

# The Mediating Effect of Food Safety Culture on the Relationship between Safe Food Handling Knowledge and Practices and Customer Satisfaction on Food Service Establishment

Angelica J. Devera<sup>1</sup>, Loren Grace F. Pelarca<sup>2</sup>, John Mark B. Lazaro<sup>3</sup>

<sup>1,2</sup>Student, Santo Tomas College of Agriculture Sciences and Technology

<sup>3</sup>Instructor, Santo Tomas College of Agriculture Sciences and Technology

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## ABSTRACT

Customer satisfaction serves as a vital metric, essentially reflecting how customers evaluate their service experiences against their initial expectations. This study determined the mediating effect of the food safety culture on the relationship between safe food handling knowledge and practices and customer satisfaction. This study utilizes quantitative, non-experimental, descriptive, correlational research design and mediation analysis with 100 samples from customers. This study used convenience sampling technique. The statistical tools used in this study are mean, pearson r, and path analysis. The study's findings demonstrated that the level of food safety culture, safe food handling knowledge and practices and customer satisfaction. Furthermore, there was a significant interrelationship in food safety culture, safe food handling knowledge and practices and customer satisfaction. Also, a significant partial mediation effect of food safety culture was observed in the relationship between safe food handling knowledge and practices and customer satisfaction. This means that a high level of safe food handling knowledge and practices enables food establishments to implement effective safety measures, which in turn fosters a stronger food safety culture. This positive culture enhances customer satisfaction by ensuring consistency, trust, and a high standard of safety in food services.

**Keywords:** safe food handling knowledge and practices, customer satisfaction, food safety culture, mediation analysis, Philippines

## INTRODUCTION

Customer satisfaction serves as a vital metric, essentially reflecting how customers evaluate their service experiences against their initial expectations (Gunawardane, 2023). However, maintaining customer satisfaction faces challenges like inconsistent service delivery and diverse customer needs that can hinder businesses' ability to achieve high levels of satisfaction (Oyeniya, 2019). Moreover, factors such as low service, lack of customer orientation, high competitive pressure, and limited target groups can negatively impact the customer satisfaction particularly in food service establishments (Hussain et al., 2022). This dissatisfaction can negatively impact business success by reducing customer referrals and repeat business, as unhappy customers may seek out competitors and share negative feedback (Mazhar et al., 2022). Furthermore, this dissatisfaction can also manifest behaviors such as complaining, spreading negative reviews and switching to competitors (Kim et al., 2019).

In Canada, customer dissatisfaction with Canadian food businesses frequently stems from food safety and quality issues resulting from improper storage, inadequate kitchen hygiene, and insufficient employee training which erode customer trust and contribute to declining sales (Bennett, 2021). Similarly, In UK, issues like subpar food presentation, ineffective order management, and a lack of customer focus are damaging customer satisfaction with a study revealed that nearly two-thirds of consumers are concerned about food safety, underscoring the importance of resolving these service quality problems to maintain consumer confidence (Miftari, 2024). In India, there are several service quality issues, such as poor order monitoring, inadequate food presentation, and

inattention to customer needs, can negatively impact customer satisfaction in Indian restaurants, indicating that these factors significantly influence customer loyalty and their overall dining experience (Vasani et al., 2024).

In Cebu City, Philippines, bakeries face challenges such as slow service, limited product variety, and other factors that can negatively affect customer satisfaction and loyalty. These issues significantly impact customer perceptions and overall experiences in the bakery industry (Camarillo et al., 2021). In Saranay, Caloocan City, food hubs face various sanitation problems, such as inadequate hygiene practices, unclean dining areas, and failure to adhere to sanitation regulations that can negatively impact customer satisfaction and their overall dining experience that influence customer loyalty, trust, and perceptions of these dining establishments (Ramirez et al., 2024). In Metro Manila, small online food vendors struggle with weak marketing, infrequent promotions, and difficulty navigating the digital environment, ultimately harming customer satisfaction due to negative perceptions of product and service quality fairness, price fairness, and staff service, which can affect customer satisfaction (Velasco et al., 2021).

Although much research had been carried out in the international and national setting investigating this study, the researchers had not come across any study establishing the mediating effect of food safety culture on the relationship between safe food handling knowledge and practices and customers satisfaction in food service establishments particularly in the Santo Tomas, Davao del Norte. Given the above conditions, the researchers found the urgency to conduct this study to find out if there is a situation of food safety culture on the relationship between safe food handling knowledge and practices and customers satisfaction in food service establishments in Santo Tomas, Davao del Norte.

### **Statement of the Problem**

This study aimed to determine the mediating effect of food safety culture on the relationship between safe food handling knowledge and practices and customer satisfaction in Santo Tomas Davao del Norte. Specifically, it addressed the following objectives.

1. What is the level of safe food handling knowledge and practices in terms of:

1.1 employee and facility policy;

1.2 cleaning and sanitation;

1.3 cleanliness of receiving area ;

1.4 cold storage area condition;

1.5 cleanliness of cooking area;

1.6 safe transportation of food;

1.7 employees training;

2. What is the level of customer satisfaction in terms of:

2.1 food and service quality;

2.2 physical environment quality;

2.3 price and value?

3. What is the level of food safety culture in terms of:

3.1 management style/food safety policy

3.2 leadership;

3.3 communication;

3.4 commitment;

3.5 work environment?

4. Is there a significant relationship between:

4.1 safe food handling knowledge and practices and customer satisfaction;

4.2 safe food handling knowledge and practices and food safety culture;

4.3 food safety culture and customer satisfaction?

5. Does food safety culture significantly mediate between safe food handling knowledge and practices and customer satisfaction?

### **Hypotheses**

The following hypotheses were tested at/using a 0.05 level of significance.

1. There is no significant relationship between:

1.1 safe food handling knowledge and practices and customer satisfaction.

1.2 safe food handling knowledge and practices and food safety culture.

1.3 food safety culture and customer satisfaction.

2. There is no significant mediating effect of food safety culture on the relationship between safe food handling knowledge and practices and customer satisfaction in food service establishment.

### **Theoretical Framework**

This study was anchored on the Servqual Model developed by Parasuraman et al., (1988), which evaluates service quality through five dimensions: tangibles, assurance, responsiveness, empathy, and dependability which are crucial to the food industry. Moreover, Santos et al., (2021) further emphasized that SERVQUAL model helps identify weaknesses in service quality, particularly in tangibility and assurance, both of which are crucial for food safety and customer satisfaction. Food safety training and education are crucial for improving practices in the food industry, where staff knowledge has a significant impact on customer satisfaction (Solano-Solano et al., 2023).

This study was also anchored on the Expectation-Confirmation Theory (ECT) by Oliver which posits that customer satisfaction hinges on whether expectations are met especially in the food handling where consumers expect fresh, high-quality food, which is dependent on proper handling procedures (Oliver, 1980). Furthermore, Expectation Confirmation Theory (ECT) posits that customer satisfaction is achieved when the actual experience matches or exceeds what was anticipated and this translates to consumer satisfaction being dependent on their perception that food safety regulations are adhered to (Ramasamy et al., 2024).

This study also anchored on the Hierarchy of Needs by Maslow (1943) which offers a pyramid-shaped framework for understanding human motivation. In the food industry, fulfilling these needs contributes to customer loyalty and satisfaction (Maslow, 1943). Furthermore, it suggests a direct link between consumer satisfaction and food safety awareness: consumers who are well-informed about food safety are more likely to appreciate and patronize establishments that emphasize hygiene (Padmaningrum et al., 2023). Similarly, Kim

and Almanza (2021) emphasize the strong link between consumer perceptions of ready-to-eat food safety and their overall satisfaction, highlighting the critical need to prioritize hygiene and safety practices to ensure customer satisfaction.

### Conceptual Framework

The conceptual framework, as shown in Figure 1, outlines the study variables. The independent variable is safe food handling knowledge and practices includes the following indicators: employee and facility policy, cleaning and sanitation, cleanliness of receiving area, cold storage area condition, cleanliness of cooking area, safe transportation of food, and employee training.

The dependent variable was customer satisfaction, with several indicators: food and service quality, physical environment quality, and price and value.

The mediating variable was food safety culture, with several indicators: management style/food safety policy, leadership, communication, commitment, and work environment.

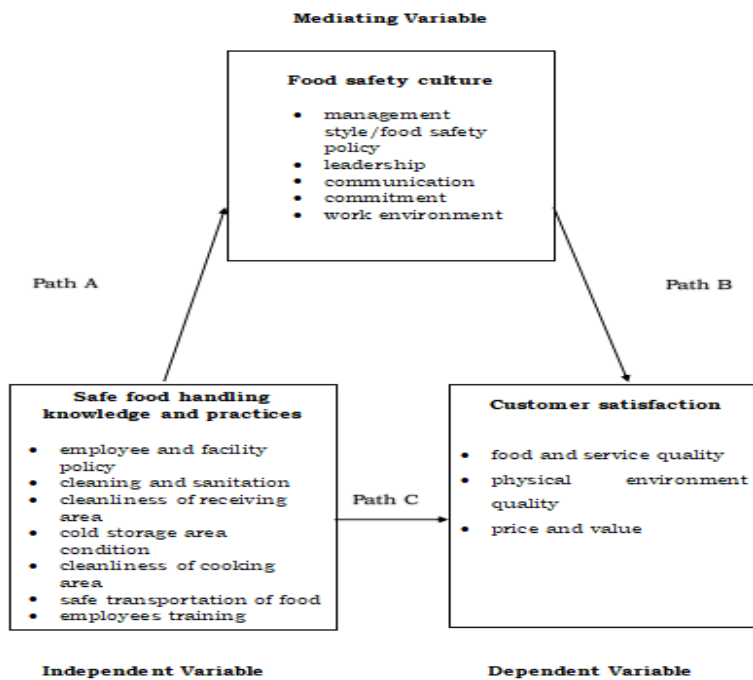


Figure 1. The Conceptual Framework of the Study

## METHODOLOGY

This chapter outlined the research methodology, covering aspects such as the research design, research subjects, research instruments, data gathering procedures, and statistical treatment of data.

### Research Design

A quantitative, non-experimental, descriptive correlational research design was chosen for this study to explore the relationships between food safety culture, safe food handling knowledge and practices and customer satisfaction. Descriptive research was an accurate and methodical description of a population, circumstance, or phenomenon (McCombes, 2022). Correlational research was a non-experimental approach in which a researcher examines two variables, analyzes and evaluates their statistical relationship, and does so without the help of any additional variables, and then draws conclusions (Fleetwood, 2023).

This study used mediation analysis to investigate how food safety culture might explain the relationship between safety food handling knowledge and practices and customer satisfaction. Mediation analysis, as defined by

Nguyen and Nguyen (2021), is a statistical method used to clarify the mechanisms through which an independent variable (safety food handling knowledge and practices) affects a dependent variable (customer satisfaction) via a third variable, known as a mediator (food safety culture). This technique helps establish potential causal pathways across various fields of study. Similarly, Schuler et al. (2024) describe mediation analysis as a statistical approach that examines how one or more mediating variables influence the relationship between an independent and a dependent variable.

**Research Subject**

The respondents on this study were 100 customers out of the estimated customers population eating in food service establishment in Santo Tomas Davao del Norte. The respondents selected through convenience sampling technique. According to Bhardwaj (2019), convenience sampling technique is a non-probability sampling method that selects participants based on their availability and proximity to the researcher, rather than using a random selection process.

**Research Instrument**

The researchers used three (3) adapted survey questionnaires for independent variable, dependent variable and mediating variable. For the dependent variable, safe food handling knowledge and practices, the questionnaire, with a total of 44 items, was adapted from the study titled “Assessing Safe Food Handling Knowledge and Practices of Food Service Managers in Doha, Qatar” by Asim et al. (2018). The instrument consisted of seven (7) indicators, namely: employee and facility hygiene policy with nine (9) items, cleaning and sanitation with seven (7) items, cleanliness of receiving area with eight (8) items, cold storage area condition with seven (7) items, cleanliness of cooking area with seven (7) items, safe transportation of food with four (4) items, and employee training with two (2) items. In describing safe food handling knowledge and practices, the following five-point Likert scale was used: 5 (Very High), 4 (High), 3 (Moderate), 2 (Low), and 1 (Very Low).

Scale	Range	Descriptive Equivalent	Interpretation
5	4.20-5.00	Very High	This means that safe food handling knowledge and practices is always manifested.
4	3.40-4.19	High	This means that safe food handling knowledge and practices is oftentimes manifested.
3	2.60-3.39	Average	This means that safe food handling knowledge and practices is sometimes manifested.
2	1.80-2.59	Low	This means that safe food handling knowledge and practices is rarely manifested.
1	1.00-1.79	Very Low	This means safe food handling knowledge and practices is least manifested.

For the dependent variable, customer satisfaction, the questionnaire, with a total of 17 items, was adapted from the study titled “Customer Satisfaction Toward Food Truck Services in Shah Alam” by Shafiqah et al. (2020). The instrument consisted of three (3) indicators, namely: food and service quality with ten (10) items, physical environment quality with four (4) items, and price and value with three (3) items. In describing customer satisfaction, the following five-point Likert scale was used: 5 (Very High), 4 (High), 3 (Moderate), 2 (Low), and 1 (Very Low).

Scale	Range	Descriptive Equivalent	Interpretation
5	4.20-5.00	Very High	This means that customer satisfaction is always manifested.
4	3.40-4.19	High	This means that customer satisfaction is oftentimes manifested.
3	2.60-3.39	Average	This means that customer satisfaction is sometimes manifested.
2	1.80-2.59	Low	This means that customer satisfaction is rarely manifested.
1	1.00-1.79	Very Low	This means customer satisfaction least manifested.

For the mediating variable, food safety culture, the questionnaire, with a total of 38 items, was adapted from the study titled “The Assessment of Food Safety Culture in Small Franchise Restaurants in Poland” by Wiśniewska (2019). The instrument consisted of five (5) indicators, namely: management style/food safety policy with seven (7) items, leadership with ten (10) items, communication with three (3) items, commitment with twelve (12) items, and work environment with four (4) items. In describing food safety culture, the following five-point Likert scale was used: 5 (Very High), 4 (High), 3 (Moderate), 2 (Low), and 1 (Very Low).

Scale	Range	Descriptive Equivalent	Interpretation
5	4.20-5.00	Very High	This means that food safety culture is always manifested.
4	3.40-4.19	High	This means that food safety culture is oftentimes manifested.
3	2.60-3.39	Average	This means that food safety culture is sometimes manifested.
2	1.80-2.59	Low	This means that food safety culture is rarely manifested.
1	1.00-1.79	Very Low	This means food safety culture is least manifested.

### Statistical Treatment of Data

The following statistical tools were used to compute data and test the hypothesis at an alpha 0.05 of significance.

**Mean.** It is the average value of all the numbers in the set and it is calculated by adding up all the values and then dividing by the total number of values (Bhandari, 2020). This statistical measure was used to examine the level between Safety Food Handling Knowledge and Practice, Customer Satisfaction and Food Safety Culture.

**Pearson r.** It is the most common way to measure how strongly two variables are related in a linear way (Turney, 2022). This method was used to examine the connections between Safety Food Handling Knowledge and Practice, Customer Satisfaction, and Food Safety Culture.

**Path Analysis.** It builds upon multiple regression by examining the relationships among variables to evaluate causal models (Awogbemi, 2022). A powerful statistical tool was utilized to explore the mediating effect of food

safety culture on the relationship between safe food handling knowledge and practices and customer satisfaction on food service establishments.

## RESULTS AND DISCUSSIONS

The data presented, evaluated, and interpreted in this section are based on the research objectives. The following topics are discussed in sequence are levels of Customer Satisfaction, Safe Food Handling Knowledge and Practices, Food Safety Culture, correlations between Customer Satisfaction and Safe Food Handling Knowledge and Practices, Customer Satisfaction and Food Safety Culture, Food Safety Culture and Customer Satisfaction, and mediation analysis results.

### Level of Food Safety Culture

The descriptive statistics on the level of food safety culture are presented in Table 1. The overall mean of 4.70, SD of 0.38, and the descriptive level of very high. It indicated a very high level of agreement among respondents that food safety culture was always manifested. Table 1 further revealed that the indicator “Communication” got a highest mean score of 4.79, SD of 0.36, and the descriptive level of very high. In contrast, the indicator “Commitment” got the lowest score of 4.63, SD of 0.40, and described as very high. These findings suggest that all dimensions of food safety culture are well-practiced within the establishment, with particular strength in communication efforts.

This high level of food safety culture reflects strong adherence to hygiene practices, proper food handling, and a safe working environment, contributing to reduced contamination risks, enhanced customer trust, and overall operational excellence. Therefore, employees demonstrate strong awareness and responsibility toward ensuring food safety, which contributes to customer trust, reduce risk of contamination and overall excellence.

**Table 1**  
*Level of food safety culture*

<u>Indicator</u>	Mean	SD	Descriptive Level
Management Style/Food Safety Policy	4.73	0.30	Very High
Leadership	4.69	0.29	Very High
Communication	4.79	0.55	Very High
Commitment	4.63	0.40	Very High
Work Environment	4.65	0.38	Very High
<b>Overall</b>	<b>4.70</b>	<b>0.38</b>	<b>Very High</b>

The findings align with the study of Cavellius et al., (2023) that food safety culture is high when it comes to unwavering management dedication, clear and open communication, comprehensive training programs, strict compliance with legal requirements, and the continuous improvement of food safety management systems. Additionally, regulatory pressure often drives high-risk industries to develop and maintain a particularly strong food safety culture (FSC)(Pai et al., 2024). Moreover, establishing a robust food safety culture hinges on committed leadership, transparent communication, comprehensive training programs, and the continuous improvement of food safety management systems; their research underscores the critical role of these factors in fostering a strong food safety culture within food service organizations (Spagnoli et al., 2024).

### Level of Safe Food Handling Knowledge and Practices

The descriptive statistics on the level of safe food handling knowledge and practices are presented in Table 3. The overall mean of 4.70 SD of 0.37 and descriptive level of very high. It indicated a very high level of agreement among respondents that safe food handling practices are always manifested. Table 3 further revealed that the indicator “Cleanliness of Cooking Area” got the highest mean score of 4.74, SD of 0.35, and descriptive level of very high, suggesting a strong focus on maintaining hygiene in food preparation areas. In contrast, the indicator “Cleaning and Sanitation” got the lowest mean score of 4.66, SD of 0.38, and describes as very high.

These findings suggest that respondents perceive a strong adherence to food safety practices, particularly in hygiene, storage, and transport. The consistently high ratings indicate that food handlers are well-informed and actively apply their knowledge, contributing to public health and overall food safety within the establishment. Therefore, the establishment maintains a robust culture of safe food handling, which enhances operational standards, minimizes the risk of contamination, and fosters customer trust and satisfaction.

**Table 2**  
*Level of food handling knowledge and practices*

Indicator	Mean	SD	Descriptive Level
Employee and facility policy	4.69	0.28	Very High
Cleaning and sanitation	4.66	0.35	Very High
Cleanliness of receiving area g	4.70	0.41	Very High
Cold Storage area condition	4.67	0.33	Very High
Cleanliness of cooking area	4.74	0.34	Very High
Safe transportation of food	4.73	0.39	Very High
Employees training	4.70	0.46	Very High
<b>Overall</b>	<b>4.70</b>	<b>0.37</b>	<b>Very High</b>

These findings aligned with the study of da Vitória et al. (2021), which emphasizes that a high level of safe food handling knowledge and practices was achieved through comprehensive training, effective communication, and strict adherence to cleanliness regulations. Additionally, fostering food safety in food service relies on comprehensive training, transparent communication, and strict compliance with hygiene regulations, ultimately leading to a high level of safe food handling knowledge and practices among staff (Alemayehu et al., 2021). Moreover, a high level of food safety knowledge and practices through comprehensive training, effective communication, and strict adherence to cleanliness protocols, all of which are essential for promoting food safety in their operations (Tuglo et al., 2021).

### Level of Customer Satisfaction

The descriptive statistics on the level of customer satisfaction was presented in Table 4. The overall mean of 4.77, SD of 0.34, and described as very high. It indicated a very high level of agreement among respondents customer satisfaction are always manifested. Table 4 further revealed that the indicator “Price and Value” got the highest mean score of 4.81 SD of 0.32, and described as very high, suggesting that customers strongly perceived the offerings to be worth their cost. In contrast, the indicator “Food and Service Quality” got the lowest mean score of 4.71, SD of 0.36, and describes as very high.

**Table 3**  
*Level of Customer Satisfaction*

Indicator	Mean	SD	Descriptive Level
Food and service quality	4.71	0.34	Very High
Physical environment quality	4.78	0.32	Very High
Price and value	4.81	0.35	Very High
<b>Overall</b>	<b>4.77</b>	<b>0.34</b>	<b>Very High</b>

These findings suggest that while all areas of customer satisfaction were perceived extremely positively, the perception of value for money stood out most prominently for respondents. Therefore, providing high-quality products and services at reasonable prices greatly influences customer satisfaction, leading to increased customer loyalty, repeat patronage, and positive word-of-mouth recommendations.

It conforms to the study of Hallencreutz and Parmler (2019) that Achieving high customer satisfaction requires steadfast managerial dedication, clear and open communication, comprehensive training programs, strict adherence to legal requirements, and a continuous focus on improving service quality. Additionally, continuous

improvement, customer-centricity, process management, and employee engagement—is the key to achieving high customer satisfaction (Alsaqer at al., 2024). Moreover, achieving high customer satisfaction necessitates steadfast managerial dedication, clear and open communication, and the continuous development of the food service establishment (Robson, 2020).

### Correlation between Safe Food Handling Knowledge and Practices and Customer Satisfaction

Showed in Table 4.1 was the findings about the relationship between Safe Food Handling Knowledge and Practices and Customer Satisfaction with an overall calculated r-value of 0.421 and a p-value of <0.001, lower than the 0.05 which is the set level of significance of the study. Thus, the null hypothesis is rejected. Also, this shows that safe food handling knowledge and practices was medium correlated with their customer satisfaction

This implies that the correlation coefficient of the variables got a positive, medium, and significant correlation. Therefore, safe food handling knowledge and practices significantly contribute to enhancing customer satisfaction by ensuring food safety and building trust with consumers.

**Table 4.1**

*Significance on the Relationship between safe food handling knowledge and practices and customer satisfaction*

Variables Correlated	r	p-value	Decision on H <sub>0</sub>	Decision on Relationship
safe food handling knowledge and practices and customer satisfaction	0.421**	<0.001	Rejected	<u>Significant</u>

It conforms to the study of Aquino et al. (2021) which found that a strong correlation exists between safe food handling knowledge and practices and customer satisfaction, underscoring that food handlers possess greater knowledge and employ better practices, food safety standards and hygiene improve, leading to increased consumer satisfaction. Additionally, a significant positive correlation between food safety knowledge and practices and customer satisfaction, underscoring that enhanced food handling procedures are a consequence of greater food safety awareness and positive attitudes, potentially leading to increased consumer satisfaction (Teffo & Tabit, 2020). Moreover, a strong connection exist between safe food handling knowledge and practices and customer satisfaction, which shows that enhanced food quality and safety are linked to greater customer satisfaction, which results from food workers becoming more aware of and compliant with safety standards (Ateye et al., 2024).

### Correlations between Safe Food Handling Knowledge and Practices and Food Safety Culture

Showed in Table 4.2 was the findings about the relationship between Safe Food Handling Knowledge and Practices and Food Safety Culture with an overall calculated r-value of 0.634 and a p-value of <0.001, lower than the 0.05 which is the set level of significance of the study. Thus, the null hypothesis is rejected. Also, this shows that safe food handling knowledge and practices was strongly correlated with food safety culture.

This implies that the correlation coefficient of the variables got a positive, strong, and significant correlation. Therefore, as safe handling knowledge and practices improves, food safety culture is also enhanced, leading to more robust commitment to food safety standards and a safer environment for both employees and customers.

**Table 4.2**

*Significance on the Relationship between safe food handling knowledge and practices and food safety culture*

Variables Correlated	r	p-value	Decision on H <sub>0</sub>	Decision on Relationship
safe food handling knowledge and practices and food safety culture	0.634**	<0.001	Rejected	<u>Significant</u>

These findings align with the study of Ateye et al. (2024), their findings revealed a significant positive correlation between food safety culture and both safe food handling practices and knowledge, highlighting that advancements in safety standards and understanding strengthen food safety cultures within restaurants.

Additionally, food safety knowledge and practices significantly influences towards safe food handling knowledge and practices, underscoring that enhanced knowledge and positive attitude toward food safety lead to improved food handling practices (Aquino et al., 2021). Moreover, the findings align with the study of Elobeid et al. (2019), illustrated that a strong food safety culture significantly enhances food handlers' understanding, perspectives, and behaviors, while also highlighting the role of continuous training in elevating food safety standards (Elobeid et al., 2019).

### Correlations between Food Safety Culture and Customer Satisfaction

Showed in Table 4.3 was the findings about the relationship between Food Safety Culture and Customer Satisfaction with an overall calculated r-value of 0.852 and a p-value of <0.001, lower than the 0.05 which is the set level of significance of the study. Thus, the null hypothesis is rejected. Also, this shows that food safety culture was very strongly correlated with customer satisfaction.

This implies that the correlation coefficient of the variables got a positive, very strong, and significant correlation. Therefore, fostering a strong food safety culture within establishments significantly enhances customer satisfaction, as it builds trust, ensures consistent quality, and reinforces the perception of safety and reliability in food service.

**Table 4.3**

*Significance on the Relationship between food safety culture and customer satisfaction*

Variables Correlated	r	p-value	Decision on H <sub>0</sub>	Decision on Relationship
food safety culture and customer satisfaction	0.852**	<0.001	Rejected	<u>Significant</u>

These findings align with the study of Wei, (2021), which showed that food safety culture significantly impact customer satisfaction, highlighting that a strong food safety culture contributes to improved customer experiences and trust. Additionally, a well-developed food safety culture could lead to improved customer satisfaction by showing a significant link between the expenses associated with quality and the level of maturity of the food safety culture Spagnoli et al. (2024). Moreover, a customers' perceptions of food safety significantly influenced their satisfaction and loyalty towards restaurants, highlighting how a robust food safety culture improves customer experiences and fosters confidence (Cha & Borchgrevink, 2019).

### Mediation Analysis of the Three Variables using Path Analysis

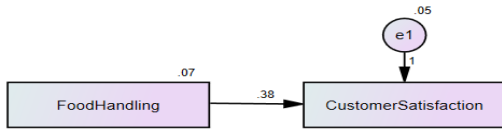
Displayed in Figure 2 was the different steps taken in the path. The independent variable (IV) was Safe Food Handling Knowledge and Practices, the dependent variable (DV) was Customer Satisfaction, and the mediating variable (MV) was Food Safety Culture.

In Step 1, path C (IV and DV), the result yielded an estimate of .385 and a standard error (SE) of .083 with a p<value of 0.000, which is lower than the 0.05 level. This means there is a significant influence between safe food handling knowledge and practices and customer satisfaction since the probability value is p<0.000. Thus, the null hypothesis of no significant relationship is therefore rejected.

In Step 2, path A (IV and MV), with the presence of mediating variable, the result yielded an estimate of 1.040 and a standard error (SE) of .064 with a p<value of 0.000, which is lower than the 0.05 level of significance. This means a significant influence exists between safe food handling knowledge and practices and food safety culture since the probability value is p<0.000. Thus, the null hypothesis of no significant relationship is therefore rejected.

In Step 3, which is path B (MV and DV), with the presence of mediating variable, the result yielded an estimate of .749 and a standard error (SE) of .130 with a p<value of 0.000, which is lower than the 0.05 level. This means a significant influence exists between food safety culture and customer satisfaction since the probability value is p<0.000. Thus, the null hypothesis of no significant relationship is therefore rejected.

In Step 4, which is path C', the combined influence of IV and MV on DV. It was revealed that Customer Satisfaction (DV) regresses on Food Safety Culture (MV) and Safe Food Handling Knowledge and Practices (IV), which the result yielded an estimate of  $-.394$  and standard error (SE) of  $.130$  with a  $p$ -value of  $0.002$ , which is a lower than the  $0.05$  level of significance. This means a significant influence exists between the three variables since the probability value is  $p < 0.001$ . Thus, the null hypothesis of no significant relationship is therefore rejected.



Regression Weights: (Group number 1 - Default model)

		Estimate	S.E.	C.R.	P
CustomerSatisfaction	<--- FoodHandling	.385	.083	4.622	***

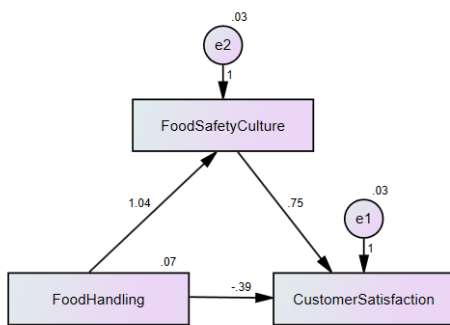


Figure 2. Path Diagram for the Regression Mode

Regression Weights: (Group number 1 - Default model)

		Estimate	S.E.	C.R.	P
FoodSafetyCulture	<--- FoodHandling	1.040	.064	16.184	***
CustomerSatisfaction	<--- FoodHandling	-.394	.130	-3.041	.002
CustomerSatisfaction	<--- FoodSafetyCulture	.749	.106	7.053	***

### Partial Mediation

Since the three steps (paths A, B, and C) are all significant, mediation analysis through path analysis is warranted to assess the significance of the mediation effect. Furthermore, as stated in Step 4, the effect of safe food handling knowledge and practices and customer satisfaction was even found to reduce after being mediated by food safety culture. With this, since the regression coefficient is substantially reduced at step 4 but remains significant, partial mediation occurred since the effect was found to be significant with a  $p$ -value of  $0.001$ .

The findings of the effect size computation in the mediation test between the three variables are shown in figure 2. The effect size indicates how much of the indirect path's effect on customer satisfaction can be attributed to safe food handling knowledge and practices. The beta of safe food handling knowledge and practices towards customer satisfaction is  $.385$ , the total effect value. The beta of safe food handling knowledge and practices towards customer satisfaction with food safety culture included in the regression has a direct effect value of  $0.385$ . The indirect effect value of  $0.780$  is the multiplied portion of the original correlation between safe food handling knowledge and practices to customer satisfaction, which is  $1.040$ , and food safety culture to customer satisfaction, which is  $.49$ .

The ratio index is computed by dividing the indirect effect by the total effect; in this case, 0.779 by 0.385 equals 2.023. About 202.3 percent of the total effect of safe food handling knowledge and practices towards customer satisfaction goes through the food safety culture.

The result on the mediation analysis of food safety culture on the relationship between safe food handling knowledge and practices and customer satisfaction conforms on Servqual Model developed by Parasuraman et al., (1988), which evaluates service quality through five dimensions: tangibles, assurance, responsiveness, empathy, and dependability which are crucial to the food industry. Moreover, Santos et al., (2021) further emphasized that SERVQUAL model helps identify weaknesses in service quality, particularly in tangibility and assurance, both of which are crucial for food safety culture and customer satisfaction. Food safety training and education are crucial for improving practices in the food industry, where staff knowledge has a significant impact on customer satisfaction (Solano-Solano et al., 2023).

## SUMMARY OF FINDINGS, CONCLUSIONS, AND RECOMMENDATIONS

### Summary of Findings

The key outcomes of the study were the following:

1. The level of Food Safety Culture is quantitatively described as “Very high” with an overall mean of 4.70 with a standard deviation of 0.38. The indicator that got the highest mean of 4.79 was “communication” and the indicator that got the lowest mean of 4.63 was “commitment”.
2. The level of Safe Food Handling Knowledge and Practices is quantitatively described a very high with an overall mean of 4.70 with a standard deviation of 0.37. The indicator that got the highest mean of 4.74 was “cleanliness of cooking area” and indicator that got the lowest mean of 4.66 is “cleaning and sanitation”.
3. The level of Customer Satisfaction is quantitatively described as “very high”, with an overall mean of 4.77 with a standard deviation of 0.34. The indicator that got the highest mean of 4.82 is “price and value”, and the indicator that got lowest mean of 4.71 is “food and service quality”.
4. The relationship between safe food handling knowledge and practices and customer satisfaction proved to have a strong positive correlation, with an r-value of .385 and a p-value of  $<0.000$ , which was lower than the significance level of 0.05. This result led to the rejection of the null hypothesis, confirming a significant relationship between safe food handling knowledge and practices and customer satisfaction.
5. The relationship between safe food handling knowledge and practices and food safety culture showed a strong positive correlation, with an r-value of 0.634 and a p-value of  $<0.001$ , which was lower than the significance level of 0.05. This result led to the rejection of the null hypothesis, confirming a significant relationship between safe food handling knowledge and practices and food safety culture.
6. The relationship between food safety culture and customer satisfaction exhibited a very strong positive correlation, with an r-value of 0.852 and a p-value of  $<0.001$ , which was lower than the significance level of 0.05. This result indicated that the null hypothesis was rejected, confirming a significant relationship between food safety culture and customer satisfaction.
7. The mediation analysis confirmed that food safety culture partially mediated the relationship between safe food handling knowledge and practices and customer satisfaction. Path analysis revealed that 202.3% of the effect of safe food handling knowledge and practices and customer satisfaction was mediated by food safety culture.

### Conclusions

In light of this study’s findings, the following statements were constructed:

1. The level of food safety culture is revealed to be very high, indicating that it is always manifested. Therefore, employees demonstrate strong awareness and responsibility toward ensuring food safety, which contributes to customer trust, reduce risk of contamination, and overall operational excellence.
2. The level of safe food handling knowledge and practices was very high, determined as always observed. Therefore, the establishment maintains a robust culture of safe food handling, which enhances operational standards, minimizes the risk of contamination, and fosters customer trust and satisfaction.
3. The level of customer satisfaction was very high, determined as always manifested. Therefore, providing high-quality products and services at reasonable prices greatly influences customer satisfaction, leading to increased customer loyalty, repeat patronage, and positive word-of-mouth recommendations.
4. A strong positive correlation exists between safe food handling knowledge and practices and customer satisfaction. Based on the findings, safe food handling knowledge and practices significantly contribute to enhancing customer satisfaction by ensuring food safety and building trust with consumers. In contrast, inadequate knowledge and poor food handling practices may lead to food safety lapses, which can result in decreased customer satisfaction, negative reviews, and potential health risks, ultimately damaging the establishment's reputation and customer loyalty.
5. A strong positive correlation exists between safe food handling knowledge and practices and food safety culture. The study's findings suggest that as safe handling knowledge and practices improve, food safety culture is also enhanced, leading to more robust commitment to food safety standards and a safer environment for both employees and customers. In contrast, limited knowledge and inconsistent food handling practices can weaken the food safety culture, resulting in poor compliance with safety protocols, increased risk of contamination, and a workplace environment that undermines both staff accountability and consumer trust.
6. A very strong positive correlation exists between food safety culture and customer satisfaction. The study's findings suggest that a strong food safety culture within establishments significantly enhances customer satisfaction, as it builds trust, ensures consistent quality, and reinforces the perception of safety and reliability in food service. In contrast, a weak food safety culture may lead to customer dissatisfaction due to concerns over hygiene, inconsistent service quality, and perceived negligence in food handling, ultimately damaging the establishment's reputation and customer loyalty.
7. The mediation analysis confirmed that food safety culture partially mediate the relationship between safe food handling knowledge and practices and customer satisfaction. The study's findings suggest that safe food handling knowledge and practices directly impacts customer satisfaction, and fostering food safety culture further increases this effect. However, because the influence of food safety culture is only partial, it's clear that other factors, such as service quality, employee behavior, are also important contributors to customer satisfaction.

## Recommendations

The following recommendations were derived from the study's findings and conclusions:

1. Food establishments may implement regular training programs focused on the importance of food safety and personal accountability. Management must lead by example, consistently reinforcing policies through supervision and positive reinforcement. Establishing clear communication channels for reporting safety issues, recognizing employees who demonstrate good practices, and fostering a sense of shared responsibility can help build a stronger commitment. Moreover, integrating food safety goals into performance evaluations and daily operations will emphasize its importance as part of the organizational culture.
2. Food handlers may undergo targeted training sessions focused specifically on proper cleaning procedures, sanitation protocols, and the use of appropriate cleaning agents. Management may implement routine monitoring systems such as cleaning schedules, checklists, and supervision to ensure consistent compliance. Moreover, visual aids like posters and step-by-step guides in food preparation areas can reinforce best practices. Regular

evaluation and refresher courses may be conducted to ensure that staff maintain a high standard of cleanliness, which is critical in preventing contamination and ensuring food safety.

3. Establishments prioritize consistent food preparation standards, ingredient freshness, and portion accuracy. Staff should undergo regular customer service training focusing on attentiveness, communication, and responsiveness to customer needs. Implementing a feedback system such as surveys or comment cards that can help identify specific issues and guide improvements. Lastly, fostering a customer-centered culture where both kitchen and service staff understand the impact of their roles on customer experience can significantly enhance satisfaction and loyalty.

4. Employees may encourage to consistently apply proper food handling practices, especially in areas such as cleaning and sanitation, to ensure food safety and uphold customer trust. Actively participating in food safety training programs, following hygiene protocols, and reporting any safety concerns can contribute to a stronger food safety culture. Also by taking personal responsibility for their role in maintaining safety and quality, employees can help improve overall service standards and boost customer satisfaction.

5. For customers, it is essential to recognize that a business's commitment to safe food handling practices directly contributes to overall dining experience. When establishments maintain high standards in food safety, cleanliness, and service quality, it not only ensures the well-being but also fosters a positive and trustworthy relationship between the customer and the business. Customers may encouraged to support establishments that prioritize these standards, as doing so promotes continuous improvement and guarantees consistently safe and enjoyable experiences. Additionally, providing constructive feedback helps businesses refine their practices, ensuring that future visits meet the expectations for both food safety and service quality.

6. Future researchers may explore the broader implications of food safety practices for customer satisfaction across different sectors of the food service industry. Further studies may examine the role of specific variables, such as employee training, customer perceptions of hygiene, and the influence of external regulations on food safety culture. Additionally, longitudinal studies may offer deeper insights into the long-term effects of implementing food safety practices on customer trust and loyalty. Expanding the research to include diverse demographic groups, geographic locations, and types of food establishments would provide a more comprehensive understanding of how food safety culture influences customer satisfaction in various contexts.

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