

Article

The Effect of Food Sustainability and the Food Safety Climate on the Job Stress, Job Satisfaction and Job Commitment of Kitchen Staff

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Abstract: Background: The food safety climate within an organization represents the job environment that affects the safe management of food and reveals the characteristics of employees. This study aimed to help establish a food safety climate in hotel kitchens that would reduce job stress and increase job satisfaction and employee engagement. Methods: This study was conducted with 570 chefs in 12 five-star hotels in South Korea using a questionnaire-based survey. A total of 570 questionnaires were distributed; 504 usable responses were used in the empirical analysis. Results: The results of this study are summarized as follows. First, among the food safety climate factors perceived by hotel chefs, leadership, resources and communication affect job stress. Second, all five factors of the food safety climate affect the job satisfaction of hotel chefs. Among these factors, leadership, responsibility and communication have positive effects on job satisfaction, while risk awareness and resources have negative effects. Third, the leadership and resources of the food safety climate have positive effects on job commitment. (4) Conclusions: This study has useful recommendations for the service industry, especially the hotel industry, for better human resource management, emphasizing food sustainability in kitchen staff job performance enhancement.

Keywords: food sustainability; kitchen staff; food safety climate; job stress; job satisfaction; job commitment



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1. Introduction

Although food safety measurement systems have been developed and implemented by many organizations and governments to provide safe food, food safety accidents such as food poisoning are still observed [1]. Most of these incidents are caused by food handlers' mistakes, food hygiene issues, or non-compliance with food safety procedures [2,3]. Recently, research has been conducted to develop more accurate tools that can assess the food safety culture and environment of organizations. Jespersen [4] suggested an objective method for the evaluation of the performance of specific actions to determine the maturity of an organization's food safety culture, and Abidin [5] generated a self-assessment questionnaire for culinary activities. However, the concept of a food safety culture and environment is still controversial, and no clear definition or consensus has been established. In order to assist in this important task, Boeck et al. [6] developed an indicator of the food safety climate based on the perceptions of employees in an organization.

The food safety climate is a component of food safety culture that is fundamental for the creation and maintenance of the awareness, attitudes and beliefs required to produce safe food [3]. The food safety climate is an intrinsic environment of an organization that is recognized by the employees involved in food safety [6]. The awareness of this climate affects the implementation of the food safety management system (FSMS) [7] and plays a key role in providing safe and hygienic food [8]. Zohar [9] stated that the food safety climate within an organization represents one of the psychological pathways by which safe

food is manufactured and processed. That is, the food safety climate within an organization represents the job environment that affects the safe management of food and reveals the characteristics of employees that can determine the risk of producing unsafe food [10]. As such, an appropriate food safety climate within an organization is required; therefore, research on the food safety climate is essential.

Heimerl et al. [11] investigated the drivers of job satisfaction in the Alpine tourism industry regarding the intention to work in the profession in the future and their satisfaction with the training. They discovered significant differences between regions in the dimensions of appreciation, international job opportunities, compatibility of family life and career, workplace climate, working hours and remuneration. Their findings also highlight differences in training satisfaction and intention to remain in the job. These regional differences provide important insights into job satisfaction and the influences upon it.

Chefs are one of the typical occupational groups in the food service industry that is obligated to treat food safely and hygienically and provide it to customers, and they work at the forefront of food hygiene and safety management. Due to the hygiene and safety of food, which is increasingly important every day, the education of chefs and the external environment have been greatly affected by the stress and satisfaction of the job [4,6]. In this regard, research on the external environment of hotel chefs is being actively conducted, but job research on the internal—that is, the intrinsic human path—is insufficient. The purpose and contribution of this study is to (a) create a positive effect on the job of chefs and a smooth human relationship in the organization for food safety based on the research results of the food safety climate through human channels on the job that chefs have, and (b) to have a positive effect and raise the job commitment for hotel chefs regarding their performance within the organization by increasing their satisfaction and decreasing their job stress.

To date, few studies have been conducted on the physical environment and organizational culture of hotel kitchens. However, there are studies of the effects of the food safety climate of hotel kitchens on the job performance and perception of kitchen staff. This study assesses the effects of risk awareness, leadership, resources, communication and accountability factors, which have been suggested as factors in the food safety climate [7], on job stress, job satisfaction and the commitment of cooking employees in hotels. The study was designed to help establish a food safety climate in hotel kitchens that would reduce job stress and increase job satisfaction and the engagement of employees engaged in cooking.

2. Literature Review

2.1. Food Safety Climate

Wright et al. [12] defined the food safety climate as the organizational attitude, awareness, knowledge, learning and training in food hygiene, guidance, communication and trust. Zohar [9] defined the food safety climate as an important and meaningful context in the creation and maintenance of food safety awareness and attitudes, and belief in the production of safe food. The food safety climate has been recognized as important and meaningful in the context of the creation and maintenance of food safety awareness, attitudes and beliefs regarding food production [13]. Although the definition of the food safety climate varies, Boeck et al. [6] defined it in terms of subfactors such as risk awareness, leadership, resources, communication and accountability, and developed and verified tools to measure these aspects. In order to provide safe food, attention is required to the development of a food safety climate; in this, the attitude and awareness of food production personnel affects the provision of safe food [13]. Boeck et al. [14] reported that the food safety climate awareness of managers and workers plays an important role in improving hygiene management and developing the attitudes needed to provide safe food. Since the food safety climate within an organization is an important factor in generating a hygienic work environment and providing safe food, research is therefore needed to determine the factors needed to establish a food safety climate in hotel kitchens.

On food safety culture and the food safety climate, Griffith et al. [15] divided the factors into leadership, communication, commitment, environment and risk perception, and included the management system as a measure of the food safety management system. Leadership on food safety is the degree to which employees can participate in compliance with regulations for food safety, and communication is sharing opinions and knowledge about food safety between managers and employees. In addition, commitment sees that personal beliefs about food safety coincide with the food safety goals within an organization; the environment is the internal structure and organizational operating system that operates the organization; and risk perception is the level of individual perception for safe food provision. Meanwhile, Abidin [5] emphasized that the food safety climate was created by the dedication, communication, resources, attitudes and actions of management and employees.

2.2. Job Stress

Studies related to job stress have been conducted in terms of physiology, psychology and behavioral science [13]. With the changes in the food service industry, various stressors have been observed. Hotel employees often experience job stress resulting from emotional and physical labor, such as through emotional exchanges with customers. Employees in the service sector, such as hotel employees, need not only to provide services to customers but also to maintain composure and service quality even when customers are unreasonable [16]. The long-term experience of customer complaints may cause anxiety and insomnia in employees, which may in turn cause stress disorders [17]. Additionally, the job stresses experienced by service workers, such as verbal and physical aggression and sexual harassment by customers and management, are ongoing issues [18].

By focusing on developing a systematic model to address and predict employee intentions to stay, Kim and Jogaratnam [19] investigated the effects of individual and organizational factors on job satisfaction and the intent to stay of hotel and restaurant employees. The study found that job characteristics, participative decision-making and pressure/stress can be good predictors of job satisfaction, while supervisory leadership and intrinsic motivation may not be good predictors of job satisfaction.

Stress is a widespread problem in modern society, and extensive research is ongoing on various groups within different occupations. Salem and Kattara [20] argued that the job stress of five-star hotel employees causes burnout, and that it is essential for managers to exercise effective leadership to reduce job stress and burnout among employees. Job stress has been studied in various ways. However, the stresses faced by hotel chefs have received limited attention. These people experience considerable pressure to satisfy customer expectations and can frequently engage in negative interactions with employees from different departments of the same organization. As our contribution to the literature, the job stress of hotel chefs is assessed in this study. Job stress and job satisfaction are two different things, but they are quite closely mutually interrelated.

2.3. Job Satisfaction

Job satisfaction is a positive emotional response to job experience or the assessment of a job. Albanese and van Fleet [21] reported that job satisfaction is determined by the attitudes related to various aspects of a job and the comparison between expected and actual experiences. March and Simon [22] proposed that the job satisfaction of employees is determined by three factors—whether their job fits their image of themselves, job relationships and predictive ability—and the relationship between the job and other roles. Herzberg et al. [23] reported that the age and years of service of employees demonstrated a U-shaped relationship with job satisfaction. Job satisfaction is initially high and decreases as expectations are not met, but can increase again once employees mature and gain more work experience.

Spencer and Steers [24] stated that the personal and organizational characteristics of members, job expectations, values and the experience of job performance influence

job satisfaction, and may lead to the desire to seek other jobs. Vroom [25] reported that employees decide to find other jobs based on expectations and evaluations of what they can achieve according to the results of their job performance. In addition, job satisfaction is also affected by opportunities for promotion, wages, supervision, working hours, work assessment and job details. Kim et al. [26] assessed the effects of impersonal supervision on employees' job satisfaction, job stress, trust in supervisors and the psychological well-being of hotel workers.

2.4. Job Commitment

Brown [27] reviewed the organizational research and methodology literature on job commitment, concluding that job commitment is affected by personal characteristic management, job characteristics and role recognition variables. Slims and Szilagyi [28] demonstrated that personal and job characteristics are significantly correlated with job commitment, and reported that internal compensations—such as skill diversity, supervision, feedback and co-workers—are more important for job commitment than external compensation, such as wages or promotions. Rabinowitz and Hall [29] stated that three factors affect job commitment: personal characteristics, situational characteristics and work outcomes. Saal [30], and Allam and Ali [31] reported that individual psychological variables, such as values, attitudes and desires for individual work, have greater impact on job commitment than do demographic variables such as gender, education level and age. Finally, Brown [27] conducted an integrated analysis of studies that assessed job commitment, reporting correlations between personal dimensions related to overall job satisfaction, turnover and sincerity. These results suggest that job commitment is strongly related to people's attitudes and approaches to their jobs.

Job commitment can therefore be considered as the difference in the level to which an individual psychologically identifies with and concentrates on performing the job, and their awareness of the importance of their own work in the job. Hong et al. [32] reported that the job satisfaction of hotel kitchen staff is affected by the importance of tasks, diversity of skills and autonomy, and that job satisfaction affects job commitment. Jung and Cho [33] showed that the kitchen environment has important effects on the job satisfaction and commitment of hotel chefs. Graham et al. [34] reported that the kitchen environment of hotels has positive (+) effects on the job satisfaction and commitment of employees. Additionally, Kim and Cho [35] showed that the hotel kitchen environment affects self-efficacy, job commitment and job performance.

2.5. Research Model and Hypotheses

According to previous studies based on the factors of the food safety climate, Yoon [36] argued that in order to reduce the job stress of hotel culinary staff, it is necessary to increase the frequency of intra-organizational communication, that is, horizontal communication, and to strengthen the smoothness of communication. Research and communication build trust and generate positive organizational behavior based on the social exchange between members of the organization [26]. It has a direct effect on satisfaction [32]. This present study focuses on the empirical analysis of the structural relationships between the food safety climate, job stress, job satisfaction and job commitment perceived by hotel kitchen staff based on the theoretical background discussed above. Specifically, it was expected that the food safety climate would affect job stress, job satisfaction and job commitment, and that job stress and satisfaction would affect job commitment.

Leadership makes the role of an individual clearer, and the earlier studies support the hypothesis of the current study stating that job satisfaction increases and has a significant positive (+) effect when individual abilities are considered [37]. Leadership also has a significant effect on organizational commitment and job commitment to corporate members [38]. Buchanan [39] found that the higher the contribution to management performance focused on leadership, the greater the area of the job commitment. Both of these are considered to be consistent with the hypothesis of the current study. Park et al. [40] suggested that the

higher the employee's responsibility factor is perceived to be, the higher the job satisfaction is. Furthermore, Kim [41] noted that when the employee's responsibility is high, they feel attached to the organizational life, happy, and satisfied with their job. These previous studies appeared to support the hypotheses of the present study. The research model that summarizes the relationship among these variables is shown in Figure 1.



Figure 1. Research model.

Based on previous studies, we hypothesize that the food safety climate perceived by hotel chefs affects their job stress, satisfaction and commitment. The following hypotheses are proposed:

Hypothesis 1. *The food safety climate of hotel kitchens significantly affects the job stress of chefs.*

Hypothesis 1a. *Risk awareness in the food safety climate significantly affects the job stress of chefs.*

Hypothesis 1b. *Leadership in the food safety climate significantly affects the job stress of chefs.*

Hypothesis 1c. *Responsibility in the food safety climate significantly affects the job stress of chefs.*

Hypothesis 1d. *Resources in the food safety climate significantly affect employees' job stress.*

Hypothesis 1e. *Communication in the food safety climate significantly affects the job stress of chefs.*

Hypothesis 2. *The food safety climate of hotel kitchens significantly affects the job satisfaction of chefs.*

Hypothesis 2a. *Risk awareness in the food safety climate significantly affects the job satisfaction of chefs.*

Hypothesis 2b. *Leadership in the food safety climate significantly affects the job satisfaction of chefs.*

Hypothesis 2c. *Responsibility in the food safety climate significantly affects the job satisfaction of chefs.*

Hypothesis 2d. *Resources in the food safety climate significantly affect the job satisfaction of chefs.*

Hypothesis 2e. *Communication in the food safety climate significantly affects the job satisfaction of chefs.*

Hypothesis 3. *The food safety climate of hotel kitchens significantly affects the job commitment of chefs.*

Hypothesis 3a. *Risk awareness in the food safety climate significantly affects the job commitment of chefs.*

Hypothesis 3b. *Leadership in the food safety climate significantly affects the job commitment of chefs.*

Hypothesis 3c. *Responsibility in the food safety climate significantly affect the job commitment of chefs.*

Hypothesis 3d. *Resources in the food safety climate significantly affect employees' job commitment.*

Hypothesis 3e. *Communication in the food safety climate significantly affects the job commitment of chefs.*

Hypothesis 4. *The job stress of hotel chefs significantly affects their job commitment.*

Hypothesis 5. *The job satisfaction of hotel chefs significantly affects their job commitment.*

3. Methods

3.1. Data Collection

The fieldwork survey was conducted with 570 chefs in 12 five-star hotels in Seoul and Incheon. The kitchen organization of a five-star hotel is a typical workplace, which operates as a systematic and organized system rather than a lower one, and most chefs recognize it as a standard for a kitchen's operation and environment. Hotel chefs working here have a strong sense of pride and attachment to their job and location. In addition, the trust of customers looking for a five-star hotel is high and the hotel's efforts to respond to it are continuous. Therefore, it was judged that chefs working in 5-star hotels were the most suitable group for this research related to job satisfaction. Consequently, nine hotels were selected in Seoul, the largest city in South Korea, which has a population of ten million, and three in Incheon, the third largest city in the country, which was a population of more than three million.

With the strong political and vibrant economic power of these cities, there are many five-star hotels in this area. Regarding the selection of the hotels, the researchers tried to make it as balanced as possible in order to avoid any possible sample bias. We selected independent and international hotel chains which were geographically balanced, old and new hotels, and hotels in the central business district and near Incheon International Airport, etc. The researchers contacted the human resources office in each hotel to enable the in-person distribution of the survey to the chefs, and the office alternatively distributed the questionnaires to each chef in person and by email when the person was not available during that time. The completed questionnaires were collected by a manager within a week after being distributed and handed over to the researchers by appointment. A total of 570 questionnaires were distributed by email (300 copies) and in-person (270 copies); of the 516 (90.5%) questionnaires that were retrieved in a six-week period between March and April 2018, 504 (88.4%) were eventually used for the analysis after removing incomplete or insincere ones. Table 1 indicates what the constructs were based on for the food safety climate research in the present study.

Table 1. Previous studies affect the constructs of the current study.

Construct in the Food Safety Climate	Previous Studies Referred to the Current Study
Risk awareness	Griffith et al. [15], Zhu and Akhtar [42]
Leadership	Maxwell [43], Yiannas [44], Hall, Dollard, and Coward [45]
Responsibility	Hall et al. [45], Griffith et al. [15], Yiannas [44], Wiegmann, Zhang, von Thaden, Sharma, and Mitchell [46].
Resources	Griffith et al. [15], Yiannas [44]
Communication	Hofmann and Morgeson [47], Yiannas [44], Griffith et al. [15]

3.2. Data Analysis

The food safety climate, job stress, job satisfaction and job commitment were assessed using instruments established by previous studies in the field and utilized in practice. In order to measure various factors of the food safety climate, the measurement tool developed and verified by Boeck et al. [6] that defined the food safety climate was used for the present study. This tool originally had a total of 28 questions, including risk perception (five questions), leadership (six questions), resources (six questions), communication (five questions) and accountability (six questions). The final 23 questions were used in this present study by removing five questions due to irrelevance to the present study: two leadership factors, one resource factor, one communication factor and one responsibility factor. The scale of the measuring tool was a five-point Likert scale: ‘Strongly disagree (1 point)’, ‘Disagree (2 points)’, ‘Neutral (3 points)’, ‘Agree (4 points)’, ‘Strongly agree (5 points)’.

In order to measure the various factors of job stress among employees, a shortened version of the measurement tool for job stress among Koreans [48] was used. This version of the tool consisted of 20 items: four job requirements, three work relations within the organization, four organizational system questions, four lack of job autonomy questions and five job insecurity questions. Job satisfaction was measured using the Minnesota Satisfaction Questionnaire (MSQ) [49], as modified by Park [50] for Korean workers. The tool consists of 20 items which assess the sub-factors of 12 internal and eight external satisfactions. The Job Involvement Questionnaire (JIQ) and the Measurement of Job and Work Involvement (MJWI) [51] were used to measure job commitment, covering the sub-factors, with eight questions on job attachment and importance, and five questions on job responsibility. The items of the tools used in this study were evaluated using a five-point Likert scale, with options consisting of ‘strongly disagree’ (1 point), ‘disagree’ (2 points), ‘neutral’ (3 points), ‘agree’ (4 points) and ‘strongly agree’ (5 points).

The causal relationships in the data were assessed using Analysis of Moment Structure (AMOS) version 23.0. A confirmatory factor analysis (CFA) was performed to assess the reliability and validity of the unidimensional measured items that constituted the research model. Job stress, satisfaction and commitment were analyzed through a second-order confirmatory factor analysis. The correlation between the following construct was then analyzed, and the variance extraction index and construct reliability were calculated in order to assess the convergent and discriminant validity. Path analysis was performed to test the hypotheses.

4. Results

4.1. Analysis of the Measurement Model

CFA is a method to verify the validity of the latent and measured variables of a concept [52]. That is, it verifies the relationships among the latent variables and between the observed and latent variables, and differs from exploratory factor analysis (EFA) in that the number of factors and items are specified before the analysis in CFA [53]. CFA was applied to the variables included in the current research model of which the validity was verified through the EFA for each potential factor conducted in the previous studies.

The questionnaire items used in this study were 18 items on the food safety climate, 14 items on job stress, 18 items on job satisfaction and 11 items on job commitment, which were extracted from the overall model presented in the EFA of this study. Measuring many items in one construct and using them all as observation variables in one model increases the complexity of the model and causes problems with the model fit, sample size and the significance of the parameter estimates. Therefore, the number of items must be adjusted by summing or averaging the items if there are many measurement items [52]. Therefore, in this study, a reliability analysis and second-order factor analysis were conducted and verified based on the EFA results of the previous studies. These items were summed and each construct was used as an observation variable.

A validity test was performed using the standardized factor loadings and standard errors of each construct. Two job-stress items and two job-satisfaction items were excluded because the factor loading was not statistically significant and the minimum value of the standardized factor loading of the remaining items was greater than 0.654 ($t = 8.487$), which was higher than the 0.5 criterion and statistically significant (Table 2). The goodness-of-fit (GFI) of the measurement model was acceptable, as indicated by the following: $GFI = 2 = 3425.311$ ($p < 0.001$), relative $\chi^2 = 2.057$ ($df = 1665$), $GFI = 0.852$, $CFI = 0.904$, normed fit index (NFI) = 0.900, RMR = 0.054 and RMSEA = 0.056.

Table 2. Results of the measurement model analysis of the overall construct.

	Factor	Estimate ^a	CR ^b	AVE ^c	CCR ^d
Food safety climate	Risk awareness (Items 19,20,21,22,23)	0.752	- ^e	0.567	0.891
	Leadership (Items 1,2,3,4)	0.785	16.122 ***	0.618	0.902
	Responsibility (Items 9,10,11,12)	0.713	13.692 ***	0.510	0.853
	Resources (Items 14,15,17)	0.707	14.633 ***	0.531	0.531
	Communication (Items 5,6)	0.686	10.383 ***	0.813	0.677
Job stress	Job demand (Items 1,2,4)	0.760	-		
	Work relations within the organization (Items 9,10,11)	0.724	10.352 ***		
	Organizational system (Items 14,15,16,17)	0.778	9.151 ***	0.530	0.747
	Lack of job autonomy (Items 5,6)	0.654	8.487 ***		
	Job insecurity (Items 12,13)	0.887	11.257 ***		
Job satisfaction	Internal satisfaction (Items 2,3,4,7,8,9,10,11,15,16,18,20)	0.927	-	0.806	0.891
	External satisfaction (Items 12,13,14,17)	0.868	10.080 ***		
Job commitment	Job attachment and importance (Items 1,2,3,4,5,6,8,9)	0.986	-	0.858	0.827
	Job responsibility (Items 11,12,13)	0.862	13.596 ***		

Table 2. Cont.

Factor	Estimate ^a	CR ^b	AVE ^c	CCR ^d
Model fit: $\chi^2 = 3425.311$ ($p < 0.001$), relative $\chi^2 = 2.057$ (df = 1665), GFI = 0.852, CFI = 0.904, NFI = 0.900, RMR = 0.054, RMSEA = 0.056				

Notes: *** $p < 0.001$. ^a Standardized factor loading, ^b CR (critical ratio) = t-value, ^c AVE (average variance extracted), ^d CCR (composite construct reliability); ^e the parameter estimates of the measured variables were fixed as 1.

4.2. Correlation and Feasibility Analysis

The results of the validity evaluation after analyzing the measurement model are presented in Table 3. The validity of the measurement model was assessed in terms of convergent and discriminant validity. The construct reliability value [54] was used to assess the convergent validity and AVE was used to assess the discriminant validity. For the construct reliability, the communication factor of the food safety climate was slightly less than the criterion value of 0.7 (0.667); all of the other factors had a value of 0.7 or higher. However, when using the standardized regression coefficient value to assess convergent validity [55], the communication factor value of 0.686 exceeded the criterion value of 0.5; therefore, the convergent validity is considered acceptable. Song [56] reported that an AVE value greater than 0.5, a construct reliability greater than 0.7 and a standardized regression coefficient value greater than 0.5 indicate convergent validity. In contrast, the observed variables of this study measuring each latent variable were congruous.

In order to test the discriminant validity of the measurement model, the method suggested by Fornell and Larcker [54] was used. The squared correlation coefficient between all of the variables did not exceed the AVE value, suggesting that discriminant validity is present [53]. The feasibility analysis therefore showed that the measurement model of this study has both convergent validity and discriminant validity.

Table 3. Analysis of the correlation and validity between the constructs.

Factor	Mean (SD)	1	2	3	4	5	6	7	8
Risk awareness	3.82 (0.713)	1							
Leadership	3.80 (0.701)	0.660 ** (0.436) ^a	1						
Responsibility	3.74 (0.663)	0.690 ** (0.476)	0.671 ** (0.450)	1					
Resources	3.69 (0.723)	0.633 ** (0.401)	0.572 ** (0.327)	0.613 ** (0.376)	1				
Communication	3.55 (0.783)	0.459 ** (0.210)	0.418 ** (0.174)	0.438 ** (0.192)	0.553 ** (0.306)	1			
Job stress	3.06 (0.210)	0.245 ** (0.060)	−0.249 ** (0.062)	−0.178 ** (0.031)	0.204 ** (0.042)	−0.354 ** (0.125)	1		
Job satisfaction	3.31 (0.685)	−0.155 ** (0.024)	0.109 * (0.012)	0.142 (0.020)	−0.189 * (0.036)	0.362 ** (0.131)	−0.507 ** (0.257)	1	
Job commitment	3.66 (0.664)	0.238 ** (0.057)	0.241 ** (0.058)	−0.256 ** (0.065)	0.510 ** (0.260)	−0.294 ** (0.086)	−0.158 ** (0.025)	0.458 ** (0.210)	1
AVE		0.567	0.618	0.510	0.531	0.813	0.530	0.806	0.858
CCR		0.891	0.902	0.853	0.715	0.677	0.747	0.891	0.827

Notes: * $p < 0.05$, ** $p < 0.01$. ^a Correlation coefficient squared.

4.3. Hypothesis Tests

4.3.1. Testing the Goodness-of-Fit of the Research Model

A structural equation model (SEM) was assessed to verify the structural relationships between the food safety climate, job stress, job satisfaction and job commitment for hotel chefs. An SEM uses common variables extracted from several different measured variables as latent variables, and can be adjusted for measurement errors in the measured variables. An SEM is suitable for the verification and development of structural models of the relationships among theoretically established variables, as it provides information and procedures by which to increase the goodness-of-fit of the model, in addition to verifying the prescribed model [54]. Additionally, a more realistic concept can be estimated because the approach considers possible errors in estimating the model, and because direct/indirect effects, total effects and parameter estimates are presented separately, the relationships among the various factors can be accurately deduced [57].

In order to verify the goodness-of-fit of the measurement model, outliers are removed to normalize the collected data, and skewness and kurtosis are analyzed to assess the presence of both univariate and multivariate outliers. SEM assumes multivariate normality, as the parameters are estimated through a linear combination of the observed variables. In most cases, multivariate normality is not satisfied. Therefore, the presence of satisfactory univariate normality is generally considered acceptable [54,58]. Figure 2 shows the results of the verification of the overall goodness-of-fit of the research model. The goodness-of-fit statistics of the structural model are as follows: $\chi^2 = 3425.311$ ($p < 0.001$), relative $\chi^2 = 2.057$ ($df = 1665$), GFI = 0.852, CFI = 0.904, NFI = 0.900, RMR = 0.054, RMSEA = 0.056, indicating that the model used in this study is structurally sound. Table 4 shows the goodness-of-fit and acceptance criteria of the study model.

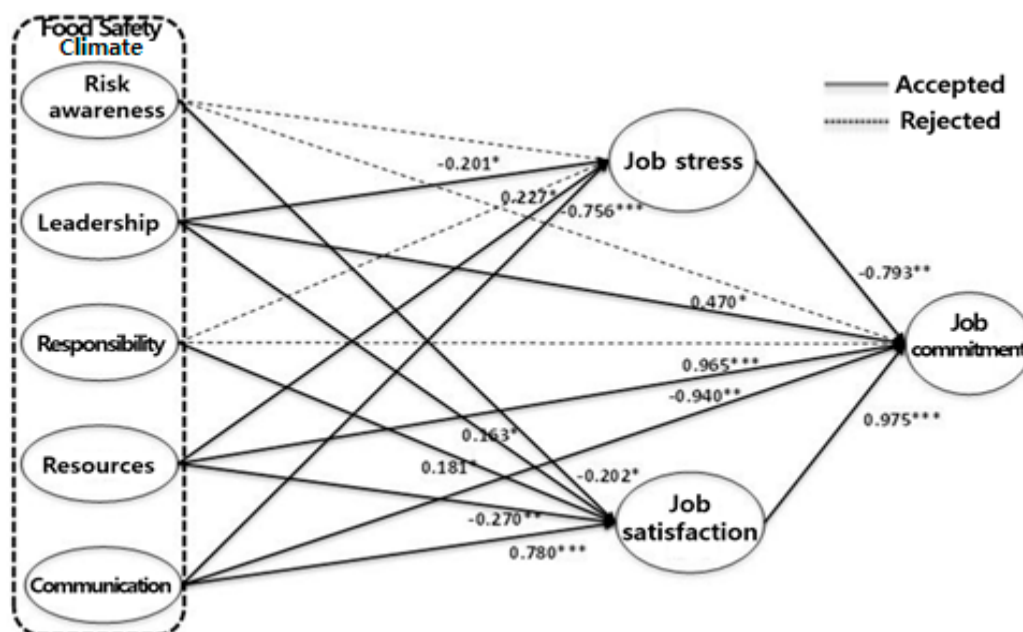


Figure 2. Results of the research model analysis. Notes: path coefficient, $\chi^2 = 3425.311$ ($p < 0.001$), relative $\chi^2 = 2.057$ ($df = 1665$), GFI = 0.852, CFI = 0.904, NFI = 0.900, RMR = 0.054, RMSEA = 0.056, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

Table 4. Goodness-of-fit of the research model.

FIT INDEX		Research Model	Acceptance Criteria	Reference
Absolute fit index	χ^2 (p)	3425.311 (<0.001)	$p \geq 0.05$	Hair et al. [53]
	relative χ^2 (χ^2/df)	2.057 (=3425.311/1665)	≤ 5.0	Marsh and Hocevar [57]
	GFI	0.852	$\geq 0.8-0.9$	Joreskog and Sorbom [58]
	RMSEA	0.056	≤ 0.08	Browne and Cudeck [59]
Normed fit index	AGFI	0.802	$\geq 0.8-0.9$	Tanaka and Huba [60]
	TLI	0.901	$\geq 0.8-0.9$	Bentler and Bonett [61]
	CFI	0.904	$\geq 0.8-0.9$	Bentler [62]
	NFI	0.900	$\geq 0.8-0.9$	Bollen [63]

4.3.2. Relationships among the Food Safety Climate Factors and Job Stress in Hotel Kitchens

The tests of the hypotheses regarding the relationships among the food safety climate, job stress, job satisfaction and job commitment are shown in Table 5. Hypothesis 1a is that risk awareness affects job stress. The nonsignificant path between risk awareness in the food safety climate (path coefficient = 0.169, $t = 1.843$) and the job stress of hotel chefs suggests that risk awareness does not affect the job stress of hotel chefs. Thus, Hypothesis 1a is rejected.

Hypothesis 1b is that leadership affects job stress. The significant path between leadership in the food safety climate (path coefficient = -0.201 , $t = 2.398$, $p < 0.05$) and the job stress of hotel chefs suggested that leadership had a negative effect on employees' job stress. Thus, Hypothesis 1b is accepted. In most prior studies, leadership negatively affected job stress [64–66], as is consistent with the current findings.

Hypothesis 1c is that responsibility affects job stress. The nonsignificant path between responsibility in the food safety climate (path coefficient = -0.119 , $t = -1.414$) and the job stress of hotel chefs suggests that responsibility does not affect job stress. Thus, hypothesis 1c is rejected. Hypothesis 1d is that resources affect job stress. The significant path between resources in the food safety climate (path coefficient = 0.227, $t = 2.362$, $p < 0.05$) and job stress of hotel chefs suggests that the availability of resources has a positive effect on the job stress of hotel chefs. Thus, Hypothesis 1d is accepted. Note that human, physical and educational resources regarding food safety were assessed; these factors negatively affect employees, leading to increased job stress.

Hypothesis 1e is that communication affects job stress. The significant path between communication in the food safety climate (path coefficient = -0.756 , $t = -6.753$, $p < 0.001$) and the job stress of hotel chefs suggests that communication had a negative effect on the job stress of hotel chefs. Thus, Hypothesis 1e is accepted. Our findings are similar to those of Yoon [36], who reported that it is necessary to increase the frequency of intra-organizational communication and strengthen effective communication in order to reduce job stress among hotel kitchen staff.

4.3.3. The Relationships between the Food Safety Climate Factors and the Job Satisfaction of Hotel Chefs

Hypothesis 2a is that risk awareness affects job satisfaction. The significant path between risk awareness in the food safety climate (path coefficient = -0.202 , $t = -2.349$, $p < 0.05$) and job satisfaction of hotel chefs suggests that risk awareness has a negative effect on the job satisfaction of hotel chefs. Thus, Hypothesis 2a is accepted. This relationship may be the result of employees feeling psychological pressure to maintain food safety. Hypothesis 2b is that leadership affects job satisfaction. The significant path between leadership in the food safety climate (path coefficient = 0.163, $t = 2.102$, $p < 0.05$) and

the job satisfaction of cooking employees suggests that leadership has positive effects on employees' job satisfaction. Thus, Hypothesis 2b is accepted. Previous studies reported similar findings, suggesting that leadership helps to define individual roles, and that job satisfaction is positively affected when individual abilities are considered [67–69].

Hypothesis 2c is that responsibility affects job satisfaction. The significant path between responsibility in the food safety climate and the job satisfaction of hotel chefs (path coefficient = 0.181, $t = 2.274$, $p < 0.05$) suggests that responsibility has a positive effect on the job satisfaction of hotel chefs. Therefore, Hypothesis 2c is accepted. Park et al. [40] reported that a higher awareness of responsibilities in hotel employees led to greater job satisfaction, and Kim [41] showed that the high responsibility of employees leads to the increased attachment and happiness of employees in an organization, as well as greater job satisfaction. These studies support our hypothesis. Hypothesis 2d is that resources affect job satisfaction. The significant path between resources in the food safety climate and the job satisfaction of hotel chefs (coefficient climate = -0.270 , $t = -2.998$, $p < 0.01$) suggests that the lack of resources has a negative effect on the job satisfaction of hotel chefs. Thus, Hypothesis 2d is accepted. This is consistent with the results of the empirical analysis by Robert and Karasek [70], which showed that job stress and satisfaction have an inverted U relationship. That is, resources can increase job stress and job satisfaction among hotel chefs.

Hypothesis 2e is that communication affects job satisfaction. The significant path between communication in the food safety climate and the job satisfaction of hotel chefs (path coefficient = 0.780, $t = 7.962$, $p < 0.001$) suggests that communication has a positive effect on the job satisfaction of hotel chefs. Thus, Hypothesis 2e is accepted. Communication builds trust based on social exchange between members of organizations and leads to positive organizational behavior [71]. Within the organization, each member directly affects job satisfaction through communication with managers, colleagues and groups [72], as is consistent with the hypotheses of our study.

4.3.4. The Relationships among the Food Safety Climate and Job Commitment of Hotel Chefs

Hypothesis 3a is that risk awareness affects job commitment. The nonsignificant path between risk awareness in the food safety climate and job commitment of hotel chefs (path coefficient = 0.209, $t = 1.044$) suggests that risk awareness does not affect the job commitment of hotel chefs. Thus, Hypothesis 3a is rejected. Hypothesis 3b is that leadership affects job commitment. The significant path between leadership and the job commitment of hotel chefs (path coefficient = 0.470, $t = 2.507$, $p < 0.05$) suggests that leadership has a positive effect on the job commitment of hotel chefs. Thus, Hypothesis 3b is accepted. A previous study reported that leadership has significant effects on organizational and job commitment among members of corporations [38], while Buchanan [39] suggested that the greater the contribution to management performance through leadership, the stronger the job commitment, as is consistent with our study's hypothesis.

Hypothesis 3c is that responsibility affects job commitment. The nonsignificant path between responsibility in the food safety climate and the job commitment of hotel chefs (path coefficient = -0.235 , $t = -1.267$) suggests that responsibility does not affect the job commitment of chefs. Thus, Hypothesis 3c is rejected. Hypotheses 3.4 is that resources affect job commitment. The significant path between resources in the food safety climate and the job commitment of cooking employees (path coefficient = 0.965, $t = 3.699$, $p < 0.001$) suggests that the level of resources has a positive effect on the job commitment of hotel chefs. Thus, Hypothesis 3d is accepted. In our study, human, physical and educational resources were assessed, and these factors were shown to have positive effects on employees' job commitment.

Hypotheses 3.5 is that communication affects job commitment. The significant path between communication and the job commitment of hotel chefs (path coefficient = -0.940 , $t = -2.580$, $p < 0.01$) suggests that communication has a negative effect on the job commitment of chefs. Thus, Hypothesis 3e is accepted. Our finding that active communication

has a significant positive effect on job commitment stands in opposition to the findings of previous studies [73]. Although different results may be obtained depending on the characteristics of the group, communication regarding food safety may be a sensitive topic among employees involved in this occupation, unlike those in certain other occupations.

4.3.5. The Relationship between Job Stress and Job Commitment

Hypothesis 4 is that job stress affects job commitment. The significant path between the job stress and job commitment of employees (path coefficient = -0.793 , $t = -2.852$, $p < 0.01$) suggests that job stress has a negative effect on job commitment. Thus, Hypothesis 4 is accepted. Kim [74] found that the job stress perceived by hotel kitchen staff has a negative effect on job commitment in a study of the relationships between job stress, satisfaction, commitment and intention to change jobs by hotel employees. Moreover, previous studies [75,76] reported that job stress has negative effects on job commitment, supporting the findings of our study. In contrast, Park [77] reported that job stress amongst employees of tourism companies increased their tension, thereby elevating individual commitment. Thus, it appears that a reasonable amount of stress may help job commitment.

4.3.6. The Relationship between Job Satisfaction and Job Commitment

Hypothesis 5 is that job satisfaction affects job commitment. The significant path between job satisfaction and job commitment (path coefficient = 0.975 , $t = 3.225$, $p < 0.001$) suggests that job satisfaction has a positive effect on job commitment. Thus, Hypothesis 5 is accepted. This finding is consistent with those of previous studies, which showed that higher job satisfaction is associated with higher job commitment [78,79]. Table 5 lists the results of the hypothesis tests.

The results of this study hypothesis were to some of the previous studies that said there is a significant positive effect on job commitment when members' communication becomes more active [73,80]. Although different results may come out depending on the characteristics of the different groups, this study hypothesis is a communication of material that is somewhat sensitive to food safety practitioners, and it is believed that this study may appear contrary to previous studies because it refers to vertical communication based on discipline, rather than horizontal communication. In general, most chefs in Korea are highly stressed by the tough job climate (unsocial hours, working in constant tension with the threat of being burnt, cut, or having an accident in a very limited and humid space; the pressure to perform in such a short period of time and the especially strong hierarchical work culture, etc.) and, consequently, many of them do not like communication (particularly vertical and formal communication with their managers, department heads or directors) with their managers or colleagues unless it is necessary. This is one of the reasons why communication among staff does not necessarily have a significant positive effect.

Table 5. Results of the hypothesis tests.

Hypothesized Relationship			Estimate ^a	S.E.	C.R.	Results
H1a	Risk awareness	→	0.169	0.072	1.843	Rejected
H1b	Leadership	→	-0.201	0.068	-2.398 *	Accepted
H1c	Responsibility	→	-0.119	0.084	-1.414	Rejected
H1d	Resources	→	0.227	0.092	2.362 *	Accepted
H1e	Communication	→	-0.756	0.139	-6.753 ***	Accepted
			Job stress			
H2a	Risk awareness	→	-0.202	0.105	-2.349 *	Accepted
H2b	Leadership	→	0.163	0.097	2.102 *	Accepted
H2c	Responsibility	→	0.181	0.124	2.274 *	Accepted
H2d	Resources	→	-0.270	0.134	-2.998 **	Accepted
H2e	Communication	→	0.780	0.188	7.962 ***	Accepted
			Job satisfaction			

Table 5. Cont.

Hypothesized Relationship			Estimate ^a	S.E.	C.R.	Results
H3a	Risk awareness	→	0.209	0.179	1.044	Rejected
H3b	Leadership	→	0.470	0.172	2.507 *	Accepted
H3c	Responsibility	→	−0.235	0.210	−1.267	Rejected
H3d	Resources	→	0.965	0.283	3.699 ***	Accepted
H3e	Communication	→	−0.940	0.860	−2.580 **	Accepted
H4	Job stress	→	−0.793	0.315	−2.852 **	Accepted
H5	Job satisfaction	→	0.975	0.372	3.225 ***	Accepted

Note: * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. ^a Standardized coefficient.

5. Conclusions

5.1. Discussion

This study empirically analyzed the structural relationship between the food safety climate and job stress, satisfaction and commitment among hotel chefs. Direct effect means that the independent variable affects the dependent variable, and indirect effect means that the independent variable indirectly affects the dependent variable through more than one mediating variable. The total effect comes from the sum of the direct and indirect effects. This study estimated the direct and indirect effects using bootstrapping to examine the detailed causal relationship between the food safety climate, job stress, job satisfaction and job commitment. As a result of the examination of the direct and indirect effects, it was found that the direct effects from job stress and job satisfaction were greater on the risk awareness, leadership and resource factors than the indirect effects were. Meanwhile, the responsibility and communication factors were found to have greater indirect effects on job commitment through job stress and job satisfaction (See Table 6).

All five factors of the food safety climate affect the job satisfaction of hotel chefs. It can be seen that higher risk awareness reduces the job satisfaction of chefs, likely due to the psychological stress associated with the pressure to produce safe food. Risk awareness regarding food is an important factor that should be present in employees. However, this may have negative effects on job satisfaction; thus, managers need to provide employees with sufficient rest and a sense of psychological stability. Finally, we observed that job satisfaction has a strong positive effect on job commitment.

Table 6. Direct, indirect and total effects on job commitment.

	Direct Effect	Indirect Effect via Job Stress	Indirect Effect via Job Satisfaction	Total Effect
Risk awareness	0.209	−0.134	−0.197	−0.122
Leadership	0.470	0.159	0.159	0.788
Responsibility	−0.235	0.094	0.176	0.035
Resources	0.965	−0.180	−0.263	0.522
Communication	−0.940	0.600	0.761	0.421

5.2. Theoretical Contribution

The food safety climate is mainly understood as the organizational attitude, awareness, knowledge, learning and training in food hygiene, communication and trust. The food safety climate is increasingly recognized as an intrinsic environment of an organization that is recognized by the employees involved in food safety [81]. Because the food safety climate within an organization is an important factor in generating a hygienic work environment and providing safe food, the relevant research is meaningful for the determination of the factors needed to establish a food safety climate in hotel kitchens.

This study innovatively established a significant theoretical contribution to our understanding of the food safety climate in hotel kitchens that would help in reducing job

stress and increasing job satisfaction and employee engagement, an approach severely lacking in the relevant academic research. It is a pioneer study that specifically focuses on an empirical analysis of the structural relationships between the food safety climate, job stress, job satisfaction and job commitment as perceived in the hotel industry. Unlike previous studies that mainly examined food safety only as a tangible attribute that affects food hygiene and diners' satisfaction with food freshness and food taste, it investigated the role of the food safety climate as being crucial in understanding job stress, job satisfaction and job commitment, and the relationships between the job stress and satisfaction and job commitment of hotel kitchen staff. This study hypothesized that the food safety climate perceived by hotel chefs affects their job stress, satisfaction and commitment, and thus made an important theoretical contribution to our understanding of the relationships between food safety and job satisfaction in the kitchen.

5.3. Managerial Implications

This study provides several practical implications that the industry can apply and adopt as useful data and resources in the hospitality and culinary industry. It has valuable recommendations for the relevant service industry in the area of better human resource management. First, the hotel industry should design systematic programs to strictly ensure food safety, food hygiene and food sustainability that are not only important for the tangible food safety for the customers and the managers but also crucial in terms of enhancing the job commitment of hotel restaurant staff in five-star hotels. The managers should provide manuals about procedures in food preparation and food sustainability in and outside the kitchen in their properties. The level of food treatment is a reflective barometer of how the hotel organization uses food materials and the way it treats kitchen staff. Secondly, the hotel industry should implement democratic and open-minded communication with kitchen staff so that they can have comfortable working conditions by providing a horizontal communication mechanism. The kitchen staff in general are in a tough job situation as they need to carefully concentrate on every single procedure at work, and therefore they can easily become stressed with the many types of risks at work. In particular, invisible and informal communication such as an anonymous letter to a manager could be an effective communication tool, especially in East Asian countries, considering their highly hierarchical culture.

Thirdly, allocating some levels of responsibility to kitchen staff can elevate their job commitment, as they can feel that they are treated more respectfully and they are recognized as important staff at a workplace. Finally, managers need to check all of the formal and informal factors that influence the job stress, job commitment and job satisfaction of kitchen staff in order to eventually contribute to enhancing their job satisfaction and the health of the organization. Any gesture or program that shows care in relation to dealing with food materials, cooking processes, training new staff, team retreats or recommending suggestions would be useful, and would eventually help in reducing the turnover rate and improving the overall productivity of kitchen operations.

5.4. Limitations and Further Research

There are some limitations that should be addressed. The survey was conducted only in five-star hotels in two large cities, in only one country. The results could be different for non-five-star hotels in different countries with different job environmental cultures and job requirements at work. Further studies could be developed using comparative methods in different countries with different job environments and food sustainability cultures.

In addition, in analyzing the collected data, more multilateral further research methods would be useful to provide more accurate and valuable results, such as Spearman's Rank-Order Correlation [82].

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