



## Article

# Examining the Effect of Revenue Management on Customer Perceptions and Calculating the Service Performance Index: Food Order Application Example

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**Abstract:** In this research, the target is to create a “Service Performance Index” for food order mobile applications. In order to create the index, a structural equation model is developed. Then the coefficients which are obtained from the model are used to calculate the index values. There are some revenue management practices carried out in the food sector such as “discounts when you order a meal for two” or “privileges for contracted credit card or mobile line users”. In this context, this study tried to measure whether there is a relationship between the revenue management and customer perceptions, which are e-service quality, satisfaction and word of mouth. It was realized that revenue management has a significant, positive and high-level effect on e-service quality, satisfaction and word of mouth. The index scores of participants of the questionnaire were compared according to the frequency of benefiting from revenue management applications and discount campaigns. Thus, it was revealed that the service performance index of those who always use revenue management applications is higher than those who never use them. This result contributes to businesses with an important reference in terms of food marketing strategy.

**Keywords:** food order application; service performance index; revenue management; structural equation modeling; customer perception



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## 1. Introduction

Businesses have to follow technological developments in order to be leaders in their own sectors. One of the technological developments is the increase in services provided over the internet. Especially in the food industry, online ordering system applications have increased. In these systems, speed, quality, taste points, etc., which affect customer preferences, are used. These scores are simple indices calculated as averages. By calculating the indices in more detail, many advantages can be obtained in increasing the service quality of the enterprise. The motivation of this study is designing a large-scale service performance index model with latent and measurement variables in order to measure service quality and effect of revenue management on service quality and customer satisfaction. Revenue management is the method and system required to make demand management decisions. What is meant by the expression of demand management decisions: forecasting demand and demand characteristics, and using price and capacity to manage demand [1]. In short, revenue management is selling the right product to the right customer, at the right price and at the right time [2]. Revenue management practices are applied in various industries. Gür [3] examined revenue management practices within the scope of five basic dimensions. The presence of revenue management applications in a business provides different advantages for different customer groups.

Because of the importance of revenue management and customer perception in service sectors, in this study, perceived e-service quality, satisfaction and word of mouth dimen-

sions were evaluated in mobile applications on ordering food. Since there are campaigns in the food industry, the relationship between customer perception and revenue management practices has been evaluated. Revenue management practices in the food ordering industry, such as “discounts when you order a meal for two” or “privileges for contracted credit card or mobile line users” are used.

In this study, in order to determine the effect of revenue management on e-service quality, satisfaction and word of mouth, and for developing the index; structural equation modeling method is used. When the models in the literature for the development of an index are examined, it is seen that there are basically three different approaches. The first and most preferred one is Structural Equation Modeling (SEM). The second method is the estimation of the global and partial index by linear programming. The third approach uses artificial intelligence methods [4]. SEM is a practical approach that allows multiple regressions quickly, without the need to examine the relationships between dimensions one by one, by performing many regressions at the same time [5]. General information about the dimensions used in the model is as follows: service quality can be defined as “the ability of the business to meet and exceed customer expectations”. What matters in service quality is the quality perceived by the customer [6]. E-service can be defined as a process performed as a result of the interaction between the customer and the website supported by the technological infrastructure of the enterprise, without direct influence of the service personnel [7]. E-service quality is defined as customers’ evaluations or judgments of the quality and excellence of e-service offered by businesses [8]. Parasurman et al. [9] developed the four-dimensional E-S-Qual scale and the three-dimensional E-Recs-Qual scale to measure e-service quality. E-S-Qual scale, which includes efficiency, compatibility, performing and security dimensions was used to measure e-service quality and E-RecS-Qual scale, which includes responsiveness, amends and touch dimensions was used to measure e-compensatory service quality. Çatı and Baydaş [10] define customer satisfaction as “customer judgment on expected and actual service performances”. Customer satisfaction prolongs the time for customers to receive service from the business and increases the benefit they get during this time. [11] Customer satisfaction is the cornerstone of quality management. The most important criterion in measuring service quality is satisfaction [12]. Cronin and Taylor [13] investigated the effect of service quality, satisfaction and repurchase intention on each other. Another dimension used in this study is word of mouth. Lam and Mizerski [14] defined word of mouth as “the form of communication which the old customer offers non-commercial messages about a brand, good or service to the new customer”. The impact of mobile services in the service sector is investigated in the studies of [15,16]. E-service quality received via mobile applications was investigated in the study of Teslim [17]. E-S-Qual scale was used to measure e-service quality and E-RecS-Qual scale was used to measure e-compensatory service quality. E-S-Qual and E-Recs-Qual is a model for e-service quality measurement developed by Parasuraman et al. [9]. Zeithaml [18] was inspired by the Servqual scale and focused only on behaviors during purchase, not taken into account before purchase. Parasuraman et al. [9] updated the E-S-Qual scale to measure internet service quality. Parasurman et al. [9] developed a new scale, E-RecS-Qual, in order to evaluate the problems encountered during shopping, after the study of the E-S-Qual scale.

In this study, for calculating service performance index, revenue management and service quality dimensions are used in an integrated manner. Being integrated means that it includes a revenue management and a service quality model as well as satisfaction, word of mouth and their relational analysis. As a result of the study, revenue management significantly and positively affects perceived e-service quality, customer satisfaction and word of mouth with the service they receive from the food ordering application. The contribution of this study to the literature is important at this point. In addition, index values for service performance can be used for continuous improvement studies.

The paper is organized as follows: Section 2 describes the model and methods used in the study. In Section 3, results are conducted. Discussions are presented in Section 4, and in Section 5, the conclusion is presented.

## 2. Materials and Methods

In this study, a service performance index model is developed. The effect of revenue management on service quality, satisfaction and word of mouth is analyzed. Related literature is presented in Table 1.

**Table 1.** Literature Review Summary Table.

Year	Authors	Dimensions Used in the Study	Journal
2022	Ibrahim et al. [19]	Service quality, satisfaction	Sustainability
2000	Szymanski and Hise [20]	E-satisfaction	Journal of Retailing
2022	Arshad Khan and Alhumoudi [21]	Service quality, satisfaction	Sustainability
2019	Kitsios et al. [22]	E-satisfaction	Computer Standards and Interfaces
1998	Siskos et al. [23]	Satisfaction	Journal of Global Optimization
2014	Awasthi and Shrivastava [24]	Service quality, satisfaction	International Journal of Hospitality & Tourism Systems
2022	Daniali et al. [15]	Mobile phone performance	Social Sciences
2008	Tan and Chou [16]	Quality of mobile service	International Journal of Human-Computer Interaction
2022	Kang and Namkung et al. [25]	Service quality	Sustainability
2022	Koay et al. [26]	Service quality, satisfaction	British Food Journal
2022	Zheng et al. [27]	Customer perception	Foods
2022	Marklinder [28]	Attitude, knowledge, background and behavior factors on food safety	Foods
2022	Mielmann [29]	Attitude, mood, acceptability, familiarity, emotional response	Foods
2010	Unurlu [30]	Perceptions, attitudes	Trakya University
2018	Uslu [31]	Service quality, satisfaction, loyalty, perceived price value and trust	Gebze Teknik Üniversitesi
2015	Choi et al. [32]	Fairness	Journal of Revenue and Pricing Management
2008	Mohsin [33]	Service quality	Home International Journal of Revenue Management
2002	Matsuoka [34]	Service quality, satisfaction, loyalty, perceived value	Journal of Business Research
2017	Güderoğlu [35]	Customer satisfaction, inconsistency in prices, and ethics in pricing	Necmettin Erbakan University
2019	Lastner et al. [36]	Price fairness	Psychology and Marketing
2016	Abrate et al. [37]	Price competition	Tourism Economics
2021	Viglia et al. [38]	Perceived benefit	Journal of Business Research

A model was developed for the service performance index estimation, and in the first stage of the model, a conceptual model was created in which the measurement variables and hidden variables were explained.

Performance evaluation is necessary to improve customer perception. Indexes are one of the best methods for performance evaluation. Dede and Sezer [39] used an index model to calculate quality.

The solution of the model created in the second stage was carried out using Linear Structural Relations (LISREL). Structural relations and weights of measurement variables (priority coefficients) are determined in the model that reduces estimation errors. In the last stage, the index scores were calculated with the outputs of the structural equation model. The application of the model was carried out in the food order industry. The application model includes revenue management, e-service quality, satisfaction and word of mouth dimensions. In addition, a comparison index study was carried out, taking into account the revenue management campaigns applied in the food order industry.

The aim was to determine the relationship between these dimensions with the structural equation model. Confirmatory factor analysis and structural equation modeling were established to analyze the relationships. With the data obtained from the structural equation model, a service performance index was created to list the customers' perception about the performance of the food order application. The purpose of the study, models and hypotheses, questionnaire and some statistical analyses are mentioned below.

### *2.1. Purpose and Scope of the Research*

The purpose of this research was to create a service performance index for food order application. In addition, it was to determine whether the revenue management affects the e-service quality, satisfaction, and word of mouth. In addition, service performance indexes of customers were compared according to the frequency of use of revenue management applications. Within the scope of the research, a questionnaire was applied to 384 participants who use e-services related to food ordering. The period of conducting the survey was one week. The procedure of participants' selection was not restricted. It was broadened by applying to people from all kinds of organizations with all socio-demographic profiles of all ages so that the results were homogeneous.

In this context, participants' perceptions of benefiting from revenue management practices, perceived e-service quality, general satisfaction and word of mouth for food order application were investigated. Some of the reasons for investigating these dimensions are that revenue management practices have become very popular in recent years and their relationship with customer perception has not been studied much.

### *2.2. Research Model and Hypotheses*

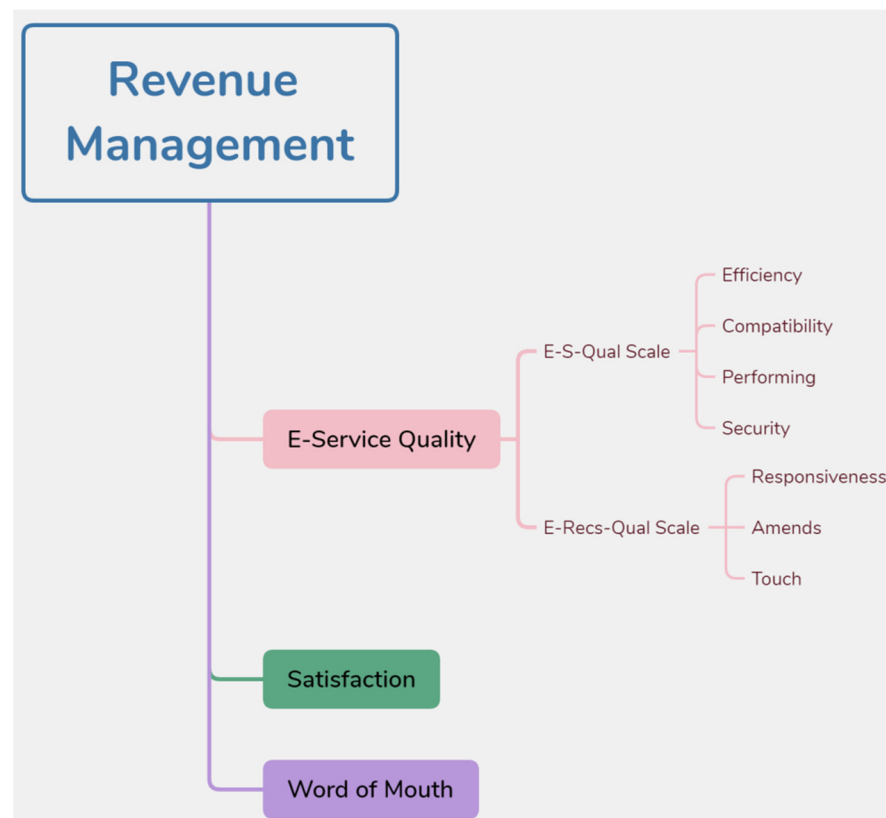
The study of Uslu [31] and the study of Choi et al [32] examined the customer perceptions of selling products sold at different times to different customers at different prices. Revenue management applications involve selling at different prices at different times depending on the amount of demand or selling similar products in economy or business class by dividing the market into segments. In such applications, customers have different perceptions. Companies also implement revenue management practices by organizing campaigns and promotions. Contracted credit card and mobile line privileges can also affect customer perception. In this study, it was aimed to investigate the effects of revenue management practices on service quality, customer satisfaction and word of mouth customer perceptions. Therefore, the following three hypotheses have been established.

The research model is shown in Figure 1 and the research hypotheses of the study are formed as follows:

**H1.** *Revenue management significantly and positively affects their perceived e-service quality regarding the service they receive from the food ordering application.*

**H2.** *Revenue management significantly and positively affects their overall satisfaction with the service they receive from the food ordering application.*

**H3.** *Revenue management significantly and positively affects their word of mouth with the service they receive from the food ordering application.*



**Figure 1.** Research Model.

The seven dimensions belonging to E-S-Qual and E-Recs-Qual scales developed by Parasuraman [9] were evaluated under the title of e-service quality in Figure 1.

- Questionnaire Form and Scales

In the first part of the questionnaire used in the study, there are questions about demographic data. In the second part, there are scales to measure the participants' use of revenue management applications, their satisfaction, perceived e-service quality and word of mouth, which are expected to give answers in the range of "1 = Strongly Disagree", "5 = Strongly Agree". The questionnaire is shown in Appendix A. In this study, the scales used in previous studies were adapted and used.

The revenue management application scale is derived from the study of Uslu [31] for airlines and the work of Choi et al. [32] on movie theaters. The revenue management scale was transformed into a new scale by supporting them with questions suitable for food ordering. Its validity and reliability were determined by performing explanatory factor analysis. The validity of the scale adapted for the food industry is tested and given in the Section 3. The satisfaction scale in the study of Taylor and Baker [40], the word of mouth scale in the study of Gremler and Gwinner [41] and the service quality scale in the work of Parasuraman et al. [9] were used.

While performing SEM, first of all, a measurement model is created. The measurement model, also known as confirmatory factor analysis, evaluates the suitability of the questionnaire questions to the dimensions. After the necessary improvements are made by looking at the goodness of fit values in the model, the relations between the dimensions can be examined by applying the structural model [42,43].

SEM solution can be achieved with maximum likelihood and partial least squares algorithms. Which method will be chosen for the solution is decided as follows:

- If the data set is continuous and normally distributed, the maximum likelihood method must be chosen.

- If the data set is ordinal or categorical, weighted partial least squares method must be chosen.

LISREL 8.80 statistical package program was used to evaluate the structural equation modeling in the study [44].

### 3. Results

In this study, the relationship between revenue management, perceived e-service quality, general customer satisfaction and word of mouth was examined with structural equation modeling. In addition, a service performance index was created from the results obtained from the structural equation modeling. The results of the index and statistical analysis techniques used in the research are given in this section. The steps of calculating the food ordering performance index were created by adapting the index calculation steps in Bekmezci [45]'s study. The steps: applying a survey, then building the measurement model and structural equation model, and finally creating the index according to the results of the model.

After the hypotheses regarding the conceptual model of the research were established, the testing phase started. Structural Equation Model (SEM) was used for this purpose. After the first version of the model was run, necessary improvements were made, and the model was finalized.

#### 3.1. Descriptive Statistics

As shown in Appendix B, a total of 45% of the participants are between the ages of 18–22. The monthly income of 37% of the participants is in the range of 5001–10,000 TL. Additionally, 45% of the participants place an order once in 3 months.

#### 3.2. Normality, Reliability and Validity Test Results

George and Mallery [46] stated that “A kurtosis value of  $\pm 1.0$  would be considered excellent for most psychometric purposes, but a value between  $\pm 2.0$  is in many cases also acceptable, depending on the particular application”. As shown in Table 2 and Appendix B, the skewness and kurtosis values of the variables related to physical evidence, social benefit, satisfaction and ambiance are between +2 and  $-2$ , and the data are normally distributed.

**Table 2.** Skewness and Kurtosis Values.

Dimension	Skewness	Kurtosis
Efficiency	−1.152	1.919
Compatibility	−0.723	0.272
Performing	−0.884	0.375
Security	−0.699	−0.204
Responsiveness	−0.752	0.020
Amends	−0.635	−0.296
Touch	−0.812	0.272
Satisfaction	−0.981	0.874
Word of Mouth	−0.997	0.918
Revenue Management	−0.661	−0.391

Murphy and Davidshofer [47] stated that Cronbach's Alpha coefficient between 0.80 and 1.00 is “highly reliable”, a range of 0.60–0.79 is “reliable”, a range of 0.40–0.59 is “low reliability” and less than 0.40 indicates that it is “not reliable”. The results of the reliability analysis performed are shown in Table 3. Cronbach's Alpha coefficient was 0.979 for all expressions. Thus, it is “highly reliable” with 0.979.

**Table 3.** Reliability Analysis.

Dimension	Cronbach's Alpha Coefficient
Efficiency	0.915
Compatibility	0.831
Performing	0.922
Security	0.903
Responsiveness	0.935
Amends	0.888
Touch	0.852
Satisfaction	0.940
Word of Mouth	0.928
Revenue Management	0.867
OVERALL	0.979

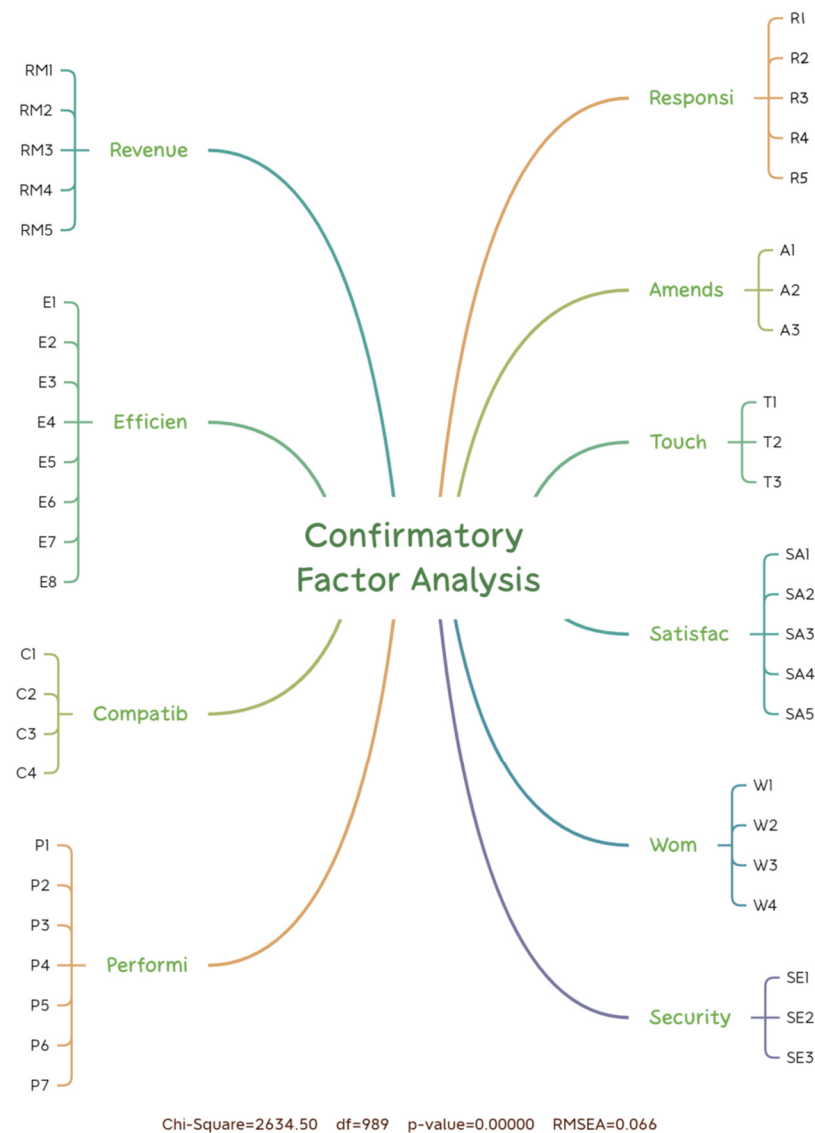
Pre-validated scales developed by Parasuraman et al. [9] for e-service quality, developed by Taylor and Baker [40] for satisfaction, and developed by Gremler and Gwinner [41] for word of mouth were used. For revenue management, a factor consisting of five statements was developed. Explanatory factor analysis was performed to determine the validity. Values are presented in Table 4. All statements were gathered under a single factor. It has been verified by Principal Component Analysis, one of the Extraction Methods, that five expressions form one dimension.

**Table 4.** Validity Analysis.

KMO and Bartlett's Test		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		0.800
Bartlett's Test of Sphericity	Approx. Chi-Square	1054.701
	df	10
	Sig.	0.000
Component Matrix		
	Component	
	1	
RM3	0.871	
RM4	0.860	
RM5	0.839	
RM2	0.797	
RM1	0.661	
	Initial Eigenvalues	
Cumulative %	65.495	

### 3.3. Confirmatory Factor Analysis (CFA)

"Confirmatory factor analysis" (CFA), also called measurement model, is as shown in Figure 2 and Appendix C. CFA is used to test the relationships between observed variables and the structure or structures that are supposed to be measured through these observed variables [48].



**Figure 2.** Confirmatory Factor Analysis.

CFA is used to determine to what extent latent variables are explained by observable variables [44].

As a result of CFA, the model's goodness of fit values are analyzed. In order to establish SEM, the criteria listed below must be within a certain value range [49].

Goodness of fit values:

- $\text{Chi-Square}/df \leq 5$
- $\text{RMSEA}$  ("RootMeanSquareError of Approximation")  $\leq 0.08$
- $\text{CFI}$  ("Comparative Fit Index") = 0.95–1.00
- $\text{NFI}$  ("Normed Fit Index"),  $\text{NNFI}$  ("Non-Normed Fit Index") = 0.90–1.00
- $\text{SRMR}$  ("Standardized Root Mean Square Residual")  $\leq 0.10$
- $p\text{-value} < 0.05$

The goodness of fit values are as follows:

- " $\text{Chi-Square}/df$ " =  $2634.50/989 = 2.66$
- " $\text{RootMeanSquareError of Approximation}$ " ( $\text{RMSEA}$ ) = 0.066
- " $\text{Comparative Fit Index}$ " ( $\text{CFI}$ ) = 0.99
- " $\text{Normed Fit Index}$ " ( $\text{NFI}$ ) = 0.98
- " $\text{Non-Normed Fit Index}$ " ( $\text{NNFI}$ ) = 0.98
- " $\text{Standardized Root Mean Square Residual}$ " ( $\text{SRMR}$ ) = 0.050

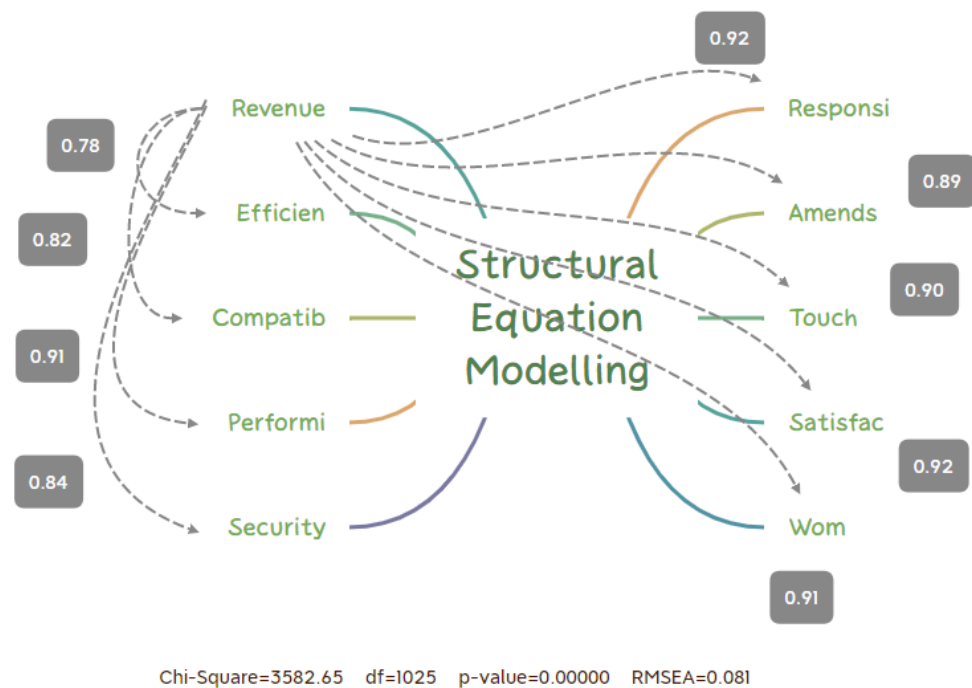


- “*p* value” = 0.00000

As can be seen, since all the values are within the range, the structural equation model can be applied.

### 3.4. Structural Equation Model (SEM)

After the measurement model was created, the structural model was created and the relationship of the dimensions with each other was determined as shown in Figure 3 and Appendix C. Since the *p*-value was 0.00, it was understood that there was a significant relationship between the dimensions. In CFA, it is determined whether each dimension creates a factor or not. In SEM, the effects of latent variables on each other are investigated. More correlation relationships are established and more regression equations are formed. Therefore, the RMSEA of the SEM models are larger than the RMSEA of the CFA model.



**Figure 3.** Structural Equation Model.

When looking at the effects of variables on each other in Structural Equation Modeling, it can be said that there is a “small” effect if the path coefficients are in the range of 0.00–0.10, “medium” if the path coefficients are in the range of 0.10–0.50, and “high” if the path coefficients are greater than 0.50 [50].

When the findings are examined, it is seen in Table 5 that revenue management has a ‘significant, positive and high-level effect’ on e-service quality, satisfaction and word of mouth ( $\beta > 0.50$ ;  $p < 0.001$ ). According to these results, the H1, H2 and H3 hypotheses were accepted.

### 3.5. Calculating the Service Performance Index

The service performance index was calculated with the coefficient values obtained from the structural equation model.

**Table 5.** Structural equation model path coefficients.

The Effect of Variables on Each Other	Path Coefficients	p-Value
Revenue Management → Efficiency	0.78	0.000
Revenue Management → Compatibility	0.82	0.000
Revenue Management → Performing	0.91	0.000
Revenue Management → Security	0.84	0.000
Revenue Management → Responsiveness	0.92	0.000
Revenue Management → Amends	0.89	0.000
Revenue Management → Touch	0.90	0.000
Revenue Management → Satisfaction	0.92	0.000
Revenue Management → Word of Mouth	0.91	0.000

The loading factors from each measurement variable to the latent variable show the ability of that measurement variable to represent that dimension. For this reason, loading factors are used as weights. The weight and average of each measurement variable are multiplied and divided by the sum of the weights, and the index is calculated as a weighted average.

The formula used to calculate the index and the charts for these calculations are shown below.

$$E_i = \frac{\sum_{i=1}^m \sum_{j=1}^n W_{ij} * X_{ij}}{\sum_{i=1}^m \sum_{j=1}^n W_{ij}} * 20 \quad (1)$$

(Service Performance Index Formula).

The service performance index values prepared for the e-service quality, satisfaction, word of mouth and revenue management dimensions are as shown in Table 6.

**Table 6.** Service Performance Index Values.

Latent Variable	Measurement Variables	Mean (x)	w	X × w	$\sum(x \times w) / \sum w$	Index Value (E)
Efficiency	E1	4.089	0.7	2.862	4.205	84.11
	E2	4.078	0.71	2.895		
	E3	4.383	0.81	3.55		
	E4	4.115	0.75	3.086		
	E5	4.078	0.73	2.977		
	E6	4.357	0.81	3.529		
	E7	4.318	0.79	3.411		
	E8	4.18	0.83	3.469		
Compatibility	C1	4.237	0.71	3.008	3.977	79.538
	C2	4.219	0.8	3.375		
	C3	3.617	0.7	2.532		
	C4	3.823	0.82	3.135		

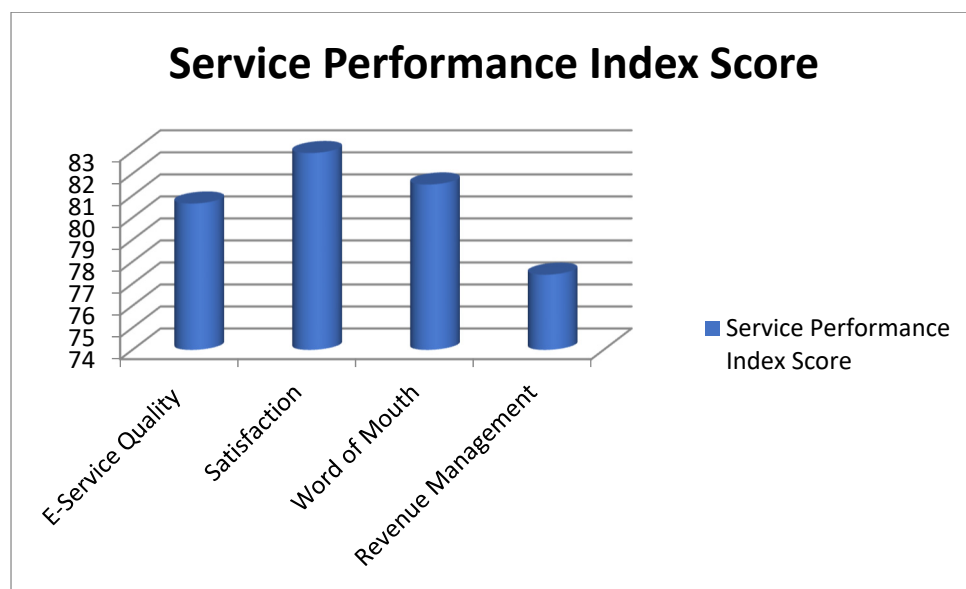
Table 6. Cont.

Latent Variable	Measurement Variables	Mean (x)	w	X × w	$\sum(x \times w) / \sum w$	Index Value (E)
Performing	P1	4.141	0.78	3.23	4.114	82.277
	P2	4.089	0.84	3.434		
	P3	3.977	0.8	3.181		
	P4	4.266	0.77	3.285		
	P5	4.138	0.79	3.269		
	P6	4.133	0.81	3.348		
	P7	4.063	0.8	3.25		
Security	SE1	3.917	0.87	3.408	3.863	77.268
	SE2	3.779	0.86	3.25		
	SE3	3.893	0.89	3.465		
Responsiveness	R1	3.896	0.87	3.389	3.948	78.954
	R2	3.914	0.9	3.523		
	R3	3.984	0.88	3.506		
	R4	4.057	0.85	3.449		
	R5	3.888	0.84	3.266		
Amends	A1	3.938	0.88	3.465	3.836	76.721
	A2	3.826	0.87	3.328		
	A3	3.74	0.83	3.104		
Touch	T1	3.857	0.78	3.008	4.018	80.369
	T2	4.141	0.85	3.52		
	T3	4.044	0.86	3.478		
Overall e-service quality index value: 80.645						
Satisfaction	SA1	4.12	0.87	3.584	4.147	82.938
	SA2	4.167	0.88	3.667		
	SA3	4.133	0.89	3.678		
	SA4	4.164	0.88	3.664		
	SA5	4.151	0.85	3.528		
Word of Mouth	W1	4.151	0.86	3.57	4.076	81.51
	W2	4.073	0.91	3.706		
	W3	4.063	0.9	3.656		
	W4	4.016	0.85	3.413		
Revenue Management	RM1	4.06	0.65	2.639	3.871	77.415
	RM2	4.078	0.65	2.651		
	RM3	3.823	0.68	2.6		
	RM4	3.719	0.66	2.454		
	RM5	3.669	0.62	2.275		
<b>Service Performance Index</b>						<b>80.223</b>

According to the Turkish Customer Satisfaction Index (TMME) model of the Turkish Quality Association, the score values calculated for each dimension are unacceptable in the 0–54 value range, very weak in the 55–59 value range, low in the 60–64 value range,

moderate in the 65–74 value range, good in the 75–79 value range, very good in the 80–84 value range, and extraordinary customer satisfaction in the 85–100 value range [51,52].

According to the service performance index results obtained in the study, as seen in Table 6 and Figure 4, the e-service quality was calculated as very good with 80.645, the satisfaction was calculated as very good with 82.938, the word of mouth was calculated as very good with 81.510 and the revenue management was calculated as good with 77.415.



**Figure 4.** Service Performance Index Scores.

While ordering food by mobile application, customers benefit from some discounts and campaigns. It has been observed that there is a difference between the customers who always use these applications and those who never use them. Comparison results are as follows.

In Table 7, five different revenue management applications are mentioned and an index comparison of the customers who benefit the least and the customers who benefit the most is given.

**Table 7.** Index Score Comparison by Frequency of Using Revenue Management Campaigns.

	E-Service Quality	Word of Mouth	Satisfaction
RM 1-1	64,029	60,035	68,337
RM 1-5	89,934	92,214	92,806
RM 2-1	62,715	61,023	67,007
RM 2-5	89,446	91,539	92,154
RM 3-1	65,216	64,513	67,471
RM 3-5	90,534	93,019	93,557
RM 4-1	68,503	65,403	70,874
RM 4-5	91,298	94,333	94,410
RM 5-1	71,080	68,890	72,274
RM 5-5	90,473	93,224	93,443

When the relationships between revenue management and customer satisfaction were examined, the following findings were obtained. As can be clearly seen from the aforementioned findings, activities or areas of attraction in revenue management have significant effects on customer satisfaction. Regarding these effects, five different revenue

management applications are mentioned and an index value comparison (out of five) of the customers who benefit the least and the customers who benefit the most is given.

RM 1: First revenue management application: "I prefer the menus that include drinks, potatoes and desserts with the meal".

- RM 1-1: The index value for the satisfaction dimension of the people who use it at the 1 level, that is, who answered "never" in the survey, is 68,337.
- RM 1-5: The index value for the satisfaction dimension of the people who use it at the 5 level, that is, who answered "always" in the survey, is 92,806.

This means that the people who always benefit from revenue management campaigns are more satisfied than the people who never buy drinks and sides with the meal.

RM 2: The second revenue management application: "I benefit from double menu campaigns".

- RM 2-1: The index value for the satisfaction dimension of the people who use it at the 1 level, that is, who answered "never" in the survey, is 67,007.
- RM 2-5: The index value for the satisfaction dimension of the people who use it at the 5 level, that is, who answered "always" in the survey, is 92,154.

This means that the people who always benefit from revenue management campaigns are more satisfied than the people who never buy two meals with a friend.

RM 3: Third revenue management application: "As I shop, I collect points and buy a new menu with these points."

- RM 3-1: The index value for the satisfaction dimension of the people who use it at the 1 level, that is, who answered "never" in the survey, is 67,471.
- RM 3-5: The index value for the satisfaction dimension of the people who use it at the 5 level, that is, who answered "always" in the survey, is 93,557.

This means that the people who always benefit from revenue management campaigns are more satisfied than the people who never buy meals for free.

RM 4: Fourth revenue management application: "I get a discounted menu with mobile line privileges".

- RM 4-1: The index value for the satisfaction dimension of the people who use it at the 1 level, that is, who answered "never" in the survey, is 70,874.
- RM 4-5: The index value for the satisfaction dimension of the people who use it at the 5 level, that is, who answered "always" in the survey, is 94,410.

This means that the people who always benefit from revenue management campaigns are more satisfied than the people who never get discounts with mobile line privileges.

RM 5: The fifth revenue management application: "I collect points by paying with a contracted credit card".

- RM 5-1: The index value for the satisfaction dimension of the people who use it at the 1 level, that is, who answered "never" in the survey, is 72,274.
- RM 5-5: The index value for the satisfaction dimension of the people who use it at the 5 level, that is, who answered "always" in the survey, is 93,443.

This means that the people who always benefit from revenue management campaigns are more satisfied than the people who never buy free meals via contracted credit cards.

As it can be understood from this, the indexes of customers who benefit from revenue management applications a lot are higher than those of customers who benefit less from revenue management applications. This is true for each application and the dimensions of e-service quality, satisfaction and word of mouth.

#### 4. Discussion

The present study clearly explored that revenue management practices have an impact on customer perception. This is consistent with the previous study findings [31,32]. Based on the results of the analysis, it is seen that customer perception factors, which are e-service quality, satisfaction and word of mouth, are affected by the frequency of using

revenue management campaigns. While Uslu [31] found a relationship between revenue management and customer perception in the airline industry, and Choi et al. [32] did so in the cinema industry, this study found a relationship between revenue management and customer perception in the food industry. From this result, it is understood that as customers buy discounted foods, they are more satisfied and recommend more.

The present research clearly highlights key drivers of food revenue management. Ordering sides with the meal, choosing double or triple meals with friends to get a discount, collecting points to use in other orders and taking advantage of mobile line or contracted credit card privileges are the factors mentioned.

In this study, in accordance with H1, e-service quality in the food sector was examined with similar methods with Teslim [17]. E-S-Qual scale which includes efficiency, compatibility, performing and security dimensions was used to measure e-service quality, and E-RecS-Qual scale which includes responsiveness, amends and touch dimensions, was used to measure e-compensatory service quality [17]. According to the results of the analysis, when the relationship between revenue management and e-service quality was examined, hypothesis one was confirmed.

In this study, in accordance with H2, similarly to Uslu [31], a satisfaction measurement was made that measured meeting the expectations and being happy about the service received by the customers. Then, the relationship between revenue management and satisfaction was investigated and hypothesis two was confirmed.

In this study, in accordance with H3 Word of mouth measurement was made by adapting from the study of Gremler and Gwinner [41], which was carried out regarding the customers' recommending and encouraging the people around them to receive the same service. According to the results of examining the relationship between revenue management and word of mouth, hypothesis three was accepted.

In addition, the comparison was made according to the frequency of customers benefiting from revenue management campaigns and discounts. The findings reveal that people who always benefit from revenue management campaigns are more satisfied than the people who never get discounts via revenue management applications.

There are some points related to the customer perception dimensions used in this research. In this study, e-service quality, satisfaction and word of mouth perceptions were examined. In future studies, the research might be replicated with different customer perception dimensions and the effect of revenue management on these dimensions could be examined. Suggested dimensions include: loyalty, willingness to pay, trust, fairness and perceived price value.

In terms of building an index, future research could investigate other approaches mentioned in the introduction, which are that linear programming and artificial intelligence methods could be used instead of structural equation modeling. Fuzzy logic is also another approach for developing indexes.

Further research on separate applications is needed to better understand different customer groups. More research into customers who shop frequently and occasionally could increase our knowledge of the differences examined by making separate evaluations. These differences can be used to create different campaigns. For example, discounts may be available for customers who shop frequently. Discount rates can be determined according to the loyalty level of the customers. In addition, marketing operations of the company can be shaped according to different types of customers.

## 5. Conclusions

Creating a service performance index was the main purpose of the study. In order to create a service performance index, conceptual models were designed and analyzed with structural equation modeling. The service performance index was created with the standardized regression coefficients obtained from the structural equation modeling of the effects of the dimensions in the model to each other.

According to the service performance index results obtained in the study, the e-service quality was calculated as very good with 80.645, the satisfaction was calculated as very good with 82.938, the word of mouth was calculated as very good with 81.510 and the revenue management was calculated as good with 77.415. According to these results, the revenue management dimension's value was good, while the customer perceptions' values were very good. For this reason, revenue management applications need to be developed first.

According to the service performance index calculations, the index value of people who always benefit from revenue management applications and campaigns is higher than those who never use them. This conclusion was reached by additional analysis for customers in different categories who follow different revenue management strategies. When the index values of the customers who do not use and who always use it are compared, it is seen that the service performance index values of the customers who use these applications are higher.

While creating the index, it has been attempted to find answers to the questions of the effect of revenue management on e-service quality, satisfaction and word of mouth in the structural equation modeling. As a result of the research carried out in this study, the relationship between revenue management and e-service quality, satisfaction, word of mouth was found to be statistically significant.

It has been concluded that the revenue management applications and campaigns have a significant, positive and high-level effect on e-service quality, satisfaction and word of mouth.

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**Informed Consent Statement:** Informed consent was obtained from all subjects involved in the study.

**Data Availability Statement:** Not applicable.

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## Appendix A. Survey Questions

### Appendix A.1. Expressions of the Dimensions of the E-S-Qual Scale

- Efficiency
  1. Food ordering site/application allows me to find what I need easily.
  2. It is easy to go anywhere within the food ordering site/application.
  3. The food ordering site/application allows me to complete my transactions quickly.
  4. The information on the food ordering site/app is well organized.
  5. Loading pages on the food ordering site/application is fast.
  6. The food ordering site/application is easy to use.
  7. The food ordering site/app allows me to get it quickly.
  8. The food ordering site/application is well organized.
- Compatibility
  9. Food ordering site/app can always be used for business.

- 10 The food ordering site/application opens and works immediately.
- 11 Food ordering site/application does not crash.
- 12 After entering order information, the pages do not freeze.
- Performing
  - 13 The food ordering site/application delivers orders when promised.
  - 14 This site makes products available for delivery within the appropriate time frame.
  - 15 The food ordering site/application delivers the product I ordered quickly.
  - 16 Sends the ordered products.
  - 17 The products claimed by the food ordering site/application are in stock.
  - 18 The offers of the food ordering site/application are correct.
  - 19 Makes firm promises about the delivery of the products.
- Security
  - 20 The food ordering site/application protects information about my web-shopping behavior.
  - 21 The food ordering site/application does not share my personal information with other sites.
  - 22 Food ordering site/application protects information about my credit card.

#### *Appendix A.2. Expressions of the Dimensions of the E-RecS-Qual Scale*

- Responsiveness
  - 1. It gives me suitable options to return the products.
  - 2. The food ordering site/application manages the process for returned products well.
  - 3. The food ordering site/application offers a meaningful guarantee.
  - 4. It tells me what to do when my transaction is not processed.
  - 5. Solves problems promptly.
- Amends
  - 6 The food ordering site/application compensates for the problems it creates.
  - 7 If the product I ordered does not arrive on time, it compensates for its error.
  - 8 He takes the products that I want to return from my home or workplace.
- Touch
  - 9 The food ordering site/application gives me a phone number to reach the company.
  - 10 The food ordering site/application has online customer representatives.
  - 11 If there is a problem, it offers the opportunity to talk to a live person.

#### *Appendix A.3. Expressions of the Satisfaction Scale*

- Satisfaction
  - 1. I think I did the right thing by using the food ordering site/app.
  - 2. I believe using the food ordering site/app is a satisfying experience.
  - 3. I am very happy with my decision to use the food ordering site/application.
  - 4. My choice to use the food ordering site/application was logical.
  - 5. The food ordering site/app did a good job meeting my expectations.

#### *Appendix A.4. Expressions of the Word of Mouth Scale*

- Word of Mouth
  - 1. I recommend this food ordering site/app when someone asks me for advice.
  - 2. If there is a conversation about the food ordering site/application, I recommend this food ordering site/application.
  - 3. I recommend this food ordering site/app to my friends, relatives and family.
  - 4. I encourage my friends, relatives and family to use this food ordering site/app.



*Appendix A.5. Expressions of the Revenue Management Scale*

- Revenue Management
  1. I prefer the menus that include drinks, potatoes and desserts with the meal.
  2. I benefit from double menu campaigns.
  3. As I shop, I collect points and buy a new menu with these points.
  4. I get a discounted menu with mobile line privileges.
  5. I collect points by paying with a contracted credit card.

**Appendix B. Descriptive Statistics****Table A1.** Descriptive Statistics of Dimensions.

		Descriptives	
		Statistic	Std. Error
E	Mean	4.1995	0.03893
	Skewness	−1.152	0.125
	Kurtosis	1.919	0.248
C	Mean	3.9740	0.04469
	Skewness	−0.723	0.125
	Kurtosis	0.272	0.248
P	Mean	4.1150	0.04249
	Skewness	−0.884	0.125
	Kurtosis	0.375	0.248
SE	Mean	3.8628	0.05404
	Skewness	−0.699	0.125
	Kurtosis	−0.204	0.248
R	Mean	3.9479	0.04972
	Skewness	−0.752	0.125
	Kurtosis	0.020	0.248
A	Mean	3.8342	0.05428
	Skewness	−0.635	0.125
	Kurtosis	−0.296	0.248
T	Mean	4.0139	0.04820
	Skewness	−0.812	0.125
	Kurtosis	0.272	0.248
SA	Mean	4.1469	0.04377
	Skewness	−0.981	0.125
	Kurtosis	0.874	0.248
W	Mean	4.0755	0.04699
	Skewness	−0.997	0.125
	Kurtosis	0.918	0.248
RM	Mean	3.8698	0.05275
	Skewness	−0.661	0.125
	Kurtosis	−0.391	0.248

**Table A2.** Cross Table of Gender.

		Income and Gender Crosstabulation			
			Gender		Total
			Man	Woman	
Income	10,001–20,000	Count	48	44	92
		% of Total	12.5%	11.5%	24.0%
	20,001–30,000	Count	14	11	25
		% of Total	3.6%	2.9%	6.5%
	30,001 and more	Count	0	6	6
		% of Total	0.0%	1.6%	1.6%
	5000 and less	Count	30	87	117
		% of Total	7.8%	22.7%	30.5%
	5001–10,000	Count	57	87	144
		% of Total	14.8%	22.7%	37.5%
	Total	Count	149	235	384
		% of Total	38.8%	61.2%	100.0%

**Table A3.** Cross Table of Age.

		Income and Age Crosstabulation						Total	
			Age						
			18	18–22	23–30	31–40	41–60		61 and up
Income	10,001–20,000	Count	2	14	22	32	20	2	92
		% of Total	0.5%	3.6%	5.7%	8.3%	5.2%	0.5%	24.0%
	20,001–30,000	Count	0	9	2	6	8	0	25
		% of Total	0.0%	2.3%	0.5%	1.6%	2.1%	0.0%	6.5%
	30,001 and more	Count	0	1	0	2	3	0	6
		% of Total	0.0%	0.3%	0.0%	0.5%	0.8%	0.0%	1.6%
	5000 and less	Count	9	80	21	5	2	0	117
		% of Total	2.3%	20.8%	5.5%	1.3%	0.5%	0.0%	30.5%
	5001–10,000	Count	9	70	37	15	12	1	144
		% of Total	2.3%	18.2%	9.6%	3.9%	3.1%	0.3%	37.5%
	Total	Count	20	174	82	60	45	3	384
		% of Total	5.2%	45.3%	21.4%	15.6%	11.7%	0.8%	100.0%

**Table A4.** Cross Table of Order Frequency.

		Income and Orderfrequency Crosstabulation				
			Orderfrequency			Total
			Once in 3 Months	1–2 in a Month	1–2 in a Week	
Income	10,001–20,000	Count	27	49	16	92
		% of Total	7.0%	12.8%	4.2%	24.0%
	20,000–30,000	Count	5	11	9	25
		% of Total	1.3%	2.9%	2.3%	6.5%

Table A4. Cont.

Income and Orderfrequency Crosstabulation					
		Orderfrequency			Total
		Once in 3 Months	1–2 in a Month	1–2 in a Week	
30,001 and more	Count	0	3	3	6
	% of Total	0.0%	0.8%	0.8%	1.6%
5000 and less	Count	77	35	5	117
	% of Total	20.1%	9.1%	1.3%	30.5%
5001–10,000	Count	65	48	31	144
	% of Total	16.9%	12.5%	8.1%	37.5%
Total	Count	174	146	64	384
	% of Total	45.3%	38.0%	16.7%	100.0%

Appendix C. Lisrel Outputs

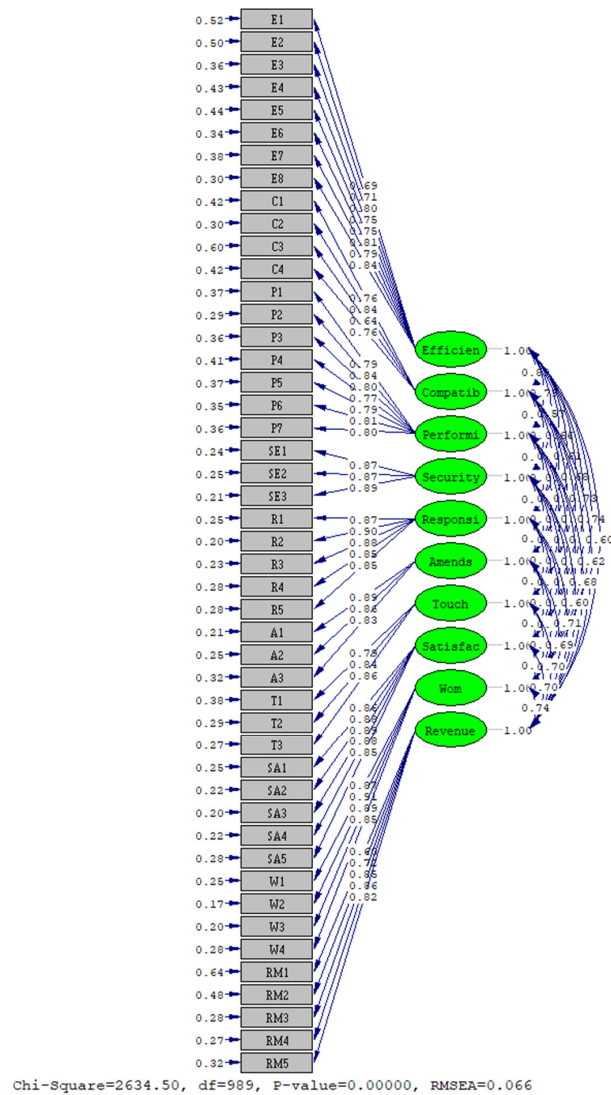


Figure A1. Confirmatory Factor Analysis.

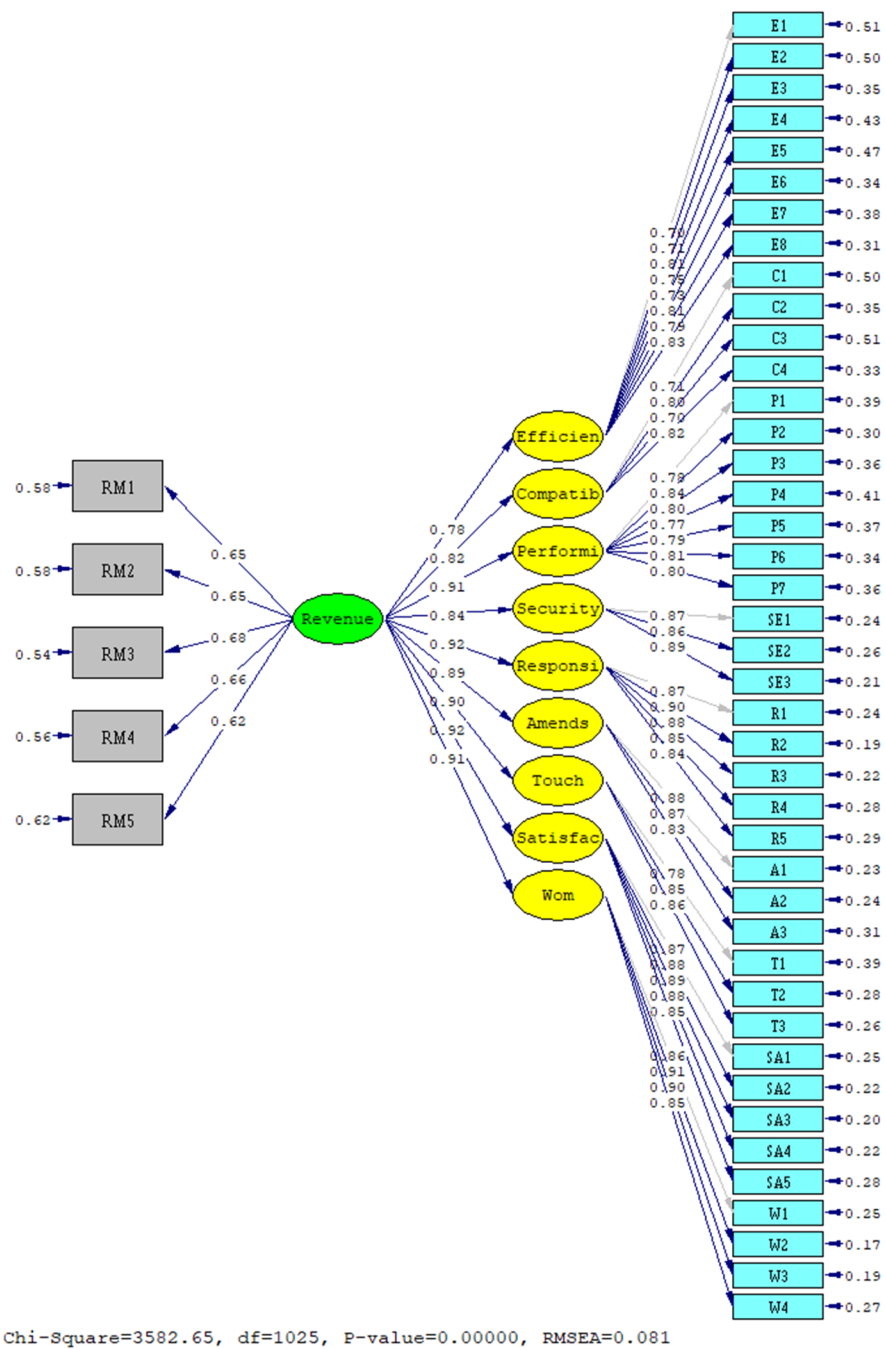


Figure A2. Structurel Equation of Revenue Management.

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