constant (α) has equaled 0.697, and (β) has equaled 0.670, with a significance level less than 0.05. The previous result suggested the following equation:

Food and Beverages Quality = 0.697 + (0.670 * Logistics Integration).

Hence, the null hypothesis (H1g) was rejected and the alternative hypothesis was accepted. There was statistically significant influence of logistics integration on F&B quality at In-flight Service EgyptAir. The current results were in line with Prajogo and Olhager (2012) who proved that logistics integration has a significant effect on operations performance.

**Table 15: Multiple Regression Coefficients for the Influence of Supply Chain Practices on Food Quality**

| Dependent Variable | | | Independent Variable |
|---|---|---|---|
| | | | Supply Chain Practices |
| Food and Beverages Quality | | R | 0.771 |
| | | $R^2$ | 0.577 |
| | | Sig. | 0.000 |
| | | Constant | 0.194 |
| | β | Customer Focus | 0.117 |
| | | Strategic Alliance | -0.005 |
| | | Information Sharing | -0.019 |
| | | Information Quality | 0.119 |
| | | Information Technology | 0.272 |
| | | Lean System | 0.315 |
| | | Logistics Integration | 0.141 |

Table 15 showed that there was a strong statistically significant correlation between SCPs and F&B quality (R=0.771). $R^2$ refers to the determination coefficient (0.577). The statistical constant (α) has equaled 0.194 with a significance level less than 0.05. Value of (β) has equaled 0.117 for customer focus, -0.005 for strategic alliance, -0.019 for information sharing, 0.119 for information quality, 0.272 for information technology, 0.315 for lean system, and 0.141 for logistics integration with a significance level less than 0.05. From the previous result, the following equation was suggested: **Food Quality = 0.194+ (0.117* Customer Focus) - (0.005 * Strategic Alliance) - (0.019* Information Sharing) + (0.119 * Information Quality) + (0.272* Information Technology) + (0.315* Lean System) + (0.141* Logistics Integration).** The current

results disagreed with Ding *et al.* (2014) and Prajogo and Olhager (2012) agreed with Zhou and Benton (2007) who found that strategic alliance, customer focus, information sharing (communication), information quality, lean System (improvement system) and logistics integration has significant influence on food quality. The current result agreed with Hsieh *et al.*, (2018) Therefore, the null hypothesis (H1) was rejected and the alternative hypothesis was accepted. There was statistically significant influence of food supply chain practices on F&B quality at In-flight Service EgyptAir Company.

## 5. EMPIRICAL MODEL

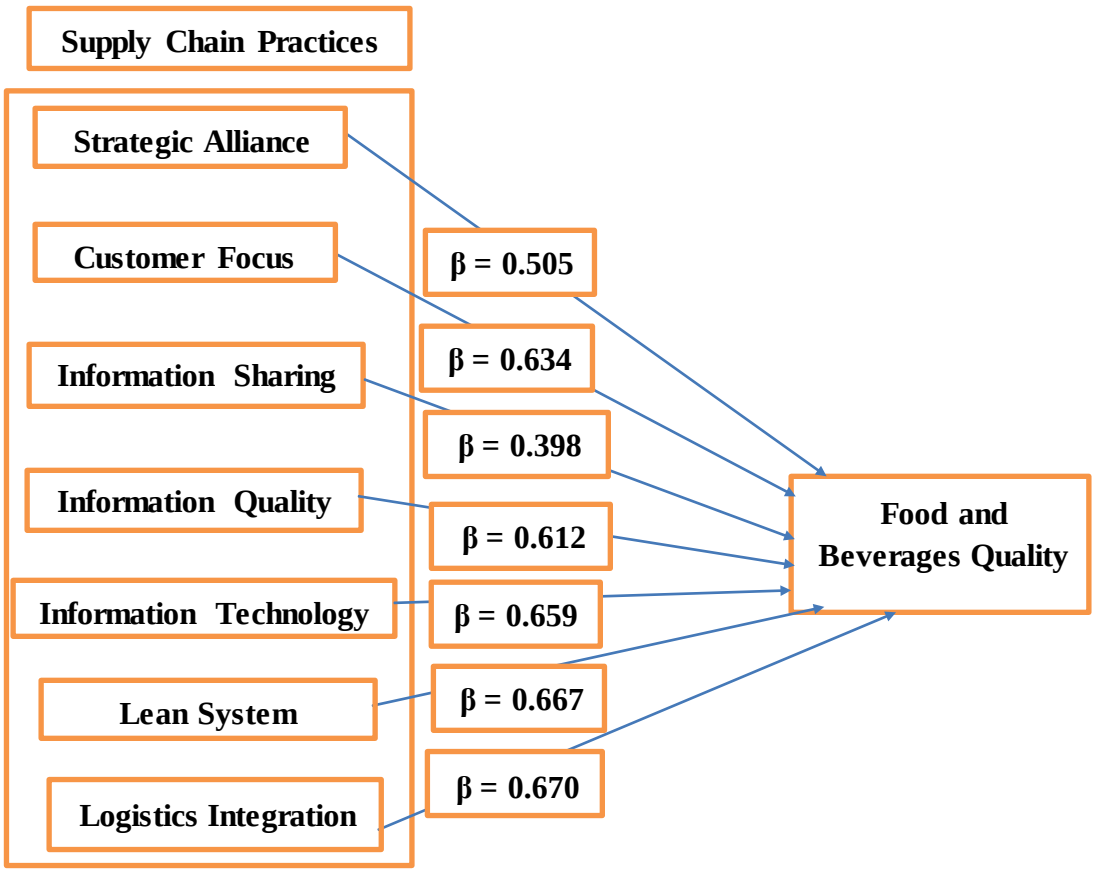


**Figure 2: Supply Chain Practices Influences on F&B Quality at In-Flight Service EgyptAir Company**

## 6. CONCLUSION AND RECOMMENDATIONS

### 6.1. CONCLUSION

The current research aims to assess the implementation of flight catering SCPs and their effects on F&B quality at In-Flight Service EgyptAir

Company. The population of this research was the managers and employees who work in production and catering management in operation sector at In-flight Service EgyptAir Company. A stratified random sample was applied in the current research to divide the target population into two or more relevant and significant strata. Cochran's formula was used for determining the sample size of infinite population. The suitable sample size was 178 participants. A quantitative method was used to collect the data. A self-administered questionnaire was conducted. It contained seven SCPs as independent variables, and F&B quality as dependent variable. A total of 220 questionnaires were distributed evenly to managers and employees. The returned forms (response rate) were 192 (87.27%) from the distributed forms. The valid forms were 180, which represent (81.8%) from the distributed forms, and the non-valid forms were 12, which represented (5.45%). The Statistical Package for the Social Sciences (SPSS) V. 25 was used to analyze the data. These questionnaires were coded, entered and analyzed.

The results showed that there was a significant influence of strategic alliance, customer focus, information sharing, information quality, information technology, lean system, and logistics integration on F&B quality at In-Flight Service EgyptAir Company. Thus, the null hypotheses (H1, H1a, H1b, H1c, H1d, H1e, H1f, and H1g) were rejected and alternative hypotheses were accepted.

## 6.2. Research Contributions

The research contribution emerges from evaluating the influence of flight catering SCPs implementation on F&B quality at In-Flight Service EgyptAir Company. The previous studies focused on assessing the impact of these practices on the performance of red meat processing industry. But the current research concentrated on measuring these practices at In-Flight Service EgyptAir Company and its influence on F&B quality. This influence of each practice on F&B quality is displayed in the empirical model of the current research.

## 6.3. Recommendations

The current research suggested a set of recommendations that would improve, control and ensure that the SCPs implement effectively at In-Flight Service Egypt Air Company as follows:

### 6.3.1. Recommendations for the Managers of In-Flight Service Egypt Air Company

- The managers should adopt supply chain management as a strategic function and carry out an action plan for effective implementation of SCPs and F&B quality.

- It is necessary to adopt effective model to improve SCPs implementation based on empirical model of the current study.
- The managers, caterers, and suppliers should work together to meet the needs of onboard passengers.
- Logistics integration, lean system, and information technology respectively are the highest variables that influence on food quality. Customer focus, information quality, strategic alliance, and information sharing respectively are also significant predictors for F&B quality. Therefore, it is necessary to concentrate on these variables to improve F&B quality.
- It is necessary to establish data and information connection at the supply chain interface to respond to market‘s demands and to create best value for customers.
- The management need to build strong information technology techniques to improve F&B quality.
- The managers should provide training courses for staff on effective implementation of SCPs and improving food quality.
- The managers should activate the supervisory and control role on SCPs and F&B quality.

#### 6.3.2. RECOMMENDATIONS FOR STAFF OF IN-FLIGHT SERVICE EGYPT AIR COMPANY

- Staff should involve in training courses of SCPs to effective implementation of these practices and improvement of F&B quality.
- Staff should contribute to set the action plan of SCPs with the managers.
- Staff should carry out the action plan to effective implementation of SCPs.
- Staff should follow the managers' policies and procedures for improving F&B quality.

### 6.4. RESEARCH LIMITATIONS AND FUTURE RESEARCHES

The current research has some limitations. First, the study was applied on In-Flight service Egypt Air Company only. Future researches can be extended to examine multiple airline companies in different size and regions to analyze the global airline catering supply chain. Second, the current research focused on the effect of SCPs implementation on F&B quality only. However, how SCPs impact other measures such as time, cost and flexibility were not explored. The future studies will focus on this area. Third, this research was conducted within the context of Egyptian airline market. The generalization of its findings to other contexts remains to be ascertained. The future research can be conducted to other countries.

Finally, this research applied a quantitative approach to evaluate the effect of in-flight catering SCPs on food quality. Thus, the further researchers shall also expand by using quantitative and qualitative approaches to get a deeper evaluation.

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