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Google Form-assisted Consumer Service Quality Instrument: Exploration Factor Analysis (EFA)

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ABSTRACT

The aim of this article is to use exploratory factor analysis to create a consumer service quality instrument with the help of google form that meets the criteria of valid, reliable, and high fit model. This is a quantitative study that the survey method. A cross-sectional survey was used as the research design. The study's sample size was 200 people who were chosen at random using a simple random sampling technique. A consumer service quality questionnaire was used as the instrument. This instrument was analyzed using Exploratory Factor Analysis techniques. The results revealed that the customer service quality instrument model based on the EFA analysis was already in the fit criteria, that each item had a loading factor greater than 0.05 in addition to item A1, and that the instrument indicator items were declared valid in general. According to the results of the reliability test, the instrument is in the very reliable category.

I. Introduction

The concept of customer satisfaction, which is used to attract customers, is the most important thing in the business world. To survive and maintain customer trust, the company must provide the highest level of service quality [12]. Customer satisfaction can provide benefits such as a harmonious relationship between the company and its customers, customers making repeat purchases to create customer loyalty, and forming a word-of-mouth recommendation that benefits the company [5]. Customer satisfaction, attitude loyalty, and purchase intent are all related to service quality [3]. Providing high-quality services is one strategy for achieving business success in the service sector [11]. To compete in the market and survive, businesses must employ the proper strategy, particularly those engaged in services or services [30]. One strategy for dealing with competition is to provide higher-quality services than competitors [14]. That service quality is strongly related to customer satisfaction; quality service providers encourage fast food restaurants to form strong bonds with their customers.

Service quality is defined as how well a service consistently meets or exceeds customer expectations. The consumer's overall impression of the organization and its services' relative inferiority/superiority is referred to as service quality [9]. The concept of service quality was proposed in the 1980s, when organizations realized that only quality could sustain excellence. According to [13], service quality is a type of consumer assessment of the level of service received in comparison to the level of service expected. When a service is received or felt to be as expected, the service quality is considered good and satisfactory [24]. Consumers may be enticed to make additional purchases as a result of their satisfaction. According to [7], service quality is defined as a dynamic condition related to service products, people, procsses, and environments that can meet and/or exceed consumer expectations. The overall characteristics and characteristics of a product or service that affect its ability to satisfy stated or implied needs are referred to as service quality. The company's service quality in order to meet the expectations of its customers. According to the definition of service quality provided above, service quality is defined as the customer's assessment of how well the service meets their expectations in terms of service perception.

Quality services can be created if company management understands the factors that influence service quality. The tangible, reliability, assurance, responsiveness, and empathy are the factors that influence the quality of service developed by Parasuraman, Zeithalm, and Berry [25]. The ability to provide services in the form of services and products that meet consumer/customer satisfaction is referred to as quality management [26]. Because it captures the relative importance of the five dimensions in influencing overall customer perceptions of service, the service quality dimension leads to an understanding of priorities for improving service quality [19]. Based on [20] research, which explains the impact of service quality dimensions on customer satisfaction. Based on the research's background, the goal is to create a service quality instrument, which is one of the factors that influence customer satisfaction. The fact that the company's marketing focus on service quality can be perceived as low quality will put it at a competitive disadvantage, potentially driving away dissatisfied customers [28]. This is supported by [8] research, which finds that service quality has a significant impact on customer satisfaction. Improving service quality must be the focus of every institution in order to remain competitive and instill trust in customers. Many studies have identified service quality as a significant variable influencing customer satisfaction and loyalty.

Service quality is important not only for consumer loyalty but also for company development; additionally, service quality can generate profits for the company [27]. Service quality is defined as a customer's assessment of the overall superiority or superiority of a product or service [23]. The customer will be satisfied if the perceived service is the same as the expected service; if the perceived service is less than the expected service, the customer will be dissatisfied. Service quality is an extrinsically felt attribute based on the customer experience of the service obtained, in this case the principles applied by employees.

The value obtained by the company from employees for filling out the scale indicates the direction of service quality. If the value of the service quality scale is high, the service quality level of the company is also high. If the value of the service quality scale is low, then the company's level of service quality, according to customers, is low. So the goal of this article is to use Exploratory Factor Analysis (EFA) to create a consumer service quality instrument with a high level of validity, reliability, and model fit.

II. Methods

This is a quantitative study that employs the survey method. Because this was a one-time study, the research design used was a cross-sectional survey. Because the data required is current, this method is used [4]. The study's sample size was 200 people who were chosen at random using a simple random sampling technique. The researcher created a consumer service quality questionnaire that was used. The instruments were then tested, and the results were analyzed using Exploratory Factor Analysis (EFA) techniques. The EFA method seeks to investigate the items in a questionnaire instrument that correspond to the variables to be measured by categorizing the items into a factor based on their respective dimensions. JASP software was used to perform the EFA analysis, which was explained using descriptive statistics.

III. Result and Discussion

In this study, EFA analysis was used (Exploratory Factor Analysis). The results of the analysis using the JASP program are as follows.

A. Instrument Grille Prior to Modification

The instrument developed is a consumer service quality questionnaire with 11 indicators. Table 1 shows a general description of the contents of this instrument.

Table 1 Grid of Consumer Service Quality Instruments

Item Code	Statement Indicator
A1	Consumer friendliness among employees
A2	Neatness of appearance of employees in serving consumers
A3	Responsible for service quality
B1	Providing consumers with clear and simple information
B2	Quick response time in serving customers

Item Code	Statement Indicator
C1	Maintain positive consumer relationships
C2	Providing consumers with facilities and easy access
D1	All customer complaints are promptly addressed and well-served
D2	Consumers are confident and at ease when making purchases
E1	Prioritizing honesty in order to increase consumer trust
E2	Does not discriminate in providing services to customers

B. Bartlett Test of Sphericity

The Bartlett test of Sphericity is required for using factor analysis. Bartlett's test is a prerequisite that determines whether or not the intercorrelation matrix is an identity matrix. If the significance value is 0.05, the intercorrelation matrix is not an identity matrix, and factor analysis can be performed [2]. The results of the analysis are shown in table 2 below.

Table 2 Bartlett's Test Results

X^2	df	p
1270.968	55.000	< .001

The analysis results show that the value of Bartlett's test meets the requirements. The significance level is 0.001, which is less than 0.05. This demonstrates that there is a correlation between variables and that further processing is possible.

C. Kaiser-Meyer-Olkin test

Olkin, Kaiser Meyer The Measure of Sampling (KMO) is a distance comparison index between the correlation coefficient and its partial correlation coefficient [10]. If the sum of the squares of the partial correlation coefficients across all pairs of variables is less than the sum of the squares of the correlation coefficients, the KMO value will be close to one. The KMO value must be greater than 0.7 or less than 0.5 [17]. The sample's adequacy, as measured by the MSA (Measure of Sampling Adequacy) value, is the next requirement that must be met. The MSA requirement must be met at a minimum of 0.5 [18]. Table 3 displays the findings of the KMO and MSA analyses.

Table 3 Results of the Kaiser-Meyer-Olkin Test

Criteria	MSA
KMO	0.851
A1	0.707
A2	0.857
A3	0.813
B1	0.749
B2	0.835
C1	0.849
C2	0.847
D1	0.887
D2	0.879
E1	0.931
E2	0.941

The results of the analysis show that the KMO value of 0.851 is greater than 0.7. Furthermore, it is well known that the MSA value of all items is greater than 0.5, so it is preferable if the item is usable.

D. Determination of the Number of Factors/Instrumental Dimensions

Combining several criteria to obtain the number of factors that best fits the research data determines the number of factors to be formed. The scree plot graph shows one of the determinations of the number of factors or dimensions on the customer service quality instrument [6]. The scree plot graph depicts the eigenvalues as a function of the number of extracted factors

[16]. The exact number of factors is indicated by the point at which the scree begins to occur. When the scree begins to look flat, you've reached this point.

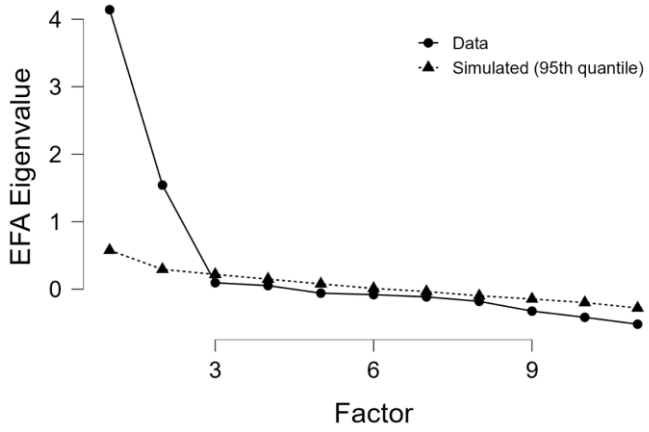

Figure 1 Scree Plot

The scree plot begins to flatten at the third point of variable extraction, as shown in Figure 1. As a result, it is *possible* to conclude that the consumer service quality instrument consists of two factors.

E. Validitas Item

The loading factor value indicates the level of item validity. Items with a loading factor of less than 0.05 are deemed invalid and must be corrected or removed from the test instrument[21]. The item validation results are shown in table 4 below.

Table 4 Loading Factor

Item	Factor 1	Factor 2	Uniqueness
C2	0.888		0.174
C1	0.855		0.236
D1	0.843		0.274
D2	0.833		0.290
E1	0.576		0.660
E2	0.535		0.707
A3		0.767	0.389
B1		0.749	0.433
A2		0.742	0.431
B2		0.685	0.495
A1		0.420	0.813

Note. Applied rotation method is varimax.

The analysis results in the table above show that two factors are formed based on the Maximum Likelihood (ML) value. Items C2, C1, D1, D2, E1, and E2 are included in factor 1. A3, B1, A2, B2, and A1 are the items included in factor 2. Furthermore, based on the EFA analysis results, it is known that there are 10 items in the valid category because they have a loading factor value greater than 0.5. Aside from the ten items, item A1 is the only one that meets the invalid criteria because it has a loading factor value less than 0.5. Figure 1 shows more information about the grouping of factors and their items.

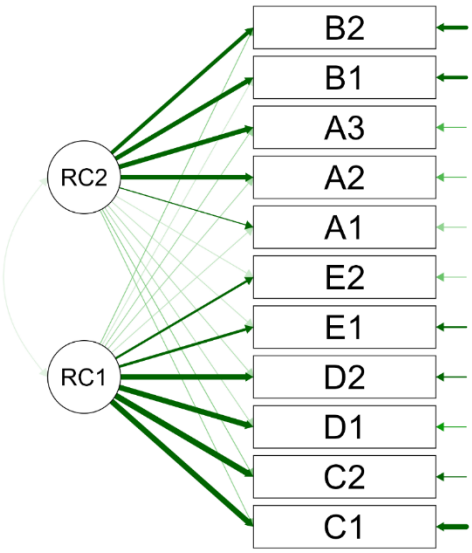

Figure 2 Path Diagram

The path diagram above shows that at factor 1, items B2 and B1 have high errors, indicating that the items provide less measurement information than expected. In factor 2, item C1 has a high error, indicating that this item may also produce unexpected measurement results.

F. Total Variance Explained

Total variance explained reveals factors' ability to measure variables, as indicated by eigenvalues and percentage variance [22]. Table 5 summarizes the findings of the analysis.

Table 5 Total Variance Explained

Factor	SumSq. Loadings	Proportion var.	Cumulative
Factor 1	3.637	0.331	0.331
Factor 2	2.461	0.224	0.554

The analysis results in the table above show that factor 1 provides 33.1 percent of the information, factor 2 provides 55.4 percent of the information, and the rest is measured by factors other than the items of this instrument.

G. Model Fit Test

The RMSEA and TLI values demonstrate the model fit test. The difference between observed and estimated covariance matrices scaled by degrees of freedom is measured by RMSEA [31]. Because the fitted model is not directly compared to the base model, RMSEA is regarded as an absolute fit index. RMSEA values between 0.05 and 0.08 indicate a good index for accepting a model's suitability. In addition to RMSEA, the TLI value can be used to test the model's fit. The TLI employs the x2/df ratio. The TLI has a similar recommended cut off, with values greater than 0.90 indicating "fit" and values greater than 0.95 indicating "good fit" [29]. The analysis results are shown in the table 6 below.

Table 6 Additional fit indices

RMSEA	RMSEA 90% confidence	TLI	BIC
0.091	0.07 - 0.113	0.918	-87.420

According to table 6, the RMSEA value is 0.091, which is within the range of 0.05 to 0.08. These findings indicate that the proposed model is appropriate. In addition, a TLI value of 0.918 was discovered, indicating that it falls into the fit category. As a result, it is possible to conclude that the customer service quality instrument model based on the EFA analysis is already in the fit criteria or is feasible to use to measure the customer service quality variable.

H. Instrument Reliability

Reliability demonstrates that the questionnaire is consistent when used to measure the same symptoms in different locations [15]. Researchers use reliability testing to assess the consistency of objects and data, specifically whether the instrument used to measure the same object multiple times will produce the same data [1]. The instrument's reliability was assessed in this study using the McDonald's, Cronbach's, Guttman's 2, and Guttman's 6 methods. According to the previous EFA analysis, the customer service quality instrument has two factors, so the reliability test is performed twice based on the number of existing factors. The analysis results are shown in the table below.

I. Reliability Factor 1

Table 7 Factor Reliability Test 1

Estimate	McDonald's ω	Cronbach's α	Guttman's λ2	Guttman's λ6	Average interitem correlation
Point estimate	0.822	0.813	0.821	0.804	0.464
95% CI lower bound	0.785	0.770	0.783	0.763	0.397
95% CI upper bound	0.859	0.850	0.856	0.848	0.527

According to the table above, the reliability value of the McDonald's method is 0.822, Cronbach's is 0.813, Guttman's 2 is 0.821, and Guttman's 6 is 0.804. According to the reliability criteria reference, if the value is greater than 0.80, the value falls into the very reliable category. The sem is greater than 0.08 for all reliability testing methods. As a result, all of the items in factor 1 are said to be very reliable.

J. Reliability Factor 2

Table 8 Factor Reliability Test 2

Estimate	McDonald's ω	Cronbach's α	Guttman's λ2	Guttman's λ6	Average interitem correlation
Point estimate	0.902	0.894	0.901	0.893	0.585
95% CI lower bound	0.881	0.870	0.880	0.875	0.536
95% CI upper bound	0.922	0.914	0.920	0.914	0.640

According to the table above, the McDonald's method has a reliability value of 0.902, Cronbach's is 0.894, Guttman's 2 is 0.901, and Guttman's 6 is 0.893. According to the reliability criteria reference, a value greater than 0.80 falls into the very reliable category. The sem is greater than 0.08 for all reliability test methods. As a result, all items in factor 2 are said to be very reliable.

K. Grid of Final Instruments

The instrument was repaired based on the results of the EFA analysis. The goal of instrument improvement is to make the instrument capable of being used in measurement activities. The changes were made in response to the results of grouping items based on the loading factor value. Based on the findings of the EFA analysis, 11 items were created and then classified into two factors/dimensions. Factor 1 is referred to as Reliability, while Factor 2 is referred to as Responsiveness. Factor 1 is made up of 5 items, while Factor 2 is made up of 6 items. Table 9 describes the most recent grid based on the results of the EFA analysis.

Table 9 Grid of Service Quality Instruments After Modification

Dimension/Factor	Item Code	Statement Indicator
Reliability	A1	Consumer friendliness among employees
	A2	Neatness of appearance of employees in serving consumers
	A3	Responsible for service quality
	B1	Providing consumers with clear and simple information
	B2	Quick response time in serving customers
Responsiveness	C1	Maintain positive consumer relationships

Dimension/Factor	Item Code	Statement Indicator
	C2	Providing consumers with facilities and easy access
	D1	All customer complaints are promptly addressed and well-served
	D2	Consumers are confident and at ease when making purchases
	E1	Prioritizing honesty in order to increase consumer trust
	E2	Does not discriminate in providing services to customers

This section explains instrument testing, hypothesis testing (if any), research findings, data analysis and interpretation, and discussion. If the paper requires a table or image, use this example

IV. Conclusion

In this study, we were successful in identifying an instrument model of customer service quality that met the valid, reliable criteria and has a good fit model. Overall, the analysis results provided a formulation of indicator adjustment with dimensions formed from the data provided by the respondents. The final result is a grid of consumer service quality instruments that researchers and practitioners can use to more accurately measure consumer service quality variables.

This research suggests that statement items be tailored to the intended location or organization. This is due to the fact that this instrument generally assesses the quality of consumer service without considering the specifications of the institution or organization that provides goods and/or services to consumers. The novelty of this research is that the instrument is designed to be general in nature so that it can be used anywhere with modifications to the respondent's agency or purpose. However, the adjustment takes into account the characteristics of certain institutions or organizations so that there is no bias in the measurement results.

However there are limitations to be considered in this study, mainly regarding the characteristics of the sample. the sample is only a small representation of the various groups available. The age characteristics of the respondents are not the main assessment so that they are able to make diverse representations. In addition, although the researchers developed items based on previous research, this was the first examination of the instrument. Future research could focus on overcoming the limitations of this study, including further examination with a more racially and ethnically diverse sample, and a larger sample.

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