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Evaluation of Consumers' WTP for Service Recovery in Restaurants: Waiting Time Perspective

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Abstract: Restaurant service quality assessment has generally focused on the dining service. However, restaurant service begins with waiting for the meal. When service failure occurs due to a long waiting time, restaurant managers should adopt appropriate service recovery measures to retain consumers and reduce loss. This approach would allow them to mitigate customer dissatisfaction and negative impressions. In this study, we explore the importance of pre-processing service in the context of possible restaurant service crises and construct a restaurant service recovery model for willingness to pay (WTP) through the contingent valuation method (CVM) to measure the effects before and after implementing service recovery. Overall, several psychological and tangible service recovery measures are provided to enhance people's willingness to extend their waiting time. Within our study group, relatively young participants showed a high willingness to extend their waiting time. Furthermore, the opportunity cost of high-income people in the waiting process was relatively high. Compared with psychological service recovery programs, our results show that tangible service recovery programs prompt respondents to wait for an additional ~10 min. This paper offers support for restaurant managers to manage consumer relationships.

Keywords: waiting time; service recovery; contingent valuation method (CVM)

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1. Introduction

According to Executive Yuan's office of the Taiwanese government, in 2016, almost 93% of Taiwanese people habitually ate out, of which 33.74% had dinner outside their homes more than four times a week, with the frequency of people dining in restaurants increasing significantly. In Taiwan, it is common for consumers to queue in restaurants waiting for meals, especially during holidays. Jones and Dent (1994) showed that waiting is a ubiquitous consumer experience, and that ~70% of consumers considered the duration of the waiting time. With technological development, some restaurants are using technology-assisted mobile apps to reduce waiting times; however, this does not apply to the majority of restaurants. For example, Taiwan's well-known chain restaurant "Ding Tai Feng[1]" accounts for waiting time based on on-site number plates. During meal times, many consumers are always waiting for food at restaurant doors. Therefore, restaurant waiting is still important for the food culture phenomenon.

Usually, waiting periods are acceptable, with the length of the waiting period affecting customer satisfaction levels (Taylor 1994). For consumers, waiting is a negative experience that not only affects

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[1] Ding Tai Feng is a chain restaurant in Taiwan that specializes in the production and marketing of pasta. It is famous for its Xiaolongbao. It was recommended by the New York Times as one of the "Top Ten Gourmet Restaurants in the World".

their intention to repurchase or revisit, but also increases their total outlay in terms of money, time, and effort (Taylor 1994). Waiting may also interrupt scheduled work. Generally, the uncertainty of the waiting time duration leads to negative associated emotions such as uneasiness, tension, and sometimes anger, thereby reducing consumer satisfaction and loyalty, leading to consumer loss (Taylor 1994; Seawright and Sampson 2007). Although waiting is expected for certain services (Bielen and Demoulin 2007), excessive waiting times affect customers' evaluation of service quality and the company itself (Baker and Cameron 1996; Houston et al. 1998). Queuing has a negative effect on customers' service quality perception and satisfaction (Chuo and Heywood 2014). Moreover, excessive waiting time is negatively correlated with overall satisfaction (Bailey and Areni 2006), which may arouse public complaints, thereby damaging a company's reputation.

For restaurant operators, restaurants are only successful when consumers' perceptions of their service quality are positive, and queuing is the beginning of service acceptance (Ford et al. 2012). When restaurant measures often entail extensive queuing times, consumers often find the waiting process time-consuming (Leclerc et al. 1995), which may affect their service experience, sojourn time, and ultimately spending, reneging, and return behaviors (De Vries et al. 2018). Zakay and Hornik (1991) found that proper environmental incentives can affect consumers' waiting process evaluations. In fact, consumers may even expect to wait for some services. Therefore, consumers' willingness to wait (WTW) depends on the quality of a store's waiting experience. Not meeting customers' needs causes consumer dissatisfaction and service failure[2], which indirectly affect consumers' satisfaction and loyalty (Wang et al. 2011). Thus, effectively controlling waiting times can offset their negative effects (Dellaert and Kahn 1999), which reveals that ameliorating waiting times can reduce consumers' negative experiences regarding satisfaction and service quality (Dubé et al. 1991). However, even outstanding business strategies can result in service failure. Therefore, appropriate service recovery[3] measures must be adapted to reduce consumer loss, such as offering apologies or utilizing promotional activities to reduce dissatisfaction and negative word-of-mouth communication[4] (Keaveney 1995). Most studies on consumer waiting focus on their perceptions (Bielen and Demoulin 2007; Giebelhausen et al. 2011; Van Riel et al. 2012) to establish waiting schedules and apply the queuing theory as an operations management technique to explore waiting for processes, spatial configurations (Pillay et al. 2011; Zhao et al. 2014) and consumer behavioral responses.

In the present study, we explore whether implementing service recovery measures at restaurants for consumer waiting can extend consumers' WTW. We used the contingent valuation method (CVM) to explore restaurant consumers' WTW. Using the scenario assumption in the contingent valuation method (CVM), we relied on questionnaires to examine consumer waiting times and evaluate consumers' WTW in various conditions of service recovery. Consumer willingness to pay (WTP) is used as an analysis tool to assess the time cost of consumers' WTW in line, unlike previous studies, in which WTP research was commonly formulated on the amount consumers are willing to pay of the overall value for one year; this is difficult for the individual to do and can lead to erroneous responses caused (Arrow et al. 1993). Stejskal and Hájek (2015) highlighted that if the respondents are asked about the value of individual services without having to remember the frequency of their use for the entire year, then they give accurate results. In this study, we focus on consumers' willingness to wait for the concept, which is given as a description of the evaluated good and the expected change of the restaurants' service quality. Queue waiting times were used to measure the restaurants' service quality acceptance, and the time cost for consumers waiting in queues was indirectly assessed. Our results serve as a reference for restaurant operators to improve practical management, with the objective of alleviating mistakes

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[2]   Service failure means that customers are dissatisfied with the entire service experience (Colgate and Norris 2001).
[3]   Service recovery refers to the responsive actions taken by enterprises to eliminate consumer dissatisfaction when the provided products or services do not meet consumers' expectations (Maxham and Netemeyer 2002).
[4]   Word-of-mouth communication refers to information shared among consumers. Such communication is not only vital to consumers' purchase decisions but also determines the success or failure of an enterprise (Hawkins et al. 2001).

during service provision that can cause unintentional consumer loss. It must be said that principles of WTP and CVM are applicable in public and private sectors in many decision-making processes and show the cases where these principles have already been applied.

2. Literature Review

2.1. Waiting Time

Waiting is a time cost. This study uses the concept to measure not only the duration of consumers' WTW, but also the value of WTW. In the waiting process, consumers are willing to give up other things and focus on waiting in line. However, the negative impact that consumer waiting time has on restaurants has been associated with many studies in the literature addressing this problem (Hernandez-Maskivker et al. 2019). In the service process, waiting is the activity before entering a service system, revealing that waiting is rarely avoidable (Bordoloi et al. 2019). Consumers now regard "time" as an essential factor of service satisfaction (Hirschman 1987) and have begun reducing their waiting times (Berry and Parasuraman 1991). Consequently, time has become a vital factor for consumers when choosing services or products and evaluating service quality (Hui et al. 2006).

De Vries et al. (2018) studied the waiting time in Indian restaurants, showing that waiting time related to rebellious behavior, and longer waiting times would in fact result in customer returns. Restaurant and theme park waiting times are similar. Theme parks are usually associated with waiting and queuing (Hernandez-Maskivker et al. 2019); consumers want to enjoy the service and are willing to wait. Theme park operators use a variety of strategies to reduce waiting time and enhance tourist experiences (Zhang et al. 2017). Taylor (1994) regards waiting time as the period between a consumer being ready to receive a service and the actual service provision. Waiting time is divided into pre-process, in-process, and post-process waiting. Pre-process waiting is the period before a consumer's acceptance of a service. In-process waiting refers to the start of service acceptance and before it ends. Post-process waiting is the wait after a service ends. As an example, queuing at a restaurant is considered pre-process waiting, the waiting period after ordering is in-process waiting, and the waiting period after the meal before paying the bill is post-process waiting. De Vries et al. (2018) showed that consumers may be dissatisfied or never return due to excessive waiting times. Waiting times can appear relatively long to consumers who consider it imperative, thereby affecting their judgment (Sumaedi and Yarmen 2015). Using environmental and personal factors can divert consumers' attention from waiting times (Zakay 1989). Mechanisms for controlling waiting times mainly comprise distracting consumers using recreational facilities (Baker and Cameron 1996) and developing waiting area strategies, such as providing menus in advance or offering complimentary beverages (Taylor 1995). Taylor (1994) shows that the measures for controlling customer waiting times can reduce their anger and uncertainty and improve their emotional responses to waiting. Lee and Lambert (2000) found in their research that customers feel that "expected reasonable waiting time" is longer than "perceived waiting time", which affects their satisfaction. If customers wait longer than expected, their satisfaction will decline (Iqbal et al. 2013; De Vries et al. 2018). Customers do not want to waste time waiting and hope to use their time effectively (Lew and McKercher 2006).

In this study, we focus on waiting time during queuing, which is an assessment of pre-process waiting. Establishing measures for controlling consumer waiting times effectively alleviates their negative emotional responses toward waiting, even in problematic situations.

2.2. Service Recovery

Groth and Gilliland (2001) think that waiting time and the waiting process are important factors of service delivery. When a consumer's service process experience does not meet their expectations, this implies service failure (Bell and Zemke 1987; Bitner et al. 1990). Rafaeli et al. (2002) indicate that service failure results from customers waiting in queues, as a result of intentions regarding the connection between the design of a queue and the emotions and attitudes of people waiting. Lahap et al.

(2018) found that waiting times affect customer satisfaction and post-purchase behavior. Zeithaml et al. (1993) claim that service failure occurs when service behavior either does not satisfy consumer expectations or exceeds a tolerable range. If customers wait longer than expected, their satisfaction will decline (Lahap et al. 2016). Thus, service failure may trigger anger or dissatisfaction in consumers. If a service provider fails to take timely compensation measures or offer explanations, consumer dissatisfaction intensifies, inevitably affecting subsequent consumer behaviors.

When faced with service failure, service providers should take action to recover the service (Grönroos 1988), and change the negative perceptions of displeased consumers (Miller et al. 2000). Albrecht and Zemke (1985) report that if consumer complaints are properly handled, 95% of discontented customers can be retained. Otherwise, only 64% can be retained. In other words, the absence or improper implementation of service recovery increases consumer dissatisfaction (Hart et al. 1990), while successful service recovery improves consumer satisfaction (Bitner et al. 1994). Homburg et al. (2005) believe that satisfied customers who feel they have received a high-quality service will not only be replication customers but are also willing to pay more in the future, which has important implications for setting prices.

Smith et al. (1999) propose apology, assistance and compensation as service recovery measures. Miller et al. (2000) divide service recovery into psychological and tangible strategies: psychological recovery relates directly to consumers' psychological demand (e.g., apologies or empathy), whereas tangible service recovery relates to tangible or value-added compensation. According to Wirtz and Mattila (2004), tangible service recovery improves consumer satisfaction more effectively compared to psychological recovery. In general, service recovery consists of complementary products, such as free food, discounts, coupons, interventions from upper management, and replacements (Hwang and Lambert 2008; Colgate and Norris 2001). The fact is that customers still wait during peak meal times, thus emphasizing that waiting in restaurants is a common occurrence in department stores. It is therefore important to understand customer behavior to manage queues and waiting times (Bennett 1998) to ultimately improve service quality. Therefore, managing waiting times is a priority for restaurant management.

In summary, this study focuses on the pre-process recovery of restaurants. Based on the definition of service recovery in the literature and the mechanism for controlling waiting times, we designed various service recovery programs for different situations to assess consumers' WTW at restaurants. Examples of service recovery include the integration of psychological and tangible strategies, with apologies being mandatory for psychological service recovery, and dining discounts or free food being tangible service recovery measures.

2.3. Willingness to Pay (WTP)

WTP plays a key role when customers choose a product from different alternatives. Gupta and Çakanyıldırım (2016) pointed that WTP is the maximum amount of money that a customer would be willing to pay in order to receive a product or service. Most earlier WTP studies with the application of CVM have focused mainly on non-market goods and examined the environmental resources and conservation regarding preferences and perceptions. Naidoo and Adamowicz (2005) estimate the demand for improved biodiversity among foreign visitors in a Ugandan forest park to maximize park revenue. Uyarra et al. (2005) found that tourists were willing to pay an environmental (conservation) levy for improved sewage treatment that would improve water quality in the Folkestone Marine Reserve. Jin et al. (2006) examined residents' preferences for alternative solid waste management policy changes in Macau. Mmopelwa et al. (2007) estimate overseas and South African visitors' WTP to visit Moremi Game Reserve in Botswana under a hypothetical park management scenario of high-cost low-volume tourism. Thur (2010) estimates that the WTP is significantly more than the existing US$10 annual user fee for access to a marine park.

In recent years, many studies have increasingly focused on customers' willingness to pay for service quality (Hernandez-Maskivker et al. 2019; Kuo and Jou 2018; Merkert and Beck 2017; Sukhu et al. 2017).

A study by Hernandez-Maskivker et al. (2019) confirmed that theme park visitors are willing to pay a high price for fast access. Kuo and Jou (2018) found that people's willingness to pay over a long distance is higher than for a short distance when choosing counter check-in services. Merkert and Beck (2017) studied travel time savings and willingness to pay for regional airfares. Their results showed that regional aviation services were of high value for people in regional, rural, and remote areas. Sukhu et al. (2017) studied a restaurant's service pricing strategy, showing that the customer's WTP has a significant positive relationship with food quality, the ambiance of the restaurant and the service encounter value.

3. Methods

3.1. CVM

In this study, we used the CVM to assess how restaurant service recovery affects waiting times. Using questionnaire-based surveys, we explored a hypothetical question concerning variations in WTP according to the number of products and their quality. The CVM, which has been employed to investigate natural resources and environment-related cases without market values, can be used to evaluate unrealized market benefits, which is suitable for this study examining consumer WTW.

CVM is a hypothetical market that can be used to discuss individual expressions for a given activity (such as restaurant waits in this study) or product (the study's improved waiting quality) to give prices. CVM has been extensively used to estimate the value of non-marketed goods and services through interviews using questionnaire surveys. The CVM uses SP preferences, whereby the respondent evaluates the public services in a hypothetical market through their WTW for service. The method elicits respondents' preference for non-marketed goods and services by asking them how much they would be willing to pay to acquire improvements or to avoid negative aspects in them.

Following Cameron and James (1987), the standard model of assessing consumer WTW for service recovery provided by restaurants is as follows:

$$\begin{aligned} WTW_i &= f(x_i) + \varepsilon_i \\ &= x_i'\beta + \varepsilon_i \end{aligned} \tag{1}$$

where WTW_i denotes consumer WTW, ε_i represents the residual term and conforms with the hypothesis of $N(0, \sigma^2)$ and x_i defines the explanatory variable vector of the ith respondent. β is a vector of estimated coefficients.

A close-ended bidding version of CVM has been widely applied to evaluate various environmental and public goods. Estimation methods can be divided into single and double-bounded dichotomous choice models. Although dichotomous and double-bounded dichotomous choice questions have been used less frequently in novel food product valuation, these contingent valuation techniques are easily extendable to this application (Wertenbroch and Skiera 2002). The double-bounded dichotomous choice model developed by Hanemann et al. (1991) is used to estimate changes in people's WTW after implementing restaurant service recovery. The model is not only effective at estimating but also at reducing respondents' stress and avoids problems such as starting-point bias and range deviation (Hoehn and Randall 1987; Duffield and Patterson 1991).

The double-bounded dichotomous choice model is based on the threshold value of the first bid (T). When people agree to wait at the first inquiry, they are surveyed for the second question, where they are requested to double their waiting time (2T). If participants are unwilling to wait at the first inquiry, the second inquiry provides a waiting time half that of the original threshold time. Therefore, four combinations of inquiry results are obtained, namely responses of YES–YES (positive reply to both questions), NO–YES (negative reply to the first question but a positive reply to the second), YES–NO (positive reply to the first question but a negative reply to the second), and NO–NO (negative reply to both questions).

Let y_i represent the respondent's vote: 1 if "YES" and 0 if "NO". Assume ε_i is independent and normally distributed with a mean 0 and standard deviation σ, and Bid_i is the randomly assigned bid amount for each respondent i. The probability of a "YES" vote given x_i and ε_i is equal to the probability that the individual's WTW is greater than the bid amount, as follows:

$$
\begin{aligned}
\Pr(y_i = 1 \,|\, x_i) = \quad &Pr[WTW > Bid_i] = Pr\big[x_i'\beta + \varepsilon_i > Bid_i\big] = Pr\big[\varepsilon_i > Bid_i - x_i'\beta\big] \\
= \quad &\Pr\big[Z_i > (Bid_i - x_i'\beta)/\sigma\big]
\end{aligned}
\tag{2}
$$

where Z_i is the standard normal random variable and σ is a variance parameter.

3.2. Questionnaire Design

The questionnaire primarily focuses on general situations that people may encounter when queuing at a restaurant, namely waiting experience, waiting pattern and time, and satisfaction with the waiting service. Using situation design, this study constructs physical and psychological behaviors and emotional reactions that often occur when the waiting time exceeds consumers' expectations while queuing. Such behaviors and reactions might inadvertently create service failure at restaurants. Therefore, the questionnaire item regarding WTW when restaurant operators provide service recovery was divided into two hypothetical situations: (1) restaurant staff sincerely apologize without providing tangible service recovery and (2) in addition to apologizing, restaurant staff provide tangible service recovery such as restaurant discounts or free food.

The waiting time in this study is set according to the double-bounded dichotomous choice model. Random interview and open inquiry methods are adopted in a trial interviews to enable participants to express their WTW in hypothetical situations. The pre-test was conducted in June 2015 to ensure the validity and reliability of the questionnaire. A total of 62 questionnaires were distributed, and 50 valid questionnaires were obtained, as shown in Table 1. Based on the feedback from the pilot test, the content of the questionnaire has been modified. In accordance with Alberini (1995), the respondents' WTW values were arranged in ascending order, where the highest and lowest 10% of the bid values were deleted to reduce observational error. Selected from the remaining bid values, the 20th, 40th, 60th and 80th percentiles served as the basis for the first inquiry about the WTW. In Table 1, the WTW for an apology (without tangible service recovery) was 5 min, 10 min, 15 min and 20 min, whereas the WTW for relevant tangible service recovery was 5 min, 10 min, 20 min and 30 min.

Table 1. Bid values for the double-bounded dichotomous choice model.

Survey Order (Questionnaire Version)	WTW for a Sincere Apology (Without Tangible Service Recovery) from the Restaurant (min)	Valid Questionnaire for Psychological Service Recovery	WTW for Tangible Service Recovery Provided by the Restaurant (min)	Valid Questionnaire for Tangible Service Recovery
Group 1 (questionnaire A)	5 (2.5/10)	134	5 (2.5/10)	138
Group 2 (questionnaire B)	10 (5/20)	141	10 (5/20)	133
Group 3 (questionnaire C)	15 (7.5/30)	132	20 (10/40)	137
Group 4 (questionnaire D)	20 (10/40)	133	30 (15/60)	132

Note: The bid values for the first inquiry are outside the brackets, which determine the bid values for the second inquiry (within the brackets): if the respondents' replies are positive in the first inquiry, the bid values in the second inquiry increase. Conversely, negative replies in the first inquiry reduce the bid values in the second inquiry. WTW: willingness to wait.

The last section of the questionnaire collected participants' demographic information (e.g., sex, age, marital status, education level, occupation and mean monthly income) to explore the essential factors of the model.

4. Results

4.1. Descriptive Statistics

The formal questionnaire survey was conducted from 1 October 2015 to 30 November 2015, and is based on Tainan City[5] Department Store restaurants, including chain or non-chain restaurants. In general, department store restaurants often have on-site queuing, especially during peak hours. Therefore, waiting time length indirectly affected consumers' impression of restaurant service quality, and consumers of different types also had different cognitive responses to restaurant waiting queues. The target sample for this study was focused on people who had prior experience of being patronized in department store restaurants. Overall, 596 questionnaires were distributed, 13 of which were invalid. Moreover, 43 samples were deducted because they were protest observations. Therefore, 540 questionnaires were validly obtained. In terms of the demand to return, 583 questionnaires were collected.

Respondent demographics are shown in Table 2. The majority of participants were female (54.7%), with the largest proportion aged 31–40 years (31.4%), followed by 21–30 years (29.2%), and 41–50 years (22.8%). Overall, 49.9% of the respondents were married (47.9% were unmarried). Regarding education level, the majority (41.3%) of participants had a university degree, 29.0% had a senior high school degree, and 16.5% had a junior college degree. Moreover, 31.9% of the participants worked in the service sector, and 22.6% of the participants worked in the industrial or business sector. Most respondents had a monthly income of NT$20,001–40,000 (44.6%), followed by NT$40,001–60,000 (25.4%).

Table 2. Demographics of participants queuing at a restaurant.

Demographic Variables	Items	Sample Size	Percentage
Sex	Male	264	45.3%
	Female	319	54.7%
Age	20 years or younger	13	2.2%
	21–30 years	170	29.2%
	31–40 years	183	31.4%
	41–50 years	133	22.8%
	51–60 years	68	11.7%
	61 years or older	16	2.7%
Marital status	Married	279	47.9%
	Unmarried	291	49.9%
	Others	13	2.2%
Education level	Junior high school, lower	30	5.1%
	Senior/vocational high school	169	29.0%
	Junior college	96	16.5%
	University	241	41.3%
	Graduate school	47	8.1%
Occupation	Farming, forestry, fishery, or animal husbandry	18	3.1%
	Industrial or business sector	132	22.6%
	Military personnel, civil servant or teacher	35	6.0%
	Service sector	186	31.9%
	Student	70	72.0%
	Household management	41	7.0%
	Retired	19	3.3%
	Self-employed	76	13.0%
	Other	6	1.0%

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[5] Located in the south of Taiwan, Tainan City is the earliest developed city in Taiwan and is renowned for its local cuisine. The local people have a cognitive name for the cuisine.

Table 2. *Cont.*

Demographic Variables	Items	Sample Size	Percentage
	NT$20,000 or less	133	19.4%
	NT$20,001–40,000	260	44.6%
	NT$40,001–60,000	148	25.4%
Monthly income	NT$60,001–80,000	39	6.7%
	NT$80,001–100,000	13	2.2%
	NT$100,000–150,000	4	0.7%
	More than NT$150,000	6	1.0%
Experience of filing	Yes	208	15.7%
a customer complaint	No	375	64.3%

The restaurant waiting service satisfaction analysis results are shown in Table 3. Overall, the respondents' satisfaction scores for each item of the restaurant waiting service were similar; the item "I clearly understand the language of the service personnel" has a slightly higher mean (3.76) compared to the other items.

Table 3. Satisfaction with the waiting service of the restaurant.

Survey Questions	Mean	Standard Error
I feel the sincerity of the service personnel	3.67	0.032
I clearly understand the language of the service personnel	3.76	0.029
I think that empathy would solve any inconvenience I experience	3.65	0.030
I feel that the service personnel are well trained and experienced	3.62	0.030
I will immediately think of coming to this restaurant	3.49	0.031
I will voluntarily recommend the service of this restaurant	3.53	0.032
If anyone asks me to recommend a restaurant, I would recommend this one	3.60	0.032
I will continue holding a positive view toward this restaurant in the future	3.67	0.030

4.2. Setting of the Model for Restaurant Waiting Service Recovery

A hypothetical questionnaire was employed in this study. Using the CVM situational design, this study utilized the double-bounded dichotomous choice model to interview respondents queuing at restaurants before the dining service who received psychological service recovery (without tangible service recovery) or tangible service recovery to develop an empirical model for assessing individual WTW values. During the interview, establishing hypothetical situations explained the common phenomenon during the wait before dining, which inadvertently and gradually led to service failure. The model also further accounted for the timely service recovery measures provided by the restaurant to alleviate consumers' negative impressions developed while waiting.

This section discusses the results of the respondents' WTW in response to the service recovery provided by the restaurant. The model considers WTW factors that potentially affect the provision of psychological service recovery and tangible service recovery. For example, demographic variables, such as respondents' income and age can influence their feelings about waiting. Furthermore, experiences and attitudes associated with waiting for restaurants may also affect WTW cognitive behavior through service recovery measures. Therefore, this study constructs a model that considers WTW associated with service recovery measures (psychological and tangible) provided by the restaurant, as shown below:

$$\ln WTW_1 = f(Age, Income, Dinner, Waiting\ way, Queued\ status, Satisfaction, Facility, Complained\ experience)$$
$$\ln WTW_2 = f(Age, Income, Dinner, Waiting\ way, Queued\ status, Satisfaction, Facility, Complained\ experience)$$

where $\ln WTW_1$ and $\ln WTW_2$ represent the WTW for restaurants with or without tangible service recovery. The model's variable descriptions are shown in Table 4 and are as follows: (1) the demographic variable age denotes the mean age of the respondents, and income denotes the mean monthly income of the respondents; (2) experiences and attitudes associated with queuing for restaurants: dinner is a dummy variable, whereby 1 = dining with more than five people and 0 = other; waiting pattern is a dummy variable, whereby 1 = on-site queuing and 0 = other; the waiting experience is a dummy variable, whereby 1 = negative experience associated with queuing and 0 = other; satisfaction refers to the satisfaction of the respondents toward service recovery; facility is a dummy variable, whereby 1 = restaurant facilities need improvement and 0 = other; and complaint filing experience is a dummy variable, whereby 1 = respondents have had experience filing a customer complaint and 0 = other. The evaluation model was established based on the mentioned variable data, and maximum likelihood estimation was used to determine Weibull, lognormal, and gamma distribution functions regarding the empirical analysis of consumer WTW associated with waiting service recovery.

Table 4. Settings and description of variables for WTW associated with waiting service recovery provided by the restaurant.

Items		Description	Mean	Standard Deviation
Demographic variables	Age	Age (year)	37.24	0.481
	Income	Mean monthly income (dollar)	39,352	896.202
Restaurant waiting experience and cognition	Dinner	Dummy variable; 1 = dining with more than five people and 0 = other	0.44	0.021
	Waiting pattern	Dummy variable; 1 = on-site queuing and 0 = other	0.11	0.013
	Waiting experience	Dummy variable; 1 = regards service failure as severe and 0 = other	0.55	0.021
	Satisfaction	Satisfaction toward the waiting service	3.63	0.026
	Facility	Dummy variable; 1 = restaurant facilities need improvement and 0 = other	0.30	0.020
	Complaint filing experience	Dummy variable; 1= have had experience filing a customer complaint and 0 = other	0.36	0.021

According to the mentioned model settings and variable descriptions, the results of the evaluation model are shown in Tables 5 and 6. In the next section, we discuss the results of WTW associated with an apology as a psychological service recovery measure and tangible service recovery measure.

Table 5. Estimated results of the WTW function for psychological service recovery.

Items		Probability Distribution Pattern of Evaluation Functions		
		Weibull	Gamma	Lognormal
Intercept		2.06 (9.10) ***	1.81 (7.60) ***	1.79 (7.58) ***
Demographic variables	Age	−0.164 (−2.61) ***	−0.161 (−2.38) **	−0.156 (−2.30) **
	Income	−0.000000595 (−0.41)	−0.00000101 (−0.68)	−0.00000109 (−0.72)

Table 5. *Cont.*

Items		Probability Distribution Pattern of Evaluation Functions		
		Weibull	**Gamma**	**Lognormal**
Restaurant waiting experience and cognition	Dinner	−0.0832 (−1.39)	−0.0757 (−1.18)	−0.0715 (−1.11)
	Waiting pattern	0.103 (1.04)	0.111 (1.06)	0.1.13 (1.07)
	Waiting experience	0.133 (2.19) **	0.163 (2.48) **	0.168 (2.56) **
	Satisfaction	0.323 (5.49) ***	0.329 (5.50) ***	0.327 (5.46) ***
	Facility	0.188 (2.68) ***	0.148 (1.98) **	0.142 (1.90) **
	Complaint filing experience	−0.155 (−2.49) **	−0.123 (−1.83) *	−0.117 (−1.74) *
Scale		0.488 (21.45) ***	0.602 (17.66) ***	0.616 (22.50) ***
Log likelihood		−532.14	−522.32	−522.56
Log likelihood ratio		45.40 ***	42.50 ***	42.05 ***

Note: t values are within parentheses and coefficient values outside the parentheses. *, **, and *** denote significance levels at 10%, 5% and 1%, respectively. Log likelihood ratio = (−2) × (restricted log likelihood − log likelihood), $x^2(8, 0.01) = 20.09$.

Table 6. Estimated results of the WTW function for tangible service recovery.

Items		Probability Distribution Pattern of Evaluation Functions		
		Weibull	**Gamma**	**Lognormal**
Intercept		3.12 (14.61) ***	2.75 (12.63) ***	2.77 (13.00) ***
Demographic variables	Age	−0.385 (−6.43) ***	−0.359 (−5.52) ***	−0.365 (−5.72) ***
	Income	−0.000000131 (−0.09)	−0.000000.409 (−0.28)	−0.000000378 (−0.26)
Restaurant waiting experience and cognition	Dinner	0.109 (1.89) *	0.118 (1.96) *	0.118 (1.97) **
	Waiting pattern	0.125 (1.80) *	0.152 (2.12) **	0.148 (2.07) **
	Waiting experience	0.127 (2.18) **	0.168 (2.69) ***	0.163 (2.65) ***
	Satisfaction	0.138 (2.54) **	0.153 (2.86) ***	0.155 (2.90) ***
	Facility	0.113 (1.73) *	0.099 (1.39)	0.105 (1.51)
	Complaint filing experience	−0.13 (−2.19) **	−0.0646 (−1.01)	−0.0712 (−1.13)

Items	Probability Distribution Pattern of Evaluation Functions		
	Weibull	Gamma	Lognormal
Scale	0.464 (21.09) ***	0.577 (19.67) ***	0.569 (21.70) ***
Log likelihood	−513.55	−497.38	−497.56
Log likelihood ratio	59.14 ***	56.35 ***	57.19 ***

Note: *t* values are within parentheses and coefficient values are outside the parentheses. *, **, and *** denote significance level at 10%, 5% and 1%, respectively. Log likelihood ratio = (−2) × (restricted log likelihood − log likelihood), $x^2(8, 0.01) = 20.09$.

4.2.1. Estimated Results of an Apology Given by Restaurant Managers as a Psychological Service Recovery Measure

According to the log likelihood ratio of Weibull, gamma, and lognormal models and the t values of the scales, the explanatory powers of the model pass a goodness of fit test. Regarding the demographic variables, the coefficient values of age are negative and significant in all three models at the 5% significance level, revealing that older respondents were relatively unwilling to wait even after the restaurant staff had apologized. Moreover, the coefficient values of income were negative in all three models but not significant, revealing that people with a high income are often unwilling to wait. For restaurant waiting experience and cognition, the coefficient values of waiting experience were positive and significant in all three models, showing that if restaurant operators offer a timely apology to their customers who experience service failure during queuing, the customers were relatively willing to continue waiting. The coefficient values of satisfaction were positive and significant in all three models at the 1% significance level; even when the service was inadequate, the respondents who felt relatively satisfied when waiting were willing to continue waiting because of the apology given by the restaurant. The coefficient values of facility were positive and significant in all three models at the 5% significance level. This suggests that consumers who value the facilities provided to control the waiting time exhibit a relatively high WTW after restaurant operators sincerely apologize. Finally, the coefficient values of complaint filing experience were negative and significant in all three models at the 10% significance level, revealing that the respondents who had experience filing a customer complaint were relatively unwilling to wait even after receiving an apology from the restaurant operators.

4.2.2. Estimated Result of the Tangible Recovery Service Provided by Restaurant Managers

According to the log likelihood ratio of Weibull, gamma, and lognormal models and the t values of the scales, the explanatory powers of the model pass a goodness of fit test. In terms of the demographic variables, the coefficient values of age were negative and significant in all three models and at the 1% significance level, indicating that older people did not tend to queue for restaurants even when restaurant operators provided dining discounts. The coefficient values of income were negative and non-significant in all three models, indicating that those with a high income did not tend to spend time waiting in a queue at the restaurant. Regarding variables associated with restaurant waiting experience and cognition, the coefficient values of dinner were negative and significant for all three models at the 10% significance level. Therefore, having exceeded the mean customer number for a table, those who dined with more than five people were relatively willing to accept the offered tangible service recovery and continue waiting in a queue at the restaurant. The coefficient values of waiting patterns were positive and significant for all three models at the 5% significance level, indicating that consumers queuing on the spot were usually unable to determine their waiting time. If restaurant operators provided tangible service recovery in a timely manner, consumers were relatively willing to extend their waiting time. Similarly, the coefficient values of waiting experience and satisfaction for waiting were positive and significant in the three models at the 5% significance level. This indicates that people

who perceive service failure as serious are willing to extend their waiting time in response to the tangible service recovery provided by restaurants, whereas those who are relatively satisfied with restaurant waiting services are likely to spend more time waiting. The coefficient value of facility was positive and significant in the Weibull model at the 10% significance level, implying that those who considered that the facilities of a specific restaurant required improvement were willing to continue waiting after receiving tangible service recovery. Finally, the coefficient value of complaint filing experience was negative and significant in the Weibull model at the 5% significance level, indicating that people who filed consumer complaints were relatively unwilling to extend their waiting time.

Regarding the demographic variables, younger respondents were relatively willing to extend their waiting time when provided with psychological or tangible service recovery. However, respondents with high income were relatively unwilling to extend their waiting time regardless of either service recovery. For the variables concerning restaurant waiting experience and cognition, the respondents who dined with more than five people and those who queued on the spot were relatively responsive to tangible service recovery and were willing to extend their waiting time, whereas those who regarded service failure as serious and those who queued on the spot were willing to accept service recovery in any form and extend their waiting time.

After estimating the WTW evaluation model for the relevant waiting service recovery, this study further estimates consumers' WTW associated with an apology (psychological service recovery) and dining discount or free food (tangible service recovery) based on the obtained results. Conventional assessment of bid values is often based on median values for calculation, which is relatively less susceptible to extreme values. The use of mean values to determine effective values has a relatively high bias error rate (Cooper et al. 2002). Therefore, in this study, we employed the coefficient estimation results of both service recovery measures and the WTW evaluation model to estimate the WTW for psychological and tangible service recovery, as follows:

$$\log(\text{WTW}) = X_i \gamma + \delta \varepsilon^x \tag{3}$$

where γ denotes the parameter for estimation, δ is the scale of a location parameter and WTW represents the mean of the respondents' average WTW. Supposing that the restaurant operator provides timely service recovery measures to compensate for a service failure that occurs during the waiting process, the estimated results of the evaluation models based on an apology (without tangible service recovery) and tangible service recovery can be jointly employed with the mentioned WTW estimation equation to estimate the WTW and confidence interval of the respondents for the various types of waiting service recovery at restaurants.

4.2.3. Evaluation of WTW Associated with Service Recovery Measures Provided by the Restaurant

Estimated through Weibull distribution, the WTW values for the 540 participants associated with waiting service recovery measures (e.g., sincere apologies and dining discounts) of the restaurant are compiled in Table 7. When the respondents waited for longer than they expected, the mean additional waiting time was approximately 21 min after accepting a sincere apology from the restaurant operator—under the 95% confidence level, the confidence interval is 18–25 min. Tangible service recovery measures of dining discounts or free food prompted each of the respondents to wait for an additional 31 min on average—under the 95% confidence level, the confidence interval is 27–38 min. The results reveal that respondents had a relatively high waiting tolerance for tangible service recovery measures. Thus, direct tangible service recovery in addition to psychological service recovery provides relatively strong incentives for consumers to continue waiting.

Table 7. Estimated result of the WTW associated with restaurant service recovery (Weibull distribution).

Evaluation Criterion	Mean	95% Confidence Interval
Apology (psychological recovery)	20.93	(17.62–24.89)
Apology and relevant dining discounts (tangible service recovery)	30.82	(26.94–37.63)

Unit: min/frequency/person.

From the empirical results, it can be observed that psychological recovery measures are an important service for consumer waiting, especially for consumers who have had poor experience in service quality and who are relatively concerned about the quality of waiting. The quality of consumers' waiting time may not only affect the mood of the meal but may even affect the willingness of the next purchase.

In addition, the restaurants can provide consumers with tangible service recovery, and this is likely to make consumers willing to spend time waiting. Especially in Eastern food culture, "queuing" is a unique culture and phenomenon, and consumers are willing to wait in line. However, if you exceed the time you are willing to wait, this will inevitably affect the willingness to continue waiting. Therefore, psychological service recovery can effectively delay the waiting time and ease the waiting mood; however, tangible service recovery can further enable consumers to obtain actual satisfaction, reverse the lack of service errors and extend the waiting time.

5. Conclusions

Taylor (1994) and Bordoloi et al. (2019) claim that waiting is an inevitable condition for consumers and a preceding operation before entering a service system. In reality, an individual's perception toward services is part of the waiting process. The propositions obtained here are by no means meant to be an extensive list of all the psychological considerations involved in managing customers' acceptance of waiting times.

Therefore, waiting time is often closely associated with perceptions of service. For service-oriented restaurant managers, queuing is no longer a marketing strategy to attract a crowd but the beginning of consumer loss. Sasser et al. (1979) observed that "the feeling that somebody has successfully 'cut in front' of you causes even the most patient customer to become furious; one of the most frequent irritants mentioned by customers at restaurants is prior seating". Our study explores pre-process service importance in the context of possible service crises in restaurants and constructs the restaurant service recovery model for the WTW through the CVM to measure the effects before and after implementing service recovery.

Service businesses would benefit from future research examining the influence of distributive and interactional justice dimensions on the service delivery process (e.g., cost and level of service). The results serve as a crucial reference for restaurant managers to manage consumer relationships.

5.1. Factors of WTW Associated with the Service Recovery Provided by Restaurants

People's WTW varies with age. Relatively young respondents are willing to extend their waiting time when provided with service recovery. Generally, young people in groups are relatively willing to queue for restaurants. Some studies also show that young people had more tolerance for waiting times than elderly people at restaurants (Hwang and Lambert 2008) and at theme parks (Hernandez-Maskivker et al. 2019). Conversely, relatively old people are likely to make reservations at restaurants (Hwang and Lambert 2008) to avoid waiting and therefore do not tend to wait.

The coefficient value of income is negative and not significant in the evaluation model of the WTW, revealing that income does not have an imperative explanatory power under the hypothesis of this model. Researchers apply the CVM to the WTP value of a certain target, whereby income is an essential indicator, showing that people with high income have a relatively high WTP ability. However, the value of income is negative and displays no explanatory power in the model. The key

reason for this might be the nature of different situations. First, people with a high income have a relatively high opportunity cost in the waiting process; therefore, they are reluctant to wait.

The external behavioral conditions and responses that affect waiting factors (Bielen and Demoulin 2007) cause the variable of income to be less essential as an indicator, which indirectly affects the estimated result of the WTW.

5.2. Results of the WTW Associated with the Waiting Service Recovery of Restaurants

When provided with psychological service recovery, each respondent is willing to wait an additional 20 min per occasion. Tangible service recovery prompts each person to wait an extra 30 min per occasion. The results indicate that tangible service recovery is a vital incentive that compensates for consumer loss, which indirectly indicates that successful service recovery improves consumer satisfaction (Bitner et al. 1994).

To summarize, the empirical results of this study show that restaurant queues are inevitable. That perceived value affects tolerance or waits can be demonstrated by our common experience in restaurants—we will accept a much longer waiting time in restaurants with good service. Giebelhausen et al. (2011) suggest that management practitioners propose a better strategy involving "optimized" waiting to reduce negative service quality. If waiting times exceed customer expectations, negative emotional responses will occur. Such a condition also applies to well-known gourmet restaurants that attract crowds and draw queues for entry. If restaurants do not handle waiting situations properly, service failure may occur, which reduces the perceived attractiveness of such restaurants. Such a condition not only influences consumers' WTW on the spot but also affects their subsequent willingness to revisit. Consequently, restaurant managers are bound to lose consumers. Restaurant managers are advised to consider the importance of waiting service quality, such as establishing compensation mechanisms for waiting. As a primary basis of service, restaurant staff can express sincere apologies for long waiting times. They can also offer tangible service recovery accordingly to alleviate negative responses from consumers due to the long wait. The objective should be to make consumers feel valued, which restaurant managers can achieve by expressing sincerity for the inconvenience caused due to long waiting times, thereby facilitating their consumers' willingness to extend their waiting time.

The results of this study have a common point. Regardless of the type of consumer, compensation and services (both psychological and tangible) are required in the queuing process. Therefore, restaurant operators should be aware that improving the restaurant's hardware and software facilities indirectly affects consumers' perception of waiting time; for example, adding dining seats and setting up waiting devices. However, the upgrade of hardware and software facilities requires additional cost investment. Further improvement in the quality of service personnel is an important investment in long-term restaurant management. As our research emphasizes, the service before restaurant entry is part of the entire service. Finally, through this study, we learn that different types of consumers have different perceptions of restaurant waiting. In order to accommodate crowds and provide high-quality services and experiences, restaurant operators need to assess service quality and establish management standards for consumer waiting. Restaurant operators can further understand the needs of different customers and make up for the psychological anxiety and emotional dissatisfaction that consumers may experience during the waiting process.

5.3. Management Implications and Suggestion

(1)　The establishment of a waiting service mechanism: In the past, restaurant service was mostly studied during the meal or after the meal. This study focused on the waiting service before the meal. Sincerely expressed apologies are a necessary basis for service. If there is a major waiting situation, a restaurant can provide appropriate substantial compensation to improve the service quality of frontline service personnel and reduce the negative impact of service failure on restaurants.

(2)　Establish the importance of service recovery: The results showed that customers are willing to wait at least 20 min or more with compensation. Therefore, if the restaurant industry can determine customers' inner tolerance, this can help in easing the customer's emotions and frustration with waiting in a timely manner.

(3)　Restaurant equipment updates: With the advancement of technology, it is important for restaurants to invest in technology, letting customers know their waiting time by developing query technology software, or letting them determine this with an electronic queue waiting system. Understanding the relevant waiting processes and information can effectively improve the waiting quality of the restaurant, especially for chain restaurants with relatively rich resources.

(4)　This study takes general restaurants as a research target and focuses on the service quality for waiting. It does not deeply distinguish between the types of restaurant operation and the type of the restaurant. In view of the operation cost of the restaurant, if future proposals can first analyze a restaurant in the chain system, this will improve the overall service quality when resources and equipment are relatively abundant. In addition, in terms of sample size, if it is possible to use the entire Taiwanese restaurants as the scope of investigation, this will further enhance the value of restaurant waiting in service quality. Finally, operators should give the customer a reasonable and satisfactory impression of service recovery and authorize employees to deal with service failures for the customer.

(5)　In the past, the study into public goods was mainly focused on WTP of preservation sites (cultural heritage, monuments, etc.), but few studies estimate the WTW of public goods on the queue. This paper studies the WTW of private sectors. Under this concept, we suggest that the WTW of public goods can be evaluated in the future.

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