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Analysis of Perceived Determinants in Customer Service Quality: Focused on Automotive Air Conditioning Service Centers

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ABSTRACT

Purpose: The objective of this paper was to determine the actual needs of customers in 3 groups: passenger cars, buses, and truck refrigerators who bring their vehicles to the Service Center to be air conditioner repaired.

Design/methodology/approach: We investigated at how variables including service quality (technician skill, service process, and overall quality), customer satisfaction (facility, responsiveness, and satisfaction), and customer loyalty (repeat orders, loyalty) influence customer perceptions. The primary data comes from a questionnaire of 425 customers. Before being analyzed with Confirmatory factor analysis (CFA), it was first tested for reliability using Cronbach alpha, CR, and AVE, all of the questionnaires are reliable.

Findings: According to the CFA findings, customer perception has a 95 % confidence impact on customer satisfaction. Following that, a separate analysis of the 3 types of customers was conducted to determine the level of confidence in service quality. Ordinal logistic regression was used to conduct a statistical analysis for a Likert scale question, and it was discovered that customers of passenger cars and buses were more confidence and satisfied with their services than truck refrigerator.

Research limitations/implications: There were complexity and uncertainty on this study, but each one led to innovative thinking. Due to prior research, there were no additional studies conducted in the context of automobile, bus, or truck air conditioning repair services. The literature review is so challenging as a result. Given the respondents were drivers, their ideas and opinions may have been clouded during data collecting. Only concentrate on surveys for corporate owners or executives if precise data is required.

Originality/value: This focused for discrepancies between perceived significance and satisfaction in hopes of identifying managerial issues related to how well customers perceive the quality of service. It is demonstrated by considering the value of each service-related characteristic. Also, this study shows that CEOs should concentrate on creating service practices that will attract customers towards the service center.

Keywords: CFA, Customer Loyalty, Customer Satisfaction, Ordinal Logistic Regression, Service Quality

I. Introduction

In Thailand, the bus passenger and truck logistics

industries both saw typical annual growth rates of 8-10% (Transportation statistic Department, 2022). According to the repair results report from Sahamontol - the Service center, currently, the number of customers visiting automotive air conditioning repair shops is declining. Automotive air conditioner Service Centers in Thailand must now work harder to maintain a

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competitive advantage in the rapidly changing after-sales business. Due to the increase in available travel options, the public transportation sector has been negatively impacted. Thailand's people now travel in different ways (Bank of Ayudhya Public Company Limited, 2022). Public transportation providers are immediately impacted by the availability of high-speed rail and low-cost airlines, which is a superior alternative (Kankanit & Moryadee, 2021). Make it a point for business owners to look for methods to save operating expenses such as decreasing the number of trips or postponing maintenance (Eggert et al., 2014). As a result, we can clarify that the issue with this research is the continual decline in the number of vehicles of all types having their air conditioning systems repaired in service centers, which is influenced by corporate conduct and the surrounding environment.

The impact that significantly reduced the revenue and the number of vehicles that come to use the service in the service center as a result of Covid-19's effects and changes in customer behavior, especially in the transport section (Kerdpitak, 2022; Pholphirul et al., 2022). People are turning away from public transportation and toward internet activities, private vehicles and motorcycles, and - to a lesser extent - walking and cycling. It is also obvious that when mobility constraints are removed or lifted, public transportation systems recover slowly (Regmi & Schwanen, 2021). When the service center must find a way to manage with the inevitable changes caused on by the environment, because the automotive air conditioning business is getting increasingly competitive. This is important for understanding and controlling service quality is due to the fact that both expectations and perceptions are mental states based on experience rather than reality (Haywood-Farmer, 1988). Whereas Sonita et al., (2020) argues that it cannot be overstated how important it is to evaluate a service's quality from the perspective of the user. Furthermore, there is significant evidence that in-house quality initiatives by a manufacturer or service provider lead in the desired impact of enhanced customer loyalty and better incentives for product and service satisfaction

(Devaraj et al., 2001). Marketing activity is an effort to meet the needs by providing the best quality service that the customer needs. Good service quality, customers will receive products and services that meet their needs (Risnawati et al., 2019). According to (Mulhern, 1999), the entity for which profitability is determined is the customer unit. Firms frequently distinguish between different categories of customers (e.g., fixed route bus versus non fixed route for a public buses, freeze product versus chill product for a truck refrigerator). Furthermore, when vehicles experience technical failures, mechanics frequently fail to respond to complaints or provide customers with accurate information regarding services (Sangode, 2011). It can be seen that the skill of the mechanics is necessary to create satisfaction (Warren & Gibson, 2023). The quality of service delivery in an automobile maintenance and repair service garage center is a means of conveying trust and promoting the image of the service garage or workshop (Baidoo & Odum-Awuakye, 2017).

The objective of this research was to analyze the actual need for service quality satisfaction among all three groups of customers. In addition, no researchers in Thailand have examined the after-sales service provided by air conditioning repair facilities in previous studies that did not analyze data via statistical hybrid techniques. Confirmatory Factor Analysis and Ordinal Logistic Regression are two major statistical approaches for determining all aspects of service quality. Customer satisfaction survey data was used to do statistical analysis of the experimental data. The Customer satisfaction survey is a sample survey used to measure the quality of services provided by the public and private sectors from the customer's perspective (Eboli & Mazzulla, 2009). Companies want to know if their main customers are satisfied and if they will purchase from them again (Lawson & Montgomery, 2006). Not only in service organizations, but also in manufacturing enterprises, is service quality a key determinant in long-term profitability (Margolies, 1998). In conjunction with this, the study is intriguing and has the potential to be useful for the after-sales service sector in a variety of ways that affect corporate leaders' conceptualizations. However, we understand

that service quality is important in every organization because providing excellent service makes a positive impression on customers who use our services.

II. Literature Review

A. Service Quality

Although "quality" is a multiple phenomenon, it is difficult to guarantee the quality of a product or service without first identifying the distinguishing feature of "quality" (Ghobadian et al., 1994). The relationship between responsiveness and service quality is highlighted in many organizations (Monnet & Teboul, 2007). Customer service quality awareness is very important to the service, particularly the automotive air conditioning maintenance service at the service center. It will lead to a great experience in purchasing our products in addition to providing satisfaction. The overall picture of a service or product, characterized by the goal of achieving the highest level of customer satisfaction, is known as service quality (Tanese et al., 2003). Service work, particularly for automotive-related products, is at the heart of doing business. As a result, automotive air conditioners must provide excellent service in all aspects to meet the expectations of customers. According to Xin & Choi, (2020), denote that evaluation of service quality differs from evaluation of product quality. Customers both contribute to the distribution of services and act as a source of new ideas. Creating a setting where internal processes are routinely controlled for delivery time and the cost is one part of providing excellent service (Pyon et al., 2011). Understanding the context of various wants is necessary for designing a quality service model that is satisfying to the point of repeat purchases which is different for each type of customer because the service center supports the maintenance of bus air conditioners, truck refrigerated and passenger cars. One of the aspects that must be considered when attempting to influence consumer impressions and prompt purchases

during a Covid19 pandemic is service quality (Rivaldo & Amang., 2022). Measuring and understanding each customer segment's true needs is important to service center management and customer retention. Customer value contributes to the business's success, and CRM provides the firm with a better awareness of its customers' wants and needs, which is important in the automobile industry (Pothal et al., 2022). Building a relationship between service centers and customers requires a unique marketing strategy than competitors; a clear target for each customer segment will support the service center in earning revenue that is consistent and sustainable. Prices influence purchase decisions, while quality of service influences purchasing decisions (Pranoto et al., 2022). It was discovered that empathic behavior will result in better perceptions after examining the relationship between survey respondents' views of service quality and consumer preferences (Oh et al., 2020). As of technician skill, employers must carefully consider the implications of soft skill development and training in order to provide their employees with the skills they need to do their tasks (Lok et al., 2021).

B. Customer Satisfaction

Customers' satisfaction is based on their perceived experiential value (Shobeiri et al., 2013). The focus of this research is to identify the relationship between variables resulting from customer experiences in air-conditioning service centers, as well as the influence of those variables. The term "perceived service quality" refers to a common attitude evaluation of excellent service (Parasuraman et al., 1988). The perceived quality of work processes, services, and overall satisfaction, as well as the establishment of credibility in quality work, were all shown in this study. According to Sukwad et al., (2022) research, word-of-mouth marketing is an effective strategy for Generation Z (millennials) in Indonesia, so we should concentrate upon this. Every organization, whether it provides good or poor service, plays an important role in establishing customer perception. The providing of service by dealers must

be done with a high degree of productivity, efficiency, and effectiveness, which is of greater interest to customers of automobiles (Mool et al., 2023). It will be easier to establish the customer's positive attitude and intention toward these services if you can explain how to improve the performance of the service, security and stability features, fare structure, and information system (Javid et al., 2021). Making a great brand experience for customers is the best approach to achieving customer satisfaction and brand trust (Hussein & Yuniarinto, 2022). According to a study by (Mensah, 2009), serious managerial training, marketing motivation, and service offering are all important for satisfaction and perceptions.

C. Customer Loyalty

Customer loyalty is a constant mental commitment on your part and theirs. This demonstrates that they are open to speaking with you and making additional purchases from you. When customers are happy with your goods and services. If a customer has a positive experience with a firm, they are more likely to suggest it to others (Baier et al., 2020). Trust is automatically created when loyalty is present. The interaction between emotions and loyalty is one such essential part of marketing where emotions have always played a significant role (Baishya & Choudhury, 2022). While Lazzari (2022) point out that the consumer's opinions regarding the brand's perceived value and whether or not they would recommend the good or service to others. Customer happiness is frequently seen by automotive businesses as a determinant of customer loyalty (Poturak et al., 2022). Haryadi et al., (2022) explained that one of a company's greatest advantages is customer loyalty based on unchanging satisfaction. The major points that support customer loyalty and satisfaction are competitive advantages (Ruslan et al., 2023). According to Chandel et al., (2023), consumer happiness plays a role in mediating some of the connections between customer loyalty and price fairness and service quality.

According to the above literature assessments, a

statistical method should be used to analyze the actual demand for after-sales service at vehicle air conditioning service centers. In order to compare the results of this research with theories or ideas that have been the subject of previous research, we decided on using hybrid methods to examine the impact of various aspects. To address a variety of related issues as a result, it is interesting and advantageous to the automobile air conditioning repair industry.

III. Methods

A. Research Concept

The goal of the study was to investigate into the aspects that influence people's perceptions of quality, which were divided into three categories: Service Quality, Customer Satisfaction, and Customer Loyalty. The questionnaire was completed by customers who arrived to use the service. Each of the quality of service dimensions is considered by measuring both customer expectations of service quality and the perceived performance level of service quality and evaluating the gap which exists between these two measurements (Morton et al., 2016). Take a look at Figure 1. Starting with the variables of interest in each field, a conceptual framework describing the concepts of this research, Service Quality is derived from the results of technician skill, service process, and overall quality in the Customer Satisfaction section, which includes facility, responsiveness, and satisfaction, and Customer Loyalty, which includes repeat orders and loyalty, all guided by a research framework that affects customer perceptions. All questions relate the relationship between the three variables that will affect the perception of the customer. The analysis is performed with a tool called Confirmatory Factor Analysis (CFA). The hypothesized components are referred to as latent variables, and confirmatory factor analysis is used to test the measurement model. The latent variables in the measurement model are defined by the researcher's

chosen measures (Weston & Gore, 2006). CFA allows the researcher to test the hypothesis that a relationship between observed variables and their underlying latent constructs exists (Diana, 2006). A set of explanatory variables was used to analyze the loyalty and satisfaction of experienced users (Thaithatkul et al., 2001).

Subsequently, the Confidence of Service quality questionnaire was used to determine the perceived level of satisfaction of three groups of customers: Passenger Car, Bus Air Conditioner, and Truck Refrigerator. As shown in Figure 2, a tool called Ordinal Logistic Regression was used to compare which customer segments were more satisfied with our services. Regression analysis is a statistical tool for examining correlation as well as in linear regression analysis, most normal statistical methods assume that the fraction or error must satisfy the normal distribution (Zaim et al., 2010). Each question is measured on a Likert scale of 5 points. Likert scale is known to be widely used to measure attitudes such as opinions, moods and feelings, preferences. Questionnaires and surveys on the Likert scale were used in research in many areas (Göb et al., 2007). Likert scale questions help you to sample opinions and get relevant information.

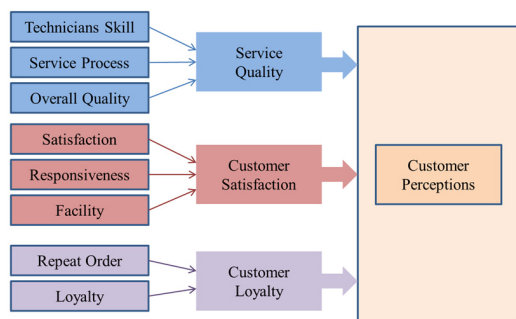


Figure 1. Conceptual framework

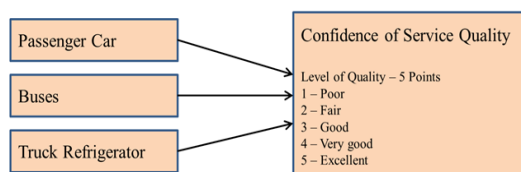


Figure 2. Impact of vehicles type on confidence of quality service

You must ask inquiries to learn what other people are thinking. After you've asked the questions, you'll need to compile the responses. A Likert scale with five level (1: poor, 2: fair, 3: good, 4: very good, 5: excellent) was employed in this study Refer to (Gazzoli et al., 2010) customers were asked to evaluate their viewpoint on a scale of 1 (strongly disagree) to 5 (strongly agree). As of the study by (Hox, 2010), Ordinal regression analysis is a technique used when the categories of the dependent variable are measured on an ordinal scale.

B. Hypothesis Development

According to conceptual frame work, this study investigated the relationship between the main characteristics of service quality, customer satisfaction, and loyalty in order to understand how it affects customer perception. Customers' perceptions of service quality are influenced by the precise work process along with the experience of technicians to handle a problem which includes the use of new equipment, which can drastically shorten repair time. It is important to use high-quality genuine parts. Assume the following hypothesis:

H1: The relationship between customer perception and service quality has a major positive impact.

Customer perception in relationship to customer satisfaction is important to providing excellent customer service since a positive customer experience results from the perception of satisfaction, which is sometimes referred to as pleasure from satisfaction. Take better care of the convenience of the service center as well as the holistic service aspect. For example, provide a lovely lounge or luxuries for customers to use while they wait for services, etc. Assume the following hypothesis:

H2: The relationship between customer perception and customer satisfaction has a major positive impact.

Customer loyalty is regarded as one of the most essential driving aspects for a company's success and is also one indicator of corporate performance (Utama, 2019). Building recognition is an important step in maintaining customer loyalty when they are satisfied. No matter how hard a business organization works to keep up a positive relationship with its customers, there is still a potential that customers will choose competitors if we create negative impressions. Customers are also more likely to develop a relationship with a brand if the relationship is considered to provide benefits and value (Lee & Jin, 2019). Surveys of customer behaviors will also be useful in assessing customer loyalty. If we believe that recommending friends to use our products or making repeat purchases is an indication of loyalty. Assume the following hypothesis:

H3: The relationship between customer perception and customer loyalty has a major positive impact.

By the way, it's important for service center managers to pay attention to the analysis of customer segments in order to build services that meet the requirements of each customer segment in order to know exactly which segments we need to target. Assume the following hypothesis:

H4: Vehicle type has a significant impact on customers' perceptions of high-quality service.

B. Data Correction

The information was obtained from Sahamonthon Solutions (Thailand) Co., Ltd., which is located at 90/26 Moo 12, Khong Song Sub-district, Khong Luang District, Pathumthani Province, Thailand. The Service Center and distributor for DENSO brand bus air conditioners. Choose a strategy for collecting data with a specific questionnaire from customers who have used cars in this service center at least once during the research period.

C. Sampling Design

In research on Structural Equation Modeling (SEM), there are general recommendations for the number of samples to be randomized, and citations of N in a study are linked to reliability and decision-making. Refer to (Kline, 2015) although there are no general guidelines about sample sizes, it is advised that a number of sample sizes of 200 samples can be analyzed for SEM. Although statistical power was a major concern for the analysis, other concerns related to sample size were also important, (Schumacker & Lomax, 2010) suggested that for SEM a 20-fold ratio to the observed variables, although statistical power was a major concern for the analysis, other concerns related to sample size also were important. However, SEM must take into account the properties of the data and the models presented must maximize the value of analyzing these models when the number of N is small (Hoyle & Gottfredson, 2015).

D. Questionnaire Preparation

The 23 questionnaires were divided according to the Latent variables three observe variables belong to Service Quality, three observe variables belong to Customer Satisfaction, and two observe variables belong to Customer Loyalty are shown in Table 1.

For Ordinal Logistic Regression analysis, use question L3: How confident are you in the quality of service? It was the variable to find the relationship of 3 groups of customers: (A) Passenger cars (B) Buses (C) Truck Refrigerator. Since the nature of the service is largely one in which the customer is involved in the delivery process, quality perception is determined not only by "Service results," but also by "Service process." This continuum has "unacceptable quality" on one end and "perfect quality" on the other; the point in the middle displays various quality gradients (Ghobadian et al., 1994). An ordinal logistic regression approach is used since the satisfaction indicator is measured on a sequential scale (Morton et al., 2016).

Table 1. Details of questionnaires

Latent Variables	Observe Variables	Questionnaires
Service Quality	Technician skill	SQ1: Technician knowledge and abilities SQ2: All customers are served promptly by service workers. SQ3: Service staff appearance
	Service Process	SQ4: Explanations regarding the work done on your vehicle SQ5: Provide your vehicle with a servicing warranty SQ6: After the repair, the personnel will make a follow-up SQ7: Gunnies spare parts were provided for the servicing job
	Overall Quality	SQ8: State-of-the-art equipment is in use SQ9: Overall satisfaction of quality service
Customer Satisfaction	Facility	S1: Facility (waiting area/TV/ WIFI / coffee/ etc) S2: How satisfied are you with the location of the Service Center?
	Responsiveness	S3: Vehicle cleanliness after repair S4: Please rate the success of service appointments when requesting an appointment S5: Before repairing, get a quote
	Overall Satisfaction	S6 : Cost of service S7: Staff communication S8: Speed of Technician Service S9: Overall Satisfaction
Customer Loyalty	Repeat Order	L1: Repeat purchases L2: How likely are you to be suggested to others? L3: How confident are you in the quality of service?
	Loyalty	L4: Would you be willing to try our other products? L5: Will you continue to do business with us if our prices increase?

E. Reliability Confirmation

The constructs were examined for their reliability and validity using a sample of 30 individuals based on the whole questionnaire (Hair et al., 2017). The reliability test of the questionnaire was successful. Average variance extracted (AVE) value of all constructs was also higher than the critical value of 0.50 suggested by (Hair et al., 2017). Values of composite reliability/Cronbach alpha between 0.60 and 0.70 are acceptable in exploratory research, but values higher than 0.70 are required in more advanced stages (Hair et al., 2014). The Cronbach Alpha is a popular method for determining an item's internal consistency (Gefen et al., 2000). According to this test the value of Alpha coefficient greater than 0.60 shows good opportunity to model the survey results for the population under study (Cronbach, 1951). A common interpretation of the coefficient is $\alpha < 0.5$ for low reliability, $0.5 < \alpha < 0.8$ for moderate

Table 2. Validity and reliability of latent constructs

Latent Constructs	AVE	CR	α
Service Quality	0.52	0.76	0.73
Customer Satisfaction	0.57	0.73	0.70
Customer Loyalty	0.53	0.69	0.87

AVE = average variance extracted, CR = composite reliability, α = Cronbach Alpha

(acceptable) reliability, $\alpha > 0.8$ for high (good) reliability (Ekolu & Quainoo, 2019). Table 2 displays the results. The AVE varies from 0.52 to 0.57, the CR varies from 0.69 to 0.76, and α value ranges from 0.7 to 0.87.

IV. Results

In this step, the data is first analyzed using descriptive statistics to determine the characteristics of the respondents. Following that, it was put through its paces with several goodness of fit tests, a confirmatory factor Study and the development of the analysis models. Then, to investigate the confidence in service quality use Ordinal Logistic Regression. The data analysis software utilized in this study is SPSS version 21 and AMOS version 24.

A. Descriptive Analysis

As of 425 questionnaires were detailed in descriptive statistics out of the 450 that were analyzed and missing information was deleted. We discovered that 69.9% of the respondents were male, and that the majority of the respondents had a Bachelor's degree (54.8%). The respondents' income ranged from 15,001 to 60,000 Thai baht, with a total of 75.2%, largely bus customers (50.6%) who utilize the service, as shown in Table 3.

Table 3. Descriptive statistics

		Frequency	%
Gender	Male	293	69.9
	Female	132	31.1
	Total	425	100
Education	Below bachelor's degree	128	29.9
	Bachelor's degree	233	54.8
	Higher than bachelor's degree	65	15.3
	Total	425	100
Income	Below 15,000	46	10.8
	15,001 - 30,000	133	31.3
	30,001 - 60,000	186	43.8
	More than 60,001	60	14.1
	Total	425	100
Vehicle Type	Passenger Car	90	21.2
	Buses	215	50.6
	Truck Refrigerator	120	28.2
	Total	425	100

B. Confirmatory Factor Analysis

Confirmatory Factor Analysis (Anderson & Gerbing, 1988), a technique for analyzing data. The key principle in using statistics to support a theory or establish structural validity (construct validity) of a constructed tool is continuous variables (metrics) must be utilized to measure latent variables, and there must be a theory that supports the values of latent variables formed and measured from the specified observable variables. The range of goodness of fit statistics used in IBM AMOS Version 24 software for confirmatory factor analysis (CFA) include Chi-Square, Comparative fit index (CFI), Tucker-Lewis Index (TLI), Normed Fit Index (NFI) the root mean square error of approximation (RMR), and root mean square error of approximation (RMSEA). Prepare for the evaluation of appropriateness as a criterion for comparing the hypothesis testing index. Table 4 of the following suitability criteria presents the correlation findings of automotive air conditioning repair service centers' service quality, customer satisfaction, and customer loyalty.

Refer to Table 4 shows the empirical data, which is acceptable for the factors studied to be correlated with the second-order CFA results, based on chi-square = 55.375, CFI = 0.954, TLI = 0.913, NFI = 0.944, RMR = 0.012 and RMSEA = 0.098, retively.

Considering Chi-square = 55.375 df = 11 p-value = < 0.001 RMSEA = 0.098 RMR = 0.037 NFI = 0.944 CFI = 0.954, the model was consistent with the empirical data. The structurally accurate measurement model values were compatible with the analytical results. The NFI and CFI index values are close to 1, while the RMR < 0.080 (Hu and Bentler, 1999). Accept the primary hypothesis, which states that the theoretical model values are consistent with empirical data or that the model is structurally correct.

As a standard score of the indicators in the effective performance measurement model, let's see Table 5, the component weight coefficients of Service Quality (Technicians Skill, Service Process, Overall Quality), Customer Satisfaction (Responsiveness, Satisfaction), and Customer Loyalty (Repeat order, Loyalty) was measured. All of these variables are critical components

of Service Quality (between 0.566 and 0.852) and Customer Satisfaction (between 0.692 and 0.851) even though they are statistically significant at every

0.01 level (z -value > 2.58) as well as Customer Loyalty (which ranges from 0.638 to 0.807), as the factor loading shown in Figure 3.

Table 4. Goodness of fit evaluation

Criteria	Recommended value	Obtained values	Model Evaluation	Supporting Theory
χ^2	$P > 0.05$	55.375	Passed	Schumacker & Lomax, (2010)
CFI	≥ 0.90	0.954	Passed	Kaplan, (2000)
TLI	≥ 0.90	0.913	Passed	Schumacker & Lomax, (2010)
NFI	≥ 0.95	0.944	Marginal Fit	
RMR	≤ 0.08	0.012	Passed	Diamantopoulos & Siguaw, (2000)
RMSEA	≤ 0.08	0.098	Marginal Fit	Fan & Sivo, (2005)

Note: Chi-square test (χ^2), Comparative Fit Index (CFI), Tucker-Lewis Index (TLI), Normed Fit Index (NFI), Root Mean Square Residual (RMR), Root Mean Square Error of Approximation (RMSEA)

Table 5. Statistical values - CFA results

Measurement model elements	Element weight matrix				b
	β	S.E.	Z - Value	R ²	
Technicians_Skill	0.566	-	-	0.320	1.000
Service_Process	0.852	0.129	10.799	0.725	1.391
Overall_Quality	0.712	0.118	10.323	0.507	1.217
Responsiveness	0.815	-	-	0.664	1.000
Satisfaction	0.692	0.061	12.230	0.478	0.744
Repeat_Order	0.807	-	-	0.652	1.000
Loyalty	0.638	0.081	9.832	0.407	0.801

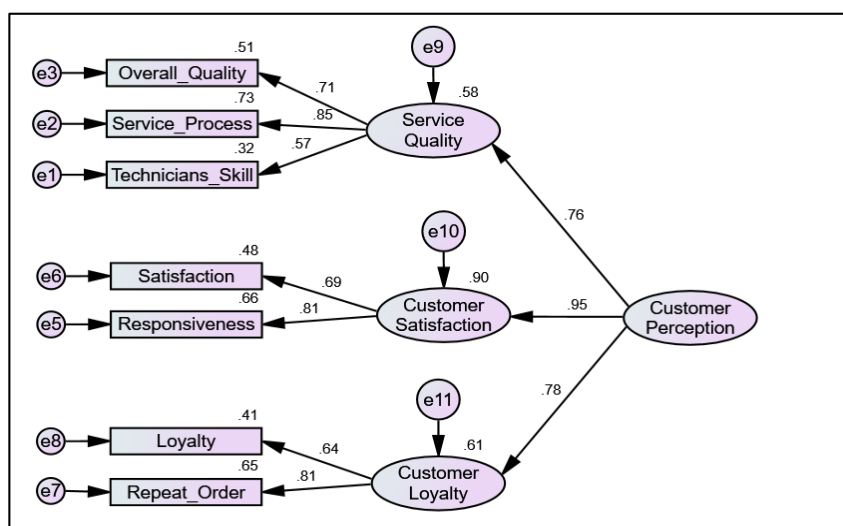


Figure 3. The second order confirmatory factor analysis of the customer perception

Refer Figure 3 from the initial study factor, in the Customer Satisfaction part, one variable was eliminated, namely Facility, since the loading factor was less than 0.5 (Awang et al., 2015); (Phillips et al., 2004). The decision to exclude facility variables from the study also found that Customer Satisfaction had the most influence on customer perception, followed by Customer Loyalty and Service Quality, respectively.

C. Ordinal Logistic Regression Analysis

When the dependent variable Y is dichotomous, the regression method used is logistic regression. As a conclusion, the regression function estimate approach combines the probability that the response will be 1 with a set of explanatory variables (Fabbri, 1997). When the ordering of categories is close, the Ordinal Logistic Regression Method cannot be employed (Menard, 2001). The ordinal logistic regression model implies that the relationship between the explanatory variable and the ordered categorical variable is categorically independent, because the ordered categorical variable of the regression coefficient is not tied to the categorical (Eygu & Gulluce, 2017). Many regression model versions for analyzing ordinal response variables

have been created and reported in past years. The general framework of generalized linear models includes the ordinal regression model (Yatskiv & Spiridovska, 2013).

According to Table 6, a total of 425 respondents responded on Confidential of Service Quality as follows: Disagree = 7 (1.6%), Neutral = 149 (35.5%), Agree = 183 (43.1%), and Strongly Agree = 86 (20.2%), in terms of customer categories: Passenger Car = 90 (21.2%), Buses = 215 (50.6%), and Truck Refrigerator 120 (28.2%).

Table 7 shows that there is no statistically significant difference between the baseline and final models, with a P value of 0.029 ($P < 0.05$), Chi-square = 7.084, and the null hypothesis rejected. In contrary, if the significance value is less than 0.05, we cannot be certain that the analysis we are performing is correct.

Table 8 shows the results. On Pearson value, the observed data has a goodness of fit of 0.316 ($P > 0.05$) with the fitted model. The null hypothesis was accepted and the difference between the observed and expected values of the model was statistically significant, indicating the model's acceptability.

As of Table 9, the referential vehicle type is the truck refrigerator, and all other type satisfactions are compact. In this scenario, the estimates value for passenger cars and buses are positive, indicating that passenger car and bus users are more satisfied than truck refrigerator users. Since these values are positive, it indicates that these users are more satisfied than truck refrigerator users. Passenger cars have a P value of less than 0.05 ($P = 0.021$), whereas buses have a P value of 0.978 ($P > 0.05$), which may explain

Table 6. Case processing summary

		N	%
Confident of Service Quality	Disagree	7	1.6%
	Neutral	149	35.1%
	Agree	183	43.1%
	Strongly Agree	86	20.2%
	Total	425	100%
Type of vehicles	Passenger Car	90	21.2%
	Buses	215	50.6%
	Truck Refrigerator	120	28.2%
	Total	425	100%

Table 8. Compliance goodness test.

	Chi-square	df	Sig.
Pearson	4.733	4	0.316
Deviance	4.753	4	0.314

Table 7. Model fitting information

Model	-2 Log Likelihood	Chi-square	df	Sig.
Intercept Only	49.605			
Final	42.522	7.084	2	0.029

Table 9. Parameter estimate

	Estimate B Coefficients	Std. Error	Wald	df	Sig.	Exponential B Values
Threshold						
Neutral	-3.985	0.406	96.232	1	0.000	0.02
Agree	-0.428	0.175	5.983	1	0.014	0.65
Strongly Agree	1.515	0.191	62.840	1	0.000	4.55
Location						
Passenger Car	0.601	0.261	5.316	1	0.021	1.82
Buses	0.006	0.212	0.001	1	0.978	1.01
Truck Refrigerator	0 ^a	-	-	0	-	-

a. This parameter is set to zero because it is redundant.

Table 10. Test of parallel line

Model	-2 Log Likelihood	Chi-square	df	Sig.
Null Hypothesis	42.522			
General	37.768	4.753	4	0.314

why, when compared to truck refrigerator customers, only passenger car customers are significant, whereas bus customers are not. Using an exponential value, it was discovered that customers in passenger cars and buses are more satisfied than truck refrigerator customers by 1.82 and 1.01 times, respectively.

Table 10, explains everything. The null hypothesis was accepted after the Chi-square test revealed that the assumption of parallelism ($p > 0.05$) was statistically significant. You could see the proportion odds. The null hypothesis states that location parameters are the same across categories. Our location parameters include passenger cars, buses, and truck refrigerator, and our satisfaction level is based on their responses. The distribution of vehicle type opinion towards satisfaction is uniform, that is, passenger car, buses, and truck refrigerator towards the referential that is highly dissatisfied to highly satisfy they are uniformly distributed null hypothesis states that the location parameters are the same across response categories. The significance level must be higher than 0.05.

V. Conclusions

Today's automotive air conditioning repair industry is continually changing, particularly due to customer demands and increasing pricing competition. The necessity to research customers' true demands is even more important because it allows managers to plan and build a comprehensive service procedure for all customer segments. In the pursuit of long-term business solutions, customer happiness and perceptions are of particular significance. Similarly, (Hui et al., 2007) stated that customers who are dissatisfied with the products and services provided by service provider will not return to the same service provider and will also communicate their negative experiences with their social circles.

As the results of the research in the use of statistical methods to analyze, it seems that customers are satisfied with the service. Customers are more focused on staff responsiveness and service process, air conditioner malfunction encountered by technicians was clearly explained, using special tools to repair, using geniuses replace parts, and the cleanliness of the car after repair is impressive to customers, according to the study model. Clear and accurate quotations

avoid confusion and keep repair costs from expanding, including product warranty and repair work during the period when customers are satisfied till they have confidence in the service center. A positive customer experience results in 95% satisfaction, followed by 76 % loyalty. According to the research, service center managers must aim to build a service model that impresses customers. Furthermore, statistical data indicates that the majority of customers, 69.9%, are male and 50.6 % are public transportation bus operators. Customers of passenger cars and public buses are more confident in service quality than truck refrigerator customers, according to the research, because the temperature inside the cabin room is more critical than that of public buses, unless the air conditioner is operated at an improper temperature, it can damage the products, causing customers to be concerned about the maintenance process.

There are conclusions and suggestions for service center executives to follow based on study results from the investigation of the hypotheses mentioned previously.

- The manager must first concentrate on the service process, which includes providing customers with clear and understandable explanations of problems and solutions. Satisfaction will be higher if we are able to respond to problems and support solutions. After the work has been concretely delivered, there must also be a product warranty and a follow-up inquiry on the maintenance results.
- The cleanliness of the vehicles being maintained must be given priority as example, provide the repaired car at no charge. Additionally, the research indicates that consumers value appointments that are scheduled in advance and provide accurate quotes before to order approval.

Finally, we can conclude from the study that the perception of the quality of air conditioning repair work is important to all groups of customers from the start of the work process, from reception to clear explanations, cleanliness of the workshop area and the car body, providing reasonable repair quotes, and

providing work warranty. Every detail contributes to a positive customer experience, resulting in satisfaction and loyalty to the service center. In order to increase competitiveness and maintain the customer base till the business's long-term sustainability.

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References

- Anderson, J. C., & Gerbing, D. W. (1988). Structural equation modeling in practice: A review and recommended two-step approach. *Psychological Bulletin*, 103(3), 411-423.
- Awang, Z., Afthanorhan, A., Mohamad, M., & Asri, M. A. M. (2015). An evaluation of measurement model for medical tourism research: the confirmatory factor analysis. *International Journal of Tourism Policy*, 6(1), 29-45.
- Awang, Z., Afthanorhan, A., Mohamad, M., & Asri, M. A. M. (2015). An evaluation of measurement model for medical tourism research: the confirmatory factor analysis approach. *International Journal of Tourism Policy*, 6(1), 29-45.
- Baier, L., Kühl, N., Schüritz, R., & Satzger, G. (2020). Will the customers be happy? Identifying unsatisfied customers from service encounter data. *Journal of Service Management*, 32(2), 265-288.
- Baishya, S. R., & Choudhury, S. (2022). Impact of Consumption Emotions on Post-Purchase Satisfaction of Automotive Customers. *IUP Journal of Brand Management*, 19(2), 43-64.
- Bank of Ayudhya Public Company Limited (n.d.). Tourism and hotel business after COVID -19 Krungsri Simple. [krungsri.com](https://www.krungsri.com/th/research/research-intelligence/ri-future-of-tourism-21). from <https://www.krungsri.com/th/research/research-intelligence/ri-future-of-tourism-21>.
- Bruisten, S. M., Nilsson-Ihrfelt, E., Buhman, M., & Ekselius, L. (2006). TOXBASE. *Emerg Med J*. 2006 Aug; 23 (8): 614-7. PMID: 16858093 [PubMed-in process] 24: Team V, Markovic M. Internet advertising of artificial tanning in Australia. *Oncol Nurs Forum*, 33(2) 249-254.
- Chandel, J. K., Mohiuddin, S. A., & Mishra, G. P. (2023).

- The drivers of customer satisfaction and loyalty in automotive aftermarket industry. *International Journal of Business Excellence*, 29(3), 351-371.
- Cronbach, L. J. (1951). Coefficient alpha and the internal structure of tests. *Psychometrika*, 16(3), 297-334.
- Devaraj, S., Matta, K. F., & Conlon, E. (2001). Product and service quality: The antecedents of customer loyalty in the automotive industry. *Production and Operations Management*, 10(4), 424-439.
- Eboli, L., & Mazzulla, G. (2009). An ordinal logistic regression model for analysing airport passenger satisfaction. *EuroMed Journal of Business*, 40-57.
- Eggert, A., Hogreve, J., Ulaga, W., & Muenkhoff, E. (2014). Revenue and profit implications of industrial service strategies. *Journal of Service Research*, 17(1), 23-39.
- Ekolu, S. O., & Quainoo, H. (2019). Reliability of assessments in engineering education using Cronbach's alpha, KR and split-half methods. *Global Journal of Engineering Education*, 21(1), 24-29.
- Eygü, H., & Güllüce, A. (2017). Determination of customer satisfaction in conservative concept hotels by ordinal logistic regression analysis. *Journal of Financial Risk Management*, 6, 269-284.
- Fabbris, L. (1997). *Statistica multivariata: analisi esplorativa dei dati*. McGraw-Hill Libri Italia.
- Fan, X., & Sivo, S. A. (2005). Sensitivity of fit indexes to misspecified structural or measurement model components: Rationale of two-index strategy revisited. *Structural Equation Modeling*, 12(3), 343-367.
- Gazzoli, G., Hancer, M., & Park, Y. (2010). The role and effect of job satisfaction and empowerment on customers' perception of service quality: A study in the restaurant industry. *Journal of Hospitality & Tourism Research*, 34(1), 56-77.
- Gefen, D., Straub, D., & Boudreau, M. C. (2000). Structural equation modeling and regression: Guidelines for research practice. *Communications of the Association for Information Systems*, 4(1), 3-71.
- Ghobadian, A., Speller, S., & Jones, M. (1994). Service quality: Concepts and models. *International Journal of Quality & Reliability Management*, 11(9), 43-66.
- Göb, R., McCollin, C., & Ramalhoto, M. F. (2007). Ordinal methodology in the analysis of Likert scales. *Quality & Quantity*, 41, 601-626.
- Hair Jr, J. F., Sarstedt, M., Ringle, C. M., & Gudergan, S. P. (2017). *Advanced issues in partial least squares structural equation modeling*. SAGE Publications.
- Haryadi, D., Haerofiatna, H., & Alfarizi, A. W. (2022). The Role of After Sales Service on Customer Loyalty Mediated by Customer Satisfaction. *eCo-Buss*, 5(2), 583-592.
- Haywood-Farmer, J. (1988). A conceptual model of service quality. *International Journal of Operations & Production Management*, 8(6), 19-29.
- Hox, J. J., Moerbeek, M., & Van de Schoot, R. (2017). *Multilevel analysis: Techniques and applications*. Routledge.
- Hoyle, R. H., & Gottfredson, N. C. (2015). Sample size considerations in prevention research applications of multilevel modeling and structural equation modeling. *Prevention Science*, 16, 987-996.
- Hu, L. T., & Bentler, P. M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural Equation Modeling: A Multidisciplinary Journal*, 6(1), 1-55.
- Hui, T. K., Wan, D., & Ho, A. (2007). Tourists' satisfaction, recommendation and revisiting Singapore. *Tourism Management*, 28(4), 965-975.
- Hussein, A. S., & Yuniarinto, A. (2022). The Effect of Brand Experience on Brand Loyalty in Indonesian Automotive Industry: The Mediating Role of Customer Satisfaction and Brand Trust. *Journal of Business and Management Review*, 3(2), 106-118.
- Javid, M. A., Shah, S. A. H., Ali, N., & Abdullah, M. (2021). Commuters' satisfaction with service quality of Airlift and Swvl bus services in Lahore. *Engineering and Applied Science Research*, 48(3), 249-256.
- Kankanit, S. K. C. U. T., & Moryadee, K. L. L. S. (2021). A study on high-speed rail pricing strategy for thailand based on dynamic optimal pricing model. *International Journal of Intelligent Engineering and Systems*, 14(3), 97-108.
- Kaplan, D. (2000). Evaluating and modifying structural equation models. In *Structural equation modeling, foundations and extensions* (pp. 106-129). Thousand Oaks: Sage Publications.
- Kaplan, D. (2008). *Structural equation modeling: Foundations and extensions* (Vol. 10). SAGE publications.
- Kerdpitak, C. (2022). Marketing Effectiveness Model of Tourism Business in Thailand. *Journal of Hunan University Natural Sciences*, 49(4), 77-85.
- Khan, G. F., Sarstedt, M., Shiao, W. L., Hair, J. F., Ringle, C. M., & Fritze, M. P. (2019). Methodological research on partial least squares structural equation modeling (PLS-SEM): an analysis based on social network approaches. *Internet Research*, 29(3), 407-429.
- Lazzari, F. (2022). After Sales as Foreign Customer Loyalty: A Perspective from Dealers of the Automotive Sector. *Revista Inteligência Competitiva*, 12(1), e0418-e0418.
- Lee, J. Y., & Jin, C. (2019). The effect of sponsor's brand on consumer-brand relationship in sport sponsorship. *Global Business & Finance Review (GBFR)*, 24(1), 27-43.
- Lok, B. L., Cheng, M. Y., & Choong, C. K. (2021). The relationship between soft skills training and development, human resource outcome and firm performance. *International Journal of Business and Society*, 22(1), 382-402.
- Margolies, J. M. (1988). *When good service isn't good enough*. Dallas, TX: Price Waterhouse.
- Menard, S. (2002). *Applied logistic regression analysis* (No. 106). Sage.
- Mensah, I. (2009). *Customers' perception of food service quality: the case of Cape Coast*. Journal of Business and

- Enterprise Development, 138-154.
- Monnet, X., & Teboul, J. L. (2007). Volume responsiveness. *Current Opinion in Critical Care*, 13(5), 549-553.
- Mool, M. M., Deshmukh, R., Pasumurti, S., Tharkude, D., & Jadhav, M. R. (2023). Dealer process efficiency, revenue generation and customer satisfaction utilizing gamification models: An empirical study-With special emphasis on Skoda Auto Volkswagen India Private Limited. *Journal of Contemporary Issues in Business and Government*, 29(1), 88-111.
- Morton, C., Caulfield, B., & Anable, J. (2016). Customer perceptions of quality of service in public transport: Evidence for bus transit in Scotland. *Case Studies on Transport Policy*, 4(3), 199-207.
- Mulhern, F. J. (1999). Customer profitability analysis: Measurement, concentration, and research directions. *Journal of interactive marketing*, 13(1), 25-40.
- Oh, E., Lee, J., & Shin, M. M. (2020). An investigation of Korean consumers service quality perception of imported retail services: Implications of consumer ethnocentrism. *Global Business & Finance Review (GBFR)*, 25(1), 33-47.
- Pahrudin, P., Liu, L. W., Li, S. Y., & Supryadi, D. I. (2021). Addressing the Impact of COVID-19 and non-pharmaceutical for perception tourism using frequentist PLS-SEMs. *Emerging Science Journal*, 5, 197-214.
- Parasuraman, A., Zeithaml, V. A., & Berry, L. (1988). SERVQUAL: A multiple-item scale for measuring consumer perceptions of service quality. *Journal of Retailing*, 64(1), 12-40.
- Phillips, J. C., Szymanski, D. M., Ozegovic, J. J., & Briggs-Phillips, M. (2004). Preliminary Examination and Measurement of the Internship Research Training Environment. *Journal of Counseling Psychology*, 51(2), 240-248.
- Pholphirul, P., Rukumnuaykit, P., Charoenrat, T., Kwanyou, A., & Srijamdee, K. (2022). Service marketing strategies and performances of tourism and hospitality enterprises: Implications from a small border province in Thailand. *Asia Pacific Journal of Marketing and Logistics*, 34(5), 887-905.
- Pothal, L. K., Tripathy, S., & Dash, A. (2022). Determinants of factors for service quality excellence at dealer end leading to CRM-an AHP approach. *International Journal of Business Excellence*, 28(1), 101-117.
- Poturak, M., Muratović, H., Pintol, A., & Salih, Y. M. M. (2022). Client satisfaction and loyalty factors in automotive industry. *Journal of Global Social Sciences*, 3(10), 77-101.
- Pranoto, F., Haryono, P. B., & Assa, A. F. (2022). The effect of service quality and price on purchase decisions mediated by brand image. *Journal of Humanities, Social Science, Public Administration and Management (HUSOCPUMENT)*, 2(2), 67-77.
- Pyon, C. U., Woo, J. Y., & Park, S. C. (2011). Service improvement by business process management using customer complaints in financial service industry. *Expert Systems with Applications*, 38(4), 3267-3279.
- Regmi, M. B., & Schwanen, T. (2012). Covid-19: Threat and opportunity for urban passenger transport in Asia and the Pacific. [online] Available [https://www.unescap.org/COVID-19: a threat and opportunity for urban passenger transport in Asia and the Pacific | ESCAP \(unescap.org\)](https://www.unescap.org/COVID-19: a threat and opportunity for urban passenger transport in Asia and the Pacific | ESCAP (unescap.org) (23 December 2021)) (23 December 2021)
- Risnawati, H., Sumarga, H. E., & Purwanto, S. (2019). The effect of service quality prices and of companies to customer satisfaction implications on customer loyalty. *International Review of Management and Marketing*, 9(6), 38-43.
- Rivaldo, Y., & Amang, A. (2022). Influence of Marketing Strategy, Trust, and Perception Service Quality of Purchasing Decisions. *Journal Manajemen dan Kewirausahaan*, 2(1), 99-103.
- Ruslan, M. S., Razak, N. S. A., Kamaruding, M., & Alshurideh, M. (2023). Does Customer Loyalty Lead to Successful Automotive Industry? a Study of Malaysian Consumer. In *The Effect of Information Technology on Business and Marketing Intelligence Systems* (pp. 2325-2343). Cham: Springer International Publishing.
- Sangode, P. B. (2011). Service Quality of Maruti Suzuki and Hyundai Dealer in Nagpur: A Comparative Study. *International Journal of Research in Finance & Marketing*, 1(1), 91-106.
- Schumacker, R. E., & Lomax, R. G. (2004). *A beginner's guide to structural equation modeling*. Psychology Press.
- Shobeiri, S., Laroche, M., & Mazaheri, E. (2013). Shaping e-retailer's website personality: The importance of experiential marketing. *Journal of Retailing and Consumer Services*, 20(1), 102-110.
- Sonita, S. U. M., Jomnonkwao, S., Champahom, T., Beeharry, R., & Ratanavaraha, V. (2020). Measuring the city bus service quality based on users' perceptions: City bus service in Phnom Penh, Cambodia. *Engineering and Applied Science Research*, 47(1), 47-55.
- Steiger, J. H. (2007). Understanding the limitations of global fit assessment in structural equation modeling. *Personality and Individual Differences*, 42(5), 893-898.
- Sukwadi, R., Caroline, L. S., & Chen, G. Y. H. (2022). Extended technology acceptance model for Indonesian mobile wallet: Structural equation modeling approach. *Engineering and Applied Science Research*, 49(2), 146-154.
- Tanese, A., Negro, G., & Gramigna, A. (Eds.). (2003). *La customer satisfaction nelle amministrazioni pubbliche, Valutare la qualità percepita dai cittadini*. Rubbettino editore.
- Thaithatkul, P., Anuchitchanchai, O., Srisurin, P., Sanghatawatana, P., & Chalermpong, S. (2021). Ride-Hailing Applications in Bangkok: Determining Service Quality, Passenger Satisfaction, and Loyalty. *International Journal of Technology*, 12(5), 903-913.
- Transportation Statistic Department (2022). An accumulated number of registered cars in Thailand. Retrieved 29 June 2022, from <https://web.dlt.go.th/statistics/index.php>.

- Utama, I. P. (2019). The role of traditional product development in building relationship quality and its impact on resort hotel brand loyalty. *Global Business & Finance Review (GBFR)*, 24(1), 44-58.
- Warren, A., & Gibson, C. (2023). Struggles over Skills: Lived Experiences of Evolving Technologies and Gendered Hierarchies at Work. *Annals of the American Association of Geographers*, 113(5), 1-21.
- Weston, R., & Gore Jr, P. A. (2006). A brief guide to structural equation modeling. *The Counseling Psychologist*, 34(5), 719-751.
- Xin, G., & Choi, J. G. (2020). The impact of factors forming employee service attitude on service quality, customer satisfaction and loyalty in the hotel industry. *Global Business & Finance Review (GBFR)*, 25(3), 84-95.
- Yatskiv, I., & Spiridovska, N. (2013). Application of ordinal regression model to analyze service quality of Riga coach terminal. *Transport*, 28(1), 25-30.
- Zaim, H., Bayyurt, N., & Zaim, S. (2010). Service quality and determinants of customer satisfaction in hospitals: Turkish experience. *International Business & Economics Research Journal (IBER)*, 9(5), 51-58.