



An investigation of consumers' perception of food safety in the restaurants

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ABSTRACT

The purpose of this study was to investigate consumers' perception on restaurants' food safety. More specifically, the first objective was to identify the importance and performance of casual dining restaurant selection factors from the aspect of food safety in the U.S., using the IPA model. The second objective was to assess the relationships between three cleanliness clues (functional clues, mechanic clues, and humanic clues) and overall satisfaction and their effects on behavioral intention. A survey instrument was used for primary data collection. Employees keeping their fingernails clean, employees wear clean uniform or protective clothing, and employees wear gloves while handling ready-to-eat food items were captured in the "concentration" quadrant, indicating they are very important to the respondents but the restaurants' performances were not satisfactory. Three cleanliness clues directly influenced overall satisfaction towards a restaurant and customer's revisit intention.

1. Introduction

1.1. Foodborne illnesses in the restaurant industry

According to the Centers for Disease Control and Prevention (CDC), foodborne diseases cause approximately 48 million illnesses, 128,000 hospitalizations, and 3000 deaths in the U.S. each year (Scallan et al., 2011). Among the foodborne outbreaks reported, 60% were associated with food served in restaurants, followed by foods prepared at homes (23%), schools (5%), workplace cafeterias (3%), religious organizations (2%), and picnics (2%) (Lynch et al., 2006). An example of one such outbreak at a restaurant due to food consumption was reported in Pennsylvania. More than 600 diners at a single restaurant were infected with hepatitis A after eating green onions in 2003 (Wheeler et al., 2005).

In addition to the substantial number of individuals affected by foodborne diseases, the economic burden caused by foodborne diseases is also significant. Crutchfield and Roberts (2000) estimated that the annual cost of five foodborne pathogens, *Campylobacter* spp., nontyphoidal *Salmonella*, *E. coli* O157:H7, *E. coli* non-O157 STEC, and *Listeria monocytogenes*, was approximately \$6.9 billion. If all foodborne pathogens are included, the total annual estimated costs related to health losses due to foodborne illness in the United States were between \$51 billion and \$77.7 billion (Scharff, 2012). Evidence showed that 60% of these cases were due to unsafe food handling practices in restaurants (Hedberg et al., 2006).

To prevent foodborne outbreaks and improve sanitation

performance in restaurants, food safety training is one of the plausible strategies to achieve these goals (Cotterchio et al., 1998; Kneller and Bierma, 1990). Since restaurants serve meals to a multitude of people, the magnitude of a foodborne illness in this context is usually greater than in home-prepared food. National Restaurant Association (2017) projected that restaurant industry sales will reach \$798.7 billion in 2017. As more people dine out, the risk of foodborne illnesses increases. Restaurants have been reported to be the main cause of between 52% (Angulo et al., 2006) and 59% (Centers for Disease Control and Prevention, 2006) of foodborne illness outbreaks in the United States.

1.2. Food safety in restaurants, customer satisfaction, and revisit intention

Statistics indicated that full-service restaurants or table-service restaurants remain one of the main contributors of restaurant sales in the industry. Full-service restaurants experienced a continual growth in sales from \$181.99 billion in 2009 to \$219.69 in 2015 (Statista, 2015). Even so, evidence showed that full-service restaurants need to improve several aspects related to food safety. For instance, reports by the FDA demonstrated that full-service restaurants violated most safe food handling practices. Some of these aspects included holding foods within the recommended time frame, temperature, and the cooling process. In addition, it was found that employee hand washing practices needed improvement (Roberts et al., 2008).

In general, consumers are concerned about food safety when eating out at restaurants (Knight, 2007). Henson et al. (2006) identified the important attributes used to determine a restaurant's safety were:

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observed cleanliness, appearance of staff, inspection results, and the general impression of the restaurant. Although food safety-related issues are not always identified immediately, customers do pay attention to undercooked and off-tasting food, as well as foreign objects in food (Sulek and Hensley, 2004), as well as food temperature (Namkung and Jang, 2007). A customer attitude survey indicated that more than half of the customers in the United Kingdom paid attention to the hygiene and cleanliness of restaurants when they dined out (Statista, 2016). This finding was supported by Liu and Jang (2009), who also concluded that food safety is the most basic standard concerning food quality evaluation. Moreover, the safety of the food served was reflected by the cleanliness of the restaurants (Macaskill et al., 2000; Scarcelli, 2007).

Customers used several visible and observable cues to form their opinions of a restaurant, such as the appearance of the dining room and servers, the server's station, and restrooms (Ryu and Jang, 2008; Scarcelli, 2007). Barber and Scarcelli's (2009) research indicated that restaurant customers were concerned about the cleanliness of restaurants and safety of the food. In addition, their decision to revisit the restaurant was also based on these various criteria. Previous literature suggested three clues to assess restaurant cleanliness and evaluate customers' restaurant experience: functional clues, mechanic clues, and humanic clues. *Functional clues* are related to the freshness and temperature of foods. *Mechanic clues* included the exterior, interior, restroom, and dining room's appearance. Meanwhile, *humanic clues* are based on servers' safe food handling behaviors and their appearance (Wall and Berry, 2007). These clues are critical to ensure customer satisfaction and a business' sustainability.

1.3. Importance-Performance analysis

Importance-performance analysis (IPA) is used to examine customers' self-perceived importance of attributes and how the organization performs regarding these attributes (Martilla and James, 1977). The IPA model is graphically presented in a four-quadrant grid based on mean importance ratings and mean importance values, which are: "Concentrate here" (High Importance–Low Performance), "Keep up the good work" (High Importance–High Performance), "Low priority" (Low Importance–Low Performance), and "Possible overkill" (Low Importance–High Performance). An organization could use this model to identify the strengths and weaknesses in its operations and strategically plan remedial actions that ultimately could improve customers' satisfaction and allow the business to be more competitive in the marketplace (Hawes et al., 1982; Martilla and James, 1977). Due to its robustness, IPA has been used in educational services (O'Neill and Palmer, 2004), healthcare (Hawes et al., 1982), the hospitality industry (Chu and Choi, 2000; Deng, 2007), and the automobile industry (Martilla and James, 1977).

Multiple facets of food safety in restaurants have been studied and identified as risky areas that may potentially cause foodborne illness outbreaks, for instance, unhygienic practices, cross-contamination, and time and temperature violations. If these risky areas are attributes customers use to evaluate the restaurants' food safety performance, restaurants should take proactive action to improve these aspects. The current literature has not investigated the relative connections between each of these risky areas and attributes. Even this connection has been established before, the consumer's perceived importance of and performance on these food safety attributes needs to be explored.

Based on the literature review, the purpose of this study was to investigate consumers' perception of restaurants' food safety. More specifically, the first objective was to identify the importance and performance of casual dining restaurant selection factors regarding the aspect of food safety in the U.S. using the IPA model. The second objective was to assess the relationships between three cleanliness clues (functional clues, mechanic clues, and humanic clues), overall satisfaction, and their effects on behavioral intention.

2. Research design and methodology

Prior to this research, the approval to use human subjects in this study was obtained from the Institutional Review Board (IRB) of two universities located in the southern part of the U.S.

2.1. Instrument development

A survey questionnaire comprised of three sections was developed based on a literature review (Chu and Choi, 2000; Deng, 2007; Liu and Jang, 2009). The first section included questions related to the demographics of the respondents, such as gender, age, ethnicity, education level, household income, and dining-out frequency. At the beginning of the second section, restaurant customer respondents were asked to name one full-service restaurant they visited most recently to better relate their experience with the research objectives. The second section asked the respondents to rate the importance of attributes based on three cleanliness cues during restaurant visits on a five-point Likert scale, with 1 being "least important" to 5 being "most important." The first category is related to humanic clues, including the following attributes: employees keeping their fingernails clean, employees wearing only specific kinds of jewelry allowed (e.g., a ring), employees wearing clean uniforms or protective clothing, employees wearing gloves while handling ready-to-eat food, and employees free of symptoms of sickness (i.e., running nose, coughing, sneezing, etc.). The second category is related to functional clues, including attributes such as the restaurant providing information about ingredients and food allergies, the restaurant serving food at the appropriate temperature (i.e., hot food hot and cold food cold), and restaurants using fresh ingredients (i.e., no off-flavor or off-color foods). Mechanic clues as the third category include non-food contact surfaces, e.g., the floor, wall, and ceilings being clean and well-maintained, the tableware is clean, the restroom(s) are clean, the hand wash lavatory and/or soap and paper towel dispensers are equipped with hot water, soap, and paper towels/air dryer in the restroom, lighting intensity is appropriate in dining areas, light shielding is appropriately set up, and serving utensils are clean.

The third section measured respondents' perceived performance of the restaurants on a five-point Likert scale, ranging from 1 (strongly disagree) to 5 (strongly agree), based on the same food safety attributes. At the end of the questionnaire, the participants were also asked their impression about their overall satisfaction with the restaurant's food safety performance.

2.2. Instrument validation

The questionnaire was reviewed by five individuals from the restaurant industry and experts in the areas of food safety to establish content validity.

2.3. Pilot study

An invitation to participate in the pilot study was sent through a market research company (Qualtrics Inc.) to the list of potential respondents. Cronbach's alpha or equal to or more than 0.7 was established to evaluate the inter-item reliability of the scale (Cronbach, 1951). A total of 30 respondents participated in the pilot study. The results of the Cronbach's alpha test indicated that all scales measuring the importance (alpha value = 0.76–0.89) and performance items (alpha value = 0.70–0.87) were reliable. The participants were also asked to provide feedback about the clarity of the questionnaire's directions. No further revision was performed after the pilot study.

2.4. Study participants and data collection

A market research company (Qualtrics Inc.) was used for data collection. This method allowed the researchers to collect data from

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