

# RELIABILITY AND VALIDITY ASSESSMENT OF MEASUREMENT SCALES FOR CUSTOMER LOYALTY AND CUSTOMER CHURN

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## Abstract

The measurement of customer loyalty and customer churn is a key part to understanding customer behavior and effective retention strategies. Since these constructs are latent in nature their assessment requires reliable and valid measuring instruments. This study evaluates the psychometric properties of structured questionnaires that are developed to measure customer loyalty and customer churn. Data was collected from 100 respondent from the target population using the non-probability sampling procedure. Reliability was measured by using Cronbach's Alpha and construct validity was measured by using Exploratory Factor Analysis (EFA). The results show acceptable internal consistency, sampling adequacy and factor loading for all constructs. Based on empirical evidence, the finalization of the measurement scales was done. The results prove that the instruments are robust and amenable to large scale empirical study and sophisticated statistical analysis.

**Keywords:** Customer Loyalty, Customer Churn, Reliability, Validity, Cronbach's Alpha, Exploratory Factor Analysis

## 1. Introduction

In today's competitive and dynamic business world, organizations have grown more focused on customer loyalty and churn management as key strategies for ensuring their long-term profitability and competitive advantage (Khan, Rahman & Qureshi, 2021; Li & Fang, 2023). Empirical evidence has consistently indicated the role of customer loyalty in promoting repeat purchasing, good word-of-mouth, customer acquisition, and reduced marketing costs; all of which lead to better firm performance (Akaka & Vargo, 2021; Kumar, 2022). On the contrary, customer churn presents serious problems in terms of financial and strategic costs, as the cost of acquiring new customers is often more than the cost of customer retention, and thus churn prevention is a serious managerial priority (Ignat, 2020; Verma and Gupta (2024). A detailed knowledge of customer loyalty and churn entails the ability to measure precisely underlying behavioral and perceptual constructs, such as satisfaction, trust, perceived value, and switching barriers (Ladhari, Brun & Morales, 2021; Nguyen, Simkin & Canhoto, 2022). Also, these constructs are intangible and multidimensional, which pose some methodological challenges for researchers (Al-Dweeri et al., 2023; Raza et al., 2025). Poorly designed instruments could result in measurement error, empirical distortion and an impaired theoretical rigor, which limits the validity and usefulness of research outcomes (Harwood & Garry, 2021; Peterson, 2022). Recent progress throughout the scale's development and validation along with an emphasis on psychometric evaluation (especially reliability and construct validity) evaluation before using the instruments in large-scale empirical studies (Henseler et al., 2020; Hair et al., 2023). Valid and reliable measures not only help in interpretation and generalizability of the results, and the analytical methods such as regression modelling, structural equation modelling become more robust (Chin & Dibbern, 2021; Sarstedt, Ringle & Hair, 2024). Therefore, a systematic evaluation of the properties of measurements is imperative in order to ensure the credibility of the empirical findings. In this respect, the present study addresses this important methodological need by systematically examining psychometrics of instruments designed to measure customer loyalty and customer churn and offers a strong basis for any future empirical analysis.

## 2. Objectives of the Study

The specific objectives for the study are:

1. To analyze the internal consistency of the measurement scale related with customer loyalty and customer churn
2. To evaluate the construct validity of the instruments with the help of exploratory factor analysis
3. To assess the clarity and understandability of the questionnaire items
4. To improve the measurement scales based on the empirical evidence
5. To establish the suitability of the instruments for large-scale empirical research

### 3. Research Methodology

#### 3.1 Research Design

The study used the descriptive and exploratory research design. A structured questionnaire method was adopted to obtain the primary data from the respondents.

#### 3.2 Sample Design and Size

##### Sample Design and Data Collection

Data collection was conducted on a total of 100 respondents selected from the target population with the help of judgment and convenience sampling techniques. These non-probability sampling methods are often used in exploratory and scale validation studies where the main goal is instrument refinement and construct validation and preliminary assessment rather than population generalization (Hair et al., 2023; Malhotra, Nunan, & Birks, 2020). Judgment sampling allowed for respondents who had relevant experience and knowledge of the service context being studied to be chosen and convenience sampling allowed for efficient data collection to be undertaken within time and resource constraints (Etikan & Bala, 2021). To ensure a balanced and independent evaluation of measurement scales, the sample was equally split into two structured questionnaires - one to elicit customer loyalty-related constructs and the other focusing on customer churn-related constructs. Such balanced distribution is recommended in the methodological studies as it prevents response bias and assures that each domain of the construct will be properly represented for reliability and validity test (Sarstedt, Ringle, & Hair, 2024). This approach also offers the possibility to better assess psychometric properties on different but related behavioral dimensions.

**Table 1: Distribution of Respondents by Questionnaire Category**

Questionnaire Category	Number of Respondents
Customer Loyalty	50
Customer Churn	50
<b>Total</b>	<b>100</b>

The results show that the respondent was distributed equally between the two categories in the questionnaire with 50 respondents allocated to the customer loyalty and 50 to the customer churn instruments. This equal distribution guarantees that both constructs will be represented enough to evaluate statistically, which would increase the robustness of the reliability and validity analyses. Balanced allocation of sample is especially important when undertaking scale validation as this helps to reduce dominance of one construct over another as well as reducing the possibility of factors being extracted in biased ways during exploratory factor analysis (Henseler et al., 2020; Hair et al., 2023). Furthermore, the overall sample size of 100 respondents can be considered sufficient for the preliminary scale assessment and construct validation, particularly in situations where this is exploratory research work and the focus is on internal consistency and dimensionality issues rather than model estimation (Wolf et al., 2021; Sarstedt et al., 2024). The balanced nature of the design is a way to reinforce the methodological strength of the study and validate the appropriateness of the data set for further multivariate techniques like regression analysis and Structural Equation Modeling (SEM). By combination of judgment, convenience sampling with equal split of respondents, the study has been balanced in terms of practical feasibility and methodological soundness. This design allows for accurate evaluation of measurement, reduces distortions due to sampling and provides a good empirical basis for further investigation on a large scale into customer loyalty and customer churn dynamics.

#### 3.3 Demographic Profile of Respondents

The demographic feature of the respondents is a mixed and balanced distribution founded on some of the most important socio-economic attributes like gender, age, education, and occupation. This is so much needed that it is the fundamental condition in behavioral and marketing research, where the heterogeneity of demographics is the determinant in making answers stronger and enhances the extrapolability of validation of results of measurement (Hair et al., 2023; Sarstedt, Ringle, and Hair, 2024). Genderwise, the survey findings indicated that 56 percent of the survey people were males and 44 percent were female, an acceptable gender distribution. Prior studies have suggested that gender balanced samples help in minimizing systematic response bias and enables a more accurate assessment of attitudinal and perceptual constructs such as satisfaction, trust and loyalty (Ladhari, Brun, & Morales, 2021; Raza et al., 2023). The near equal representation of genders helps to strengthen the credibility of the findings and ensures the measurement scales collect the views of gender groups. With respect to age, the maximum percentage of respondents (41%) belonged to 25-35 years age group followed by 25% in 36-45 years age group. These age groups are economically active consumers that are usually more involved with service providers and

display informed decision-making behavior (Nguyen, Simkin, & Canhoto, 2022). Their dominance in the sample is of particular relevance in studies on customer loyalty and churn as these segments are more likely to evaluate service quality, value and switching alternatives in a critical manner (Verma & Gupta, 2024). Educational qualifications of respondents are also an indicator of a high level of cognitive capability to understand structured survey instruments. Nearly 49% of the respondents were postgraduates, and a good number of them were graduates. The research area has shown that higher education attainment has been linked to greater response accuracy and consistency in research conducted through surveys, particularly in the measurement of abstract and multidimensional constructs (Peterson, 2022; Al-Dweeri et al., 2023). This helps to boost the confidence of the reliability of the collected data.

In terms of occupational status, 46% of the respondents were working as salaried employee followed by the respondent engaged in business and other professions. Salaried individuals are usually interacting with organized service sectors such as banking, telecommunications, and digital platforms to a great extent, hence such respondents are suitable for a study looking into loyalty and churn behavior (Kumar, 2022; Li and Fang, 2023). Their inclusion provides for the practical meaning and the contextual validity of the responses. Overall, the demographic diversity of the sample confirms that respondents of diverse backgrounds were able to clearly understand, and respond to, the questionnaire items. On the one hand, this heterogeneity supports the appropriateness of the dataset for the determination of reliability and validity and for methodological rigor of the study, and thus the foundation for the following empirical analysis, which is strengthened.

#### 4. Reliability Analysis

Reliability was determined by using Cronbach's Alpha which measures the internal consistency of scale items. A value of 0.70 and above can be considered acceptable.

Construct	Number of Items	Cronbach's Alpha
Service Quality	6	0.82
Customer Satisfaction	5	0.79
Trust	4	0.81
Brand Image	4	0.76
Perceived Value	5	0.83
Price Sensitivity	4	0.74
Service Failure	5	0.78
Switching Cost	4	0.80
Competitive Offers	4	0.75

All constructs were above the acceptable threshold which has confirmed good internal consistency and reliability of the measurement scales.

#### 5. Validity Analysis

##### 5.1 Exploratory Factor Analysis

Exploratory Factor Analysis was conducted to assess construct validity.

Test	Result
Kaiser-Meyer-Olkin (KMO) Measure	0.81
Bartlett's Test of Sphericity	$\chi^2 = 1456.32$
Significance Level	$p < 0.001$

The result of KMO value (0.81) signifies that the sampling is meritorious and the result of significant Bartlett's Test proves that the data is suitable for factor analysis.

##### 5.2 Factor Loadings

All retained items had factor loadings of greater than the recommended minimum loadings of .50 suggesting strong convergent validity. The factor structure was both found to be theoretically consistent and empirically sound.

#### 6. Findings of the Study

The findings of the study give great empirical support to the reliability and validity of the measurement scales developed to determine customer loyalty and customer churn. Reliability analysis showed that the Cronbach's

Alpha values of all the constructs were above the recommended limit of 0.70 signifying a high level of internal consistency between scale items. According to the recent methodological literature, such reliability levels ensure that the items in each construct are consistent measures of the same concept and are appropriate for behavioral research (Hair et al., 2023; Sarstedt, Ringle, & Hair, 2024). This finding provides the overall robustness of the measurement instrument. Loyalty-related constructs, such as service quality, customer satisfaction, trust, brand image and perceived value, showed especially strong reliability coefficients. The implications of these findings are of stability and clear constructs of loyalty of the customers. The centrality of these constructs in defining retention of customers and the long-run relational outcome of customer experience has been numerous in past studies to make sure that measurement of loyalty research is sound (Ladhari, Brun, and Morales, 2021; Akaka and Vargo, 2021). The reason why these constructs have high internal consistency is that the theoretical relevance and empirical usefulness of these constructs are increased. On the same note, the constructs that were associated with churns like price sensitivity, service failure, switching cost and competition offers were found to have satisfactory levels of reliability. This confirms their efficient nature in capturing aspects that determine customer switching behavior. According to recent empirical studies, these variables play a central role in churn determination particularly in a market that is competitive with regard to services, when the customers are proactively comparing the options (Verma and Gupta, 2024; Raza et al., 2023). The validity of these constructs is contributed to by the credible measurement of these constructs. The outcomes of the Kaiser-Meyer-Olkin (KMO) measure demonstrated the sufficient sampling adequacy further, while Bartlett's Test of Sphericity was apparent as statistically significant. These results suggest that the dataset contains adequate correlations between variables to support the use of factor analysis which is consistent with suggested methodological standards for construct validation (Henseler et al., 2020; Hair et al., 2023). Adequate sampling adequacy refutes the legitimacy of subsequent multivariate analyses. Exploratory Factor Analysis (EFA) showed an apparent and meaningful factor structure in which all the retained items had a significant loading on their corresponding constructs, with more than 0.50 as threshold loading. This result provides evidence of high levels of convergent validity, and that the empirical structure of the data is in good correspondence with what we would expect (Sarstedt et al., 2024; Peterson, 2022). Items with low or cross-factor loadings were discarded or altered to improve clarity of a construct, as well as precision of measurement, as suggested in recent guidelines for scale development (DeVellis, 2022; Hair et al., 2023). Apart from statistical validation, feedback from respondents suggested that the questionnaire items are clearly worded, logically structured, and easy to understand. This type of qualitative feedback is valuable in the validation of the effectiveness of the survey tools in practice and the risk of respondent fatigue which subsequently may affect data quality (Malhotra et al., 2020; Etikan et al., 2021). The improved refinements increased readability and accuracy of response. Altogether, the measures of refinement satisfied the critical presuppositions of advanced methods of multivariate analysis including regression analysis and Structural Equation Modeling (SEM). Recent research in methodology has highlighted that good measurement tools that are reliable and valid are a precondition for strong model estimation and testing of hypothesis (Chin & Dibbern, 2021; Hair et al., 2023). Consequently, the results achieved confirm that the finalized scales present a strong methodological basis for conducting large-scale empirical analysis of customer loyalty and customer churn.

## 7. Discussion

The results of the study confirm the good psychometric properties of the measurement instruments used to measure customer loyalty and customer churn and thus strengthen their methodological rigor. The consistently high reliability coefficients across all construct indicate high degree of internal consistency in scale items which in turn suggests that the instruments have been measuring the intended latent variables in a stable and dependable way. Recent methodological research underscores the importance of reliability coefficients that are above established levels of reliability in order to guarantee the precision of the measurement when conducting studies in behavioral and marketing research (Hair et al., 2023; Sarstedt, Ringle, & Hair, 2024). Moreover, the outcomes of the Exploratory Factor Analysis demonstrate high justification of construct validity since significant and meaningful factor loading of the retained items were significant. This direct factor model indicates that the results of the studies and the theoretical constructs are consistent and this is essential to make proper conclusions in customer behavior studies (Henseler et al., 2020; Peterson, 2022). The confirmation of construct validity contributes to a higher level of confidence for the interpretability of subsequent analytical models for the loyalty and churn dynamics. The systematic improvement of the measurement scales (by elimination and rewording of poor or unclear items) further enhanced both statistical soundness and practicality of the instruments. Prior research emphasizes the importance of refining scales using empirical evidence and soliciting feedback from respondents to increase clarity and minimize measurement error and improve accuracy of response (DeVellis, 2022; Malhotra, Nunan, & Birks, 2020). The positive respondent feedback on clarity and logical structure of the questionnaire items suggests good operationalization of complex constructs. Collectively, these outcomes provide a very good methodological basis for the following empirical analysis. Reliable and valid measuring instruments are a prerequisite for analytical

techniques such as regression analysis and Structural Equation Modeling (SEM), which are used extensively to analyse the causal relationships between the customer loyalty and churn variables (Chin & Dibbern, 2021; Hair et al., 2023). As such, the findings of the research study provide a sense of believability and strength to the future research endeavours that are based on such valid scales.

## 8. Conclusion

The current research has achieved the reliability and construct validity of measurement scales that have been formulated to measure customer churn and the loyalty of the customer. The empirical results indicate that the instruments are highly internally consistent, well-structured factors, and convergent validity, indicating that the methodological soundness of the instruments is good. This tightness in scale validation is significant in the measurement of intangible and multidimensional customer-related constructs, which should be correctly measured (Sarstedt et al., 2024; Raza et al., 2023). The validated measurement scales are thus seen to be suitable to the large scale empirical study, i.e. a sound platform to test hypotheses and elaborate multivariate analysis. The study provides strength to research that will be undertaken to investigate customer behavior, retention strategies and relationship management in the service industries by ensuring that accuracy of measurement is obtained. Besides, the empirically validated instrumentation will make both the theory and management decision-making process easier by means of the empirical analysis of the phenomenon of loyalty and churn in a more accurate manner (Akaka & Vargo, 2021; Kumar, 2022). Finally, the research is a good methodological contribution because it provides validated and reliable measuring instruments that can be relied upon in future empirical studies that will further contribute to research on customer loyalty and customer churn.

## 9. Implications and Future Research

The instruments that have been validated may be effectively applied in other service areas and geographical locations. Future studies can take into consideration the expansion of the framework like moderating/mediating variables, longitudinal studies, or inter-industry studies to enhance both theoretical and practical knowledge of this framework.

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