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The Relationship between Contact-Free Services, Social and Personal Norms, and Customers' Behavior for the Sustainable Management of the Restaurant Industry

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Abstract: People worldwide are experiencing increasingly complex social issues, and ways of life are changing. This study analyzes the relationship between contact-free service value, personal and social norms, and customers' behavioral intentions for sustainable restaurant businesses, demonstrating a direct association of the value and extended norm theory. Structural equation model analysis was performed to verify causality between variables; multi-group analysis was performed to confirm the moderating effects of menu price using AMOS; and frequency analysis, descriptive statistical analysis, and reliability analysis were performed using SPSS. The data were collected from Koreans aged 18 years and above (310 responses). The results revealed that contact-free service value positively affects personal norms, and personal norms positively affect behavioral intentions. In addition, social norms positively affect personal norms and behavioral intentions. In particular, it was found that social norms greatly influence personal norms. Finally, the menu price moderated the relationship between social and personal norms. These results present a variety of academic and practical implications, and this is especially meaningful for analyzing the association between contact-free service value and norm theory in the food service industry.

Keywords: contact-free service value; personal norms; social norms; menu price; food service industry

1. Introduction

We live in the era of the Fourth Industrial Revolution, wherein various data, artificial intelligence technology, and physical objects are interconnected [1]. At the same time, in dealing with various social and global crises such as the COVID-19 pandemic and rising labor costs, everyday life has changed and people have adapted, assimilating the core values of digitalization and sustainability [2]. One such adaptation is the emergence of contact-free services, wherein there is no physical contact between employees and customers, for example kiosks, service robots, and Siren Orders [3]. These services are useful in various fields such as restaurants, cafes, multiplex shopping malls, hospitals, and theaters [3]. In fact, such service methods are made using artificial intelligence (AI) technology and widely used in tourism, hospitality, and various other industries [4]. US companies have forecasted that AI service usage will increase to approximately 60% by 2022 [5]. As of 2020, contact-free consumption has increased due to COVID-19 according to 71% Koreans, and a younger population prefers contact-free services [6]. Based on advanced technology, these contact-free services are essential because they save time and labor, prevent the spread of viruses [7], and store large amounts of information [4]. AI services have been rapidly developing, including the formulation of customized services based on a massive amount of database analysis [8]. Gursoy et al. [8] explained that AI services not only provide fast and accurate services but also increase interactions between firms and customers and resolve the increasing cost of labor. According to Travelzoo [9], about 75% of customers were satisfied with the services provided by the robot and believed that AI service methods would improve the service quality. In contrast, Adam

et al. [10] argued that AI services are yet to meet customers' expectations. Therefore, there is disagreement among scholars on the satisfaction level of contact-free services. Several studies have been conducted on contact-free service value in the service sector. Marinova et al. [11] conducted a study applying the deliberate and pragmatic learning theory to enhance the efficiency and effectiveness of AI services at the service frontline, finding that smart technology learning has a significant mediating effect on the relationship between employees and customers. Bolton et al. [12] studied customers' AI service experiences from an integrated perspective of social, physical, and digital environments and derived a total of eight duality concepts that differ in business-to-customer and business-to-business relationships. Wirtz et al. [13] studied the role of robots in the service environment and analyzed customers' beliefs and behaviors on such robots from a systematic perspective. In addition, customers' acceptance of AI devices [8], AI-based chatbot services [10], and comparative studies on service robots and kiosks [14] have been conducted. As such, prior studies on contact-free services have varied with regard to application fields, detailed topics, and theories applied, and they include many technical analyses as well as qualitative studies. Extensive consideration of prior studies has confirmed that quantitative studies focused solely on the restaurants' contact-free service value in the areas of food service, hotels, and tourism have been carried out on a limited basis.

In the context of this social trend, Stern et al. [15] emphasized that the value-belief-norm theory appropriately describes certain social phenomena. In particular, they explained that values and norms are directly related concepts that predict customer behavior [15]. Humans feel uncertainty and urgency about their first social experiences [16]; therefore, by interacting with each other, norms guide their behaviors to produce new meanings and structures [16]. Furthermore, norms are the most essential characteristics of normative messages, and understanding them is fundamental [17]. This study analyzes both personal and social norms, which predict an individual's future behavior more accurately [18]. Moreover, it has been observed that social norms affect personal norms [19]. Therefore, it is important to analyze values, norms, and customers' behavioral intentions in the context of changes in service methods to facilitate the development of a sustainable restaurant industry. So far, several scholars have proved the relationship between values and norms in other fields [20–23]; however, studies that assess this association in reference to contact-free services offered by restaurants remain scant.

In addition, Zhong and Moon [24] stated that price signifies the value of a product, which directly impacts consumer behavior. Similarly, Chen et al. [25] explained that price acts as a stimulus that alters consumer behavior. Consequently, this study seeks to verify the moderating effect of menu price on the relationship between contact-free service value and norm theory. In summary, this study is quite meaningful in that it applies extended norm theory to clearly demonstrate customer behavior changes regarding contact-free service value in the food service sector, applying price, which acts as an important variable in customer consumption behaviors, as a moderator. Furthermore, this study is valuable because it is an attempt to assess the role of personal and social norms in the relationship between contact-free service value and customer behavior to reduce the research gap between existing studies and to contribute to the facilitation of the sustainable management of the food and hospitality industry. Customer behavior studies on contact-free services are expected to contribute in a variety of ways to the building of a more advanced contact-free service environment in the future.

Thus, the goals of this study are:

1. To discuss the relationship between restaurants' contact-free service value, personal norms, social norms, and customers' behavioral intentions.
2. To discuss the moderating role of menu price (low vs. high) in the relationships between the contact-free service value and extended norm theory.

2. Theoretical Framework

2.1. Contact-Free Service Value at Restaurants

Complex social issues such as the COVID-19 pandemic and the Fourth Industrial Revolution have created a new service environment [2]. Advanced AI has been created to perform human tasks as effectively as possible in the form of computer systems, machines, or robots [26]. It enhances service efficiency and provides special service experiences for customers [27]. Berry [28] emphasized that new service strategies are the key to remain competitive. Carù and Cova [29] observed that satisfactory AI services positively change the customers' behavioral intentions toward the company.

According to Prentice and Nguyen [27], AI-based services enhances customer engagement more than human services in the hotel industry. Meanwhile, Adam et al. [10] observed customers' dissatisfaction toward AI services for many reasons. Belanche et al. [7] conducted a qualitative study on the benefits of service robots in the service sector and showed that service robots increase productivity and reduce costs. Comparing the use of robots and kiosks in shopping environments, Brengman et al. [14] found that customers were more attracted to service robots than kiosks. Additionally, the use of robots was found to be more positive. Huang and Rust [30] studied the role of AI in the service field and explained that service human resources should be gradually reduced as AI advances. Kim et al. [31] studied robot services in the hotel sector and found that due to the experience of COVID-19, customers prefer hotels with robot workers; meaning, robotic services were positively valued. McLeay et al. [32] studied robot services in the age of machines and understood what needs to be supplemented for the successful application of contact-free services in the future. They argued that customers should be constantly informed about the safety and advantages of robots.

Therefore, studies on AI-based contact-free services have been conducted in various fields; particularly qualitative studies on contact-free services and technical skills. However, this current study assesses contact-free service value in the food service industry which has, hitherto, been scant.

2.2. Personal and Social Norms from the Perspective of Norm Theory

Kahneman and Miller [33] refer to norms as emotional responses and social judgments that are caused due to various reasons. Norm theory is mainly applied to understand people's emotions and predict their behaviors in certain events [33]. Nadelmann [34] explained that the role of norms in the international community has been widespread since the 1980s, and norms have been important in the analysis of individual, political, economic, religious, and moral beliefs about social institutions and events. Moreover, Svensson and Baier [17] emphasized that norms uncover meanings that are studied by academics in the social science and legal fields and are the best concepts to understand social phenomena.

Further, Stern et al. [15] argued that various social values activate personal norms and values, and personal norms work together during social movements. In short, personal norms are beliefs that guide future behavioral responses involving individual motivation and hope for a particular event [35]. Social norms are understood and socially constrained by group members and embody rules and standards [36]. They also manifest through interactions with others [36]. Several studies have proved that social norms affect personal norms; this gave rise to the extended norm theory [37–39].

Norm theory has been mainly utilized in environmental and public policy studies to understand people's behavioral changes. Studies related to the food service industry include Ramayah et al. [40], who studied baby formula selection behavior by applying subjective norms. The study identified subjective norms as variables that significantly affected mothers' baby formula selection behavior. Burger et al. [41] studied women's food choices between nutrition and taste by applying norm information. The results revealed that norms affect food choices; that is, participants who believed that other participants chose healthy food over taste were more likely to choose healthy food. Vartanian et al. [42] analyzed norms in women's food consumption and found that individuals' perceived norms regard-

ing the appropriateness of food consumption significantly impacted cookie consumption behavior. Wenzig and Gruchmann [43] studied local food preferences and found that injunctive, moral, and descriptive norms positively affected local food purchasing intentions. Hwang et al. [44] studied environmentally friendly food service delivery and observed that individuals' personal norms enhance their behavioral intentions. Furthermore, Kim and Hwang [39] studied food delivery services using drones and indicated that social norms positively affect personal norms. In addition, several researchers have utilized norm theory to study organic food [45–47], halal food [48], and agricultural food [49].

Consequently, studies have emphasized the role of norms in various social science fields and highlighted the relationship between values and norms. However, insufficient research has been conducted in the food service industry that applies norm theory to the analysis of contact-free service value. Therefore, this study demonstrates the relationship between restaurants' contact-free service value and personal and social norms to predict customers' behavioral intentions.

2.3. Moderating Role of Price

Price is a variable that directly affects consumers' purchasing behavior [50]. In fact, most people perceive that the higher the price of a product or service, the better its quality [51]. The impact of price has been studied in a variety of areas, such as mobile services, finance, and tourism.

Kukar-Kinney et al. [52] studied the moderating effect of price consciousness on price-matching guarantees in a shopping environment. They observed that consumers' search and purchase behaviors differed according to the level of their price consciousness. Palazón and Delgado [53] studied the moderating role of price consciousness in the context of sales promotion and confirmed that price discount methods were more effective for consumer groups with low price consciousness, while both price discounts and premium promotions were equally effective for groups with high price consciousness. Andrews et al. [54] studied the moderating effect of price discounts in the field of mobile services and observed that price discounts moderated the relationship between cause marketing and customers' sales purchases. Chua et al. [55] studied the moderating effect of price on cruise experience. The findings revealed that the lower price sensitivity group was more satisfied with the cruise. Narteh [51] studied the moderating effects of prices paid on service quality and customer satisfaction in banks. Price was confirmed to be a significant moderating variable. El-Said [56] studied hotel booking intentions and analyzed the moderating effects of price. The findings suggested that less price-sensitive consumers book more hotels with worse reviews than price-sensitive consumers.

Consequently, this study verifies the moderating effect of menu price on the relationship between contact-free service value and norm theory.

2.4. Relationships between the Constructs
2.4.1. Relationship between Contact-Free Service Value and Personal Norms

In a study on reducing the use of personal cars, Nordlund and Garvill [57] confirmed that environmental value positively affects people's personal norms. Chua et al. [58] revealed that altruistic values positively affect personal norms in the context of pro-environmental agriculture. Roos and Hahn [21] studied collaborative consumption and determined that altruistic value positively affected personal norms. Ateş [22] observed that biospheric value positively affects personal norms in the context of pro-environmental behaviors. According to Engel et al. [23], relational marine value positively affects people's personal norms regarding marine conservation.

Consequently, most relevant studies have observed a positive effect of service value on respondents' personal norms. Based on these findings, the following hypothesis is proposed:

Hypothesis 1 (H1): *Restaurants' contact-free service value positively affects customers' personal norms in the contact-free services environment.*

2.4.2. Relationship between Personal Norms and Behavioral Intentions

Nordlund and Garvill [57] stated that personal norms positively affect people's intentions to reduce the use of personal cars. Harland et al. [59] revealed that personal norms positively affect behavioral intentions in the context of pro-environmental behavior. According to Yang and Jolly [20], Americans' personal norms positively affect their behavioral intentions in the context of mobile data services. Gkargkavouzi et al. [60] observed that personal norms positively affect behavioral intentions in the context of environmental behavior. Similarly, Han et al. [37] conducted an eco-cruise study and confirmed that people's personal norms positively affect their intention to sacrifice for eco-cruises. Roos and Hahn [21] determined that consumers' personal norms positively affect their collaborative consumption intentions. Balundė et al. [38] revealed that respondents' personal norms positively affect their behavioral intentions in the context of waste prevention behaviors. Hwang et al. [44] studied environmentally friendly food delivery services and observed that individuals' personal norms positively affected their intention to use, and willingly pay for, environmentally friendly food delivery services. In addition, Youn et al. [19] conducted a traditional food study and found that diners' personal norms positively affect their purchase intentions.

Therefore, most relevant studies have demonstrated a positive effect of personal norms on individuals' behavioral intentions. Based on these findings, the following hypothesis is proposed:

Hypothesis 2 (H2): *Customers' personal norms positively affect their behavioral intentions in the contact-free services environment.*

2.4.3. Relationship between Social Norms and Personal Norms

Han et al. [37] revealed that social norms positively affect people's personal norms. According to Balundė et al. [38], social norms positively affect personal norms regarding waste prevention behaviors. Kim and Hwang [39] studied drone food delivery services and observed that social norms regarding emerging service methods positively affected individuals' personal norms. Youn et al. [19] revealed that social norms regarding traditional food positively affected diners' personal norms.

Consequently, most relevant studies have demonstrated a positive effect of social norms on respondents' personal norms. Based on these findings, the following hypothesis is proposed:

Hypothesis 3 (H3): *Social norms positively affect customers' personal norms in the contact-free services environment.*

2.4.4. Relationship between Social Norms and Behavioral Intentions

According to Han et al. [37], social norms positively affect people's intention to sacrifice for eco-cruises. Roos and Hahn [21] determined that social norms positively affect consumers' collaborative consumption intentions. Balundė et al. [38] explained that social norms positively affected respondents' behavioral intentions. Further, Youn et al. [19] revealed that social norms positively affected diners' purchase intentions in the context of traditional food.

Therefore, most relevant studies have demonstrated a positive effect of social norms on respondents' behavioral intentions. Based on these findings, the following hypothesis is proposed:

Hypothesis 4 (H4): *Social norms positively affect customers' behavioral intentions in the contact-free services environment.*

2.4.5. The Moderating Role of Menu Price

Ryu and Han [61] observed that when the perceived price is reasonable, customers are more satisfied with the food, service, and physical environment. Minbashrazgah et al. [62] studied green chicken purchase behaviors and confirmed the moderating effects

of price transparency on consumers' purchase intentions and purchase behaviors. Ghali-Zinoubi [50] studied organic food and analyzed the moderating role of price. The results revealed that in the relationship between attitudes and buying behaviors, the lower price sensitivity group had a higher impact on organic food.

Therefore, based on these results, this study analyzes the moderating effect of menu price on the relationship between contact-free service value and norm theory. The following hypothesis is proposed:

Hypothesis 5 (H5): *Restaurants' menu price has a moderating effect on the relationships between contact-free service value, personal norms, social norms, and behavioral intentions (see Figure 1).*
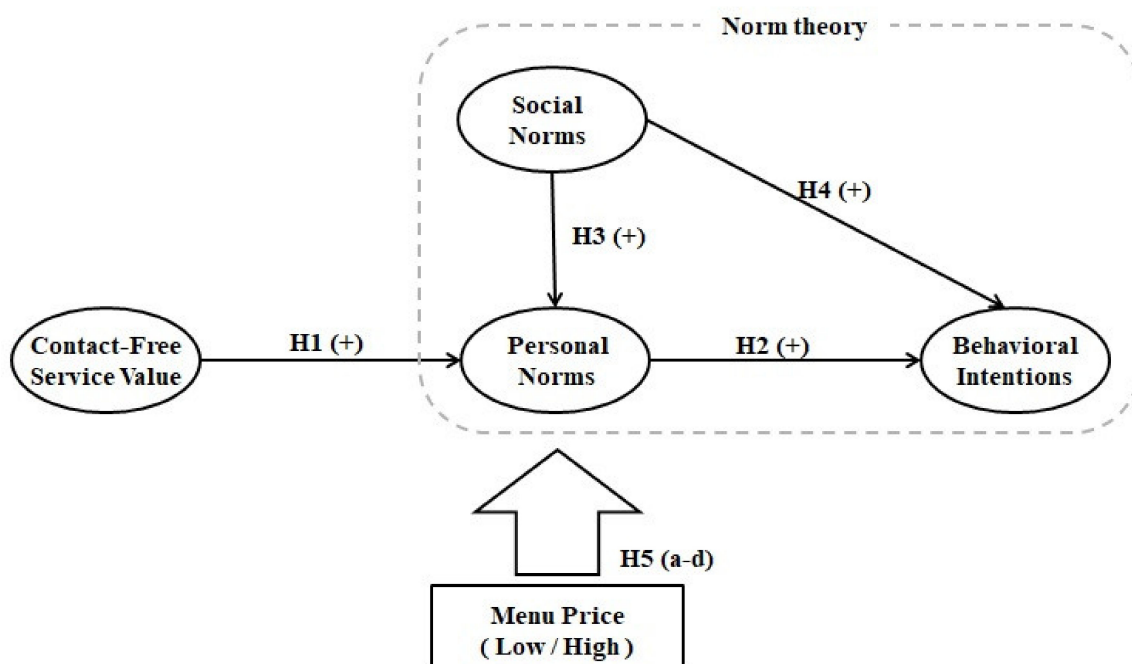

Figure 1. Research framework.

3. Materials and Methods

3.1. Data Collection and Participants

Data were collected in the second and third weeks of January 2021. An online survey was conducted through an online research company with the maximum number of panels in Korea. Respondents provided their informed consent and participated in the survey. A memory-based survey was administered to participants who had experienced using contact-free services at restaurants recently or within six months. Respondents were rewarded for participating in the survey by the online research company. Respondents aged 18 or older were eligible for participation; consequently, from the total of 324 respondents, 310 were analyzed after discarding incomplete responses.

3.2. Survey Instrument and Measures

The survey was conducted in three stages. In the first stage, respondents were asked if they had experienced using contact-free services (e.g., kiosk, service robots, self-service) at restaurants recently or within six months of sample collection. In the second stage, the respondents were asked to select the menu price paid per person at the restaurant. In the third stage, all questions related to "contact-free service value," "personal norms," "social norms," and "behavioral intentions" were answered. This also included demographic questions.

The four questions on "Contact-free service value" were adopted from Petrick [63]. Further "Personal Norms," "Social Norms," and "Behavioral Intentions" were covered by four questions each which were adopted from Youn et al. [19]. All questions were

marked on a five-point Likert scale (1 = highly disagree, 2 = disagree, 3 = normal, 4 = agree, and 5 = highly agree). All the questions were translated into Korean and corrected and confirmed by two professors who were fluent in English and Korean.

4. Results

4.1. Sample Characteristics

In terms of age, the respondents (*n* = 310) were distributed in the following order: 30s (36.5%), 20s (34.2%), 40s (19.7%), 50s (6.5%), over 60s (2.8%), and 10s (0.3%). Further, 69.4% were female respondents compared to 30.6% male respondents. The percentage of unmarried respondents (59.7%) was slightly higher than married respondents (40.3%). The respondents' education level was in the following order: graduates (68.8%), two-year college (16.8%), graduate school (8.7%), and high school (8.7%). In addition, respondents' monthly income was distributed in the following order: USD 2000 (31.3%), less than USD 1000 (19.4%), USD 3000 (15.5%), USD 1000 (11.9%), more than USD 5000 (11.3%), and USD 4000 (10.6%). Lastly, the respondents' occupations ranged from office jobs (44.2%), professional jobs (16.1%), students (15.2%), homemakers (10.6%), others (10%), to self-employed (3.9%). Table 1 presents the demographic characteristics of the respondents.

Table 1. Sample's demographic characteristics (*n* = 310).

Characteristics	*n* (%)	Characteristics	*n* (%)
Age (Years)		Monthly Income	
18–19	1 (0.3%)	<USD 1000	60 (19.4%)
20–29	106 (34.2%)	USD 1001–USD 2000	37 (11.9%)
30–39	113 (36.5%)	USD 2001–USD 3000	97 (31.3%)
40–49	61 (19.7%)	USD 3001–USD 4000	48 (15.5%)
50–59	20 (6.5%)	USD 4001–USD 5000	33 (10.6%)
Over 60	9 (2.8%)	USD 5001 ≤	35 (11.3%)
Sex		Occupation	
Men	95 (30.6%)	Student	47 (15.2%)
Women	215 (69.4%)	Office job	137 (44.2%)
Marital status		Self-employed	12 (3.9%)
Unmarried	185 (59.7%)	Professional job	50 (16.1%)
Married	125 (40.3%)	Homemaker	33 (10.6%)
Educational level		Other	31 (10%)
High school	27 (8.7%)		
Two-year college	52 (16.8%)		
University	204 (65.8%)		
Graduate school	27 (8.7%)		

Notes: Monthly income was calculated based on the exchange rate in July 2021. Exchange rate: USD 1 = about KRW 1130.

4.2. Validity and Reliability of Measurements

Confirmatory factor analysis was performed to determine the validity and reliability of the measurements of each construct. Results revealed that all CCR values were more than 0.7 and all AVE values were more than 0.5; therefore, each construct's validity was confirmed [64]. Furthermore, each construct's Cronbach's alpha values were distributed between 0.779–0.938, confirming their reliability. Additionally, the criteria for model fit were also satisfied [64] (see Table 2).

The square of correlation values and AVE values were compared to determine the discriminant validity of each construct. Results revealed that all squares of correlation values were smaller than the AVE values, which confirmed the discriminant validity of constructs [64] (see Table 3).

Table 2. Results of confirmatory factor analysis.

Construct	Standardized Loadings	*t*-Value	CCR	AVE	Cronbach's Alpha
Contact-Free Service Value			0.794	0.562	0.779
Nowadays, restaurants' contact-free services are important to me	0.755				
Restaurants' contact-free services are useful in the pandemic.	0.770	11.799			
Restaurants' contact-free services are reliable in the pandemic.	0.723	11.307			
Personal Norms			0.948	0.821	0.930
I feel an obligation to choose a restaurant that has contact-free services.	0.946				
I feel morally obliged to dine in a restaurant with contact-free services.	0.941	33.546			
I feel obliged to visit a restaurant with contact-free services.	0.907	28.864			
I need to consider the availability of contact-free services while choosing a restaurant.	0.825	22.095			
Social Norms			0.956	0.845	0.938
People whose opinions I value prefer that I dine at a restaurant with contact-free services.	0.908				
Most people who are important to me think that I should eat at a restaurant with contact-free services.	0.937	29.649			
Most people who are important to me would want me to dine at a restaurant with contact-free services.	0.919	28.963			
Most people who are important to me value that I dine at a restaurant with contact-free services.	0.912	28.467			
Behavioral Intentions			0.919	0.740	0.925
I would like to dine at a restaurant with contact-free services the next time I dine out.	0.828				
I will make an effort to dine at a restaurant with contact-free services the next time I dine out.	0.819	19.278			
I am willing to choose a restaurant with contact-free services the next time I dine out.	0.889	19.707			
I plan to dine at a restaurant with contact-free services the next time I dine out.	0.901	22.630			

Notes: $\chi^2/df = 1.911$, $p < 0.001$; Root mean-square residual (RMR) = 0.036; Goodness-of-fit index (GFI) = 0.935; Adjusted GFI (AGFI) = 0.906; Tucker-Lewis index (TLI) = 0.978; Comparative fit index (CFI) = 0.983; Incremental fit index (IFI) = 0.983; Root mean-square error of approximation (RMSEA) = 0.054; CCR: composite construct reliability; AVE: average variance extracted.

Table 3. Discriminant validity and correlations.

Construct	1	2	3	4	Mean	SD
1. Contact-free Service Value	0.562 [a]				3.723	0.624
2. Personal Norms	0.255 [b]	0.821 [a]			2.737	0.921
3. Social Norms	0.188 [b]	0.582 [b]	0.845 [a]		2.829	0.915
4. Behavioral Intentions	0.320 [b]	0.289 [b]	0.320 [b]	0.740 [a]	3.319	0.746

Notes: "a" diagonal elements are the AVE; "b" off-diagonal elements are the square of correlations.

4.3. Results of Hypotheses 1–4

To test the hypotheses, structural equation modeling analysis was performed using the AMOS program. Results revealed that contact-free service value positively affected personal norms (β = 0.198 ***, p < 0.000), which confirmed H1. This result corresponds with the results presented by Chua et al. [58], Roos and Hahn [21], and Ateş [22]. Further, personal norms positively affected behavioral intentions (β = 0.243 ***, p < 0.000), which confirmed H2. This result corresponds with the findings of Gkargkavouzi et al. [60], Roos and Hahn [21], and Hwang et al. [44]. Similarly, social norms positively affected personal norms (β = 0.695 ***, p < 0.000), which confirmed H3. This finding corresponds with the findings of Han et al. [37], Balundė et al. [38], and Kim and Hwang [39]. Last, social norms positively affected behavioral intentions (β = 0.390 **, p < 0.01), which confirmed H4. This finding corresponds with the result of Roos and Hahn [21], Balundė et al. [38], and Youn et al. [19] (see Table 4).

Table 4. Results of Hypotheses 1–4.

	Relationships	β	B	S.E.	*t*-Value	*p*-Value	Results
H1	Contact-free Service Value → Personal Norms	0.198	0.315	0.077	4.110	0.000 ***	Confirmed
H2	Personal Norms → Behavioral Intentions	0.243	0.200	0.071	2.959	0.000 ***	Confirmed
H3	Social Norms → Personal Norms	0.695	0.722	0.048	14.949	0.000 ***	Confirmed
H4	Social Norms → Behavioral Intentions	0.390	0.333	0.068	4.711	0.003 **	Confirmed

Notes: χ^2/df = 2.145, p < 0.001; Root mean-square residual (RMR) = 0.044; Goodness-of-fit index (GFI) = 0.930; Adjusted GFI (AGFI) = 0.899; Tucker-Lewis index (TLI) = 0.972; Comparative fit index (CFI) = 0.978; Incremental fit index (IFI) = 0.978; Root mean-square error of approximation (RMSEA) = 0.061; *** p < 0.001, ** p < 0.01.

4.4. Results of Hypothesis 5

A multi-group analysis (MGA) was performed to test the moderating effects of menu price (low vs. high). First, to conduct a clear MGA, we compared the bottom 25% (n = 84) and top 25% (n = 90) groups, dividing them into quartiles based on the menu price paid per person. The menu price paid per person was less than USD 8.85 in the bottom 25% group, and USD 17.7 or higher in the top 25% group. The results revealed the moderating effect of menu price on the relationship between social norms and personal norms; therefore, H5c was confirmed. While the results of both the groups were statistically significant, the higher group's social norms affected personal norms more strongly (see Table 5).

Table 5. Results for Hypothesis 5a–5d.

	Structural Relationship	Low (*n* = 84)		High (*n* = 90)		Free	Constrained	△χ²	Results
		β	*t*-Value	β	*t*-Value	χ²(df = 170)	χ²(df = 171)		
H5a	Contact-free Value → Personal Norms	0.229	2.785 **	0.165	1.801	306.281	306.281	0	Not Confirmed
H5b	Personal Norms → Behavioral Intentions	0.237	1.261	0.097	0.628	306.281	307.206	0.925	Not Confirmed
H5c	Social Norms → Personal Norms	0.714	9.435 ***	0.735	7.615 ***	306.281	310.593	4.312	Confirmed
H5d	Social Norms → Behavioral Intentions	0.171	0.907	0.690	4.170 ***	306.281	306.690	0.409	Not Confirmed

Notes: *** $p < 0.001$, ** $p < 0.01$.

5. Discussion

5.1. Theoretical Implications

This study is academically significant for three reasons. First, while studies have been conducted on the complex relationship between values, beliefs, and norms [19,60], the same is not true in contact-free service values and norms in the restaurant industry. Therefore, following Stern et al. [15], who claimed that values and norms are directly connected, this study fills the research gap. The rapid increase of contact-free services, especially in the context of various social and environmental issues, has triggered the need for such research to facilitate the sustainable performance of the restaurant industry.

Second, this study is significant because it demonstrates the strong influence of social norms on personal norms and the role of the extended norm as a leading variable that affects behavioral intentions. By considering both personal and social norms to enhance the predictive power for customers' behaviors [18,19], this study provides a theoretical foundation and basic lucid data for future research.

Third, this study is meaningful because it is an attempt to analyze the moderating effect of price—a sensitive variable for customers in purchasing situations—on the relationship between contact-free service value and norm theory in the restaurant industry. Price is an important variable that provides various stimuli in consumption situations, and it strongly impacts people's decision-making processes [50,62].

Overall, the study is essential because its results can facilitate the sustainable growth of the global restaurant industry, which is currently suffering due to the COVID-19 pandemic.

5.2. Managerial Implications

This study has three practical implications. First, while both contact-free service value and social norms positively affect personal norms, the latter's influence is stronger. As social animals who live in social environments, such as groups [65], customers are heavily influenced by social norms, such as the point of view and movements of others regarding the use of contact-free services. The results of this study reveal that more contact-free services should be modified according to social norms rather than simply personal norms. Lu et al. [66] stated that many customers still feel uncomfortable with contact-free services, and not all of them want and use AI-based services. Customers are often forced to use contact-free services by social norms, even if they do not prefer this service method, especially for older customers. In this respect, to make it convenient for customers to use contact-free services in this situation, some well-trained employees need to remain in contact-free service environments. In addition, Rahman et al. [67] emphasized that the technology of contact-free services must continue to develop in order to provide more satisfactory contact-free services to customers. In other words, in order to create a contact-free service environment in which users can communicate delicately and quickly at any time safely and with convenience and flexible problem-solving capabilities, continuous research from a technical perspective must be supported. Contact-free services based on

robust technology will provide customers with a better service experience and will be connected to saving labor costs.

Second, while both personal and social norms positively affect customers' behavioral intentions, the latter's influence is more significant. Social norms play a greater role when using contact-free service restaurants than personal norms. It has been observed that humans live in relationships, follow society's rules to maintain them, and adapt themselves to changing situations of society [68]. Therefore, the results of this study correspond with Kenrick et al. [68], as customers were using or willing to use contact-free service restaurants in the context of changing service methods. Consequently, restaurants should strengthen the safety of using contact-free services—such as regulating AI services to prevent accidents in service environments—and continue to provide information on its advantages and usages. Allam and Jones [69] emphasized that economic and political support and efforts at the national level are needed to generate the successful performance of contact-free services. Indeed, for customers who are undergoing service changes for a variety of reasons, increasing satisfaction with the use of contact-free services will require investment and support from a continuous, complex perspective.

Third, in confirming the moderating effect of menu price, the study demonstrated the influence of social and personal norms on the behaviors of groups that ate relatively cheap menus and groups that ate relatively expensive menus. While the personal norms of both the groups were influenced by social norms, this association was stronger for the group that ate from the expensive menu. According to Ramirez and Goldsmith [70], people's assessment or attitude depends on the amount of money they spend on a product or service, and the consumer behavior that results from the price differential varies greatly. This implies that people expect to be treated differently based on how much they pay, and this behavior is influenced by social norms [71]. Therefore, the price paid and social norms can be inferred as interconnected variables in this study.

Currently, contact-free services are considered to be a significant disadvantage in the event of an emergency due to a lack of problem-solving skills, inability to recover services, difficulty in closely responding to customer demands, and inability to communicate in detail [30]. Therefore, restaurants need to focus on building customers' deep trust in contact-free services along with the advancement of AI technology to provide customers with higher emotional, functional, and social satisfaction. Consequently, related data must be continuously stored, analyzed, and reflected to improve future services. In particular, a minimum number of employees must be deployed in a service contact environment so that customers do not suffer from contact-free services. Therefore, we need to become more familiar with contact-free services, especially in the context of the pandemic, to ensure the sustainable development of the restaurant industry.

5.3. Limitations and Future Research

This study has revealed a variety of implications, but it also has several limitations. First, as the study was conducted among Koreans, it cannot be generalized for other populations. Therefore, future studies should study more diverse populations. Second, this study conducted a memory-based survey as opposed to an on-site survey due to the COVID-19 pandemic. Third, this study found that the proportion of respondents in their 20s and 30s accounted for about 70% of the total sample. Consequently, the results of this study are mostly applicable to the younger Korean population and cannot be generalized for the older population.

6. Conclusions

This study involves contact-free services, which are becoming more common in our daily lives due to the development of artificial intelligence technology, rising labor costs, and the impact of COVID-19 in the Fourth Industrial Revolution era. In order to reduce the research gap in consideration of prior related studies, this study focused on the contact-free services value in the food service sector. We applied norm theory, which best describes human behavioral changes for new social phenomena, and specifically extended it to

comprehensively consider personal and social norms to more clearly predict behavioral changes. In addition, moderating effect analysis was conducted on prices, which have a strong impact on human consumption behavior, to produce important results. The contact-free service value and social norms each had a positive effect on personal norms, personal norms and social norms each had a positive effect on the customers' behavioral intentions, and the moderating effect of menu prices was also partially confirmed.

The contributions of this study are summarized as follows. The results are meaningful in that the relevant research focused solely on the contact-free service value in the food service sector, which had previously been insufficiently studied, and the direct relationship between the contact-free service value and extended norm theory provides an important foundation for future research. Moreover, substantial results were derived from the moderating effect analysis on prices, which customers are sensitive to. These attempts will serve as valuable data for predicting the acceptance of contact-free services and customer behavior in the hospitality industry, which will further expand in the future. Creating a contact-free service environment that satisfies customers requires complex economic and political support at the national level as well as steady technical innovation. This study is expected to make meaningful contributions to helping our food service environment operate more efficiently and effectively in the future through the desirable use of contact-free services.

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