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An empirical study of factors influencing television purchases and customer loyalty

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Abstract

Customer loyalty is one of the effective factors to maintain and solidify the relationship between customers and brands. Customer loyalty is an important factor in a company's growth and performance. The present study aims to increase the depth of understanding regarding customer loyalty by investigating the relevant factors that influence customer loyalty with respect to the purchase of televisions. This study also attempts to determine the different features of televisions that influence the customers while purchasing a television.

This study has emphasized the influence of relevant factors such as customer satisfaction, trust, after-sales service, value for money, and customer recommendation on the loyalty of television customers while the features of televisions that influence the customers while purchasing television that has been examined in this study include HDR, operating system, 4K resolution, display panel, smart features, screen size, and blur-free picture. The data has been collected through framing the questionnaire and doing the online survey.

In this study, a multiple logistic model is used to fit the relevant factors of customer loyalty. The results show that there is a significant relationship between customer loyalty and relevant factors affecting the loyalty of television customers. From the buying behavior of television customers, we found that a television with smart features and a blur-free picture is the most preferred specification while purchasing a new television.

Keywords: Multiple logistic models, customer satisfaction, factor analysis, Cronbach's alpha, reliability test

1. Introduction

The dream of seeing distant places is as old as the human imagination. For ages, it remained a dream, and then television came along. Television has a considerable influence on society. The marketplace is highly competitive with rapid development in different television brands. Nowadays, the customers are more intelligent and have different channels and choices to get their benefits. Customers select the products according to their experience and knowledge of different brands. Therefore, companies are in serious need to differentiate their brands from competitors. So, customer loyalty is one of the effective factors to maintain and solidify the relationship between customers and brands.

In this era of intensified rivalries, customer loyalty helps companies to gain a competitive advantage over the competitors. Organizations gradually realize that they can reduce costs by increasing customer loyalty because it is cheaper to retain existing customers due to a reduction in marketing costs than to attract new ones. Therefore, revealing which attributes have a stronger influence on customer loyalty help organizations to become more competitive by concentrating on the most important areas.

1.1 Objective of the study

The aim of the present study is to increase the depth of understanding regarding customer loyalty by investigating the relevant factors that influence customer loyalty with respect to purchase of the televisions. This study also attempts to determine the different features of televisions that influence the customers while purchasing a television, thereby providing evidence for the television industry about the development of new products and establishment in the marketplace.

The major purpose of this study is to analyze the relationship between customer loyalty about relevant factors affecting the loyalty of television customers. This study seeks to understand television customer behaviors and their television brand preferences. This study also attempts to determine which features of television customers prefer at the time of purchase.

Based on the survey, this study has emphasized the influence of relevant factors such as customer satisfaction, trust, after-sales service, value for money, and customer recommendation on the loyalty of television customers. The survey showed that these factors influence the loyalty of television customers. These results might evidence for future researchers and industry members.

2. Literature review

Numerous studies can be found on customer loyalty, Cronbach's alpha, factors analysis, and multiple logistic regression. Customer loyalty can be considered to be the essence of success in today's highly competitive world of business and customer satisfaction directly affects the brand value of the T.V.

According to Kotler "The key to customer retention is customer satisfaction". Customer loyalty can help the business to retain the most valuable customers. Customer satisfaction refers to the customer's overall evaluation of products and services. Customers will be satisfied when the performance of the product matches expectations. The better the performance, the higher will be the satisfaction level a customer has Ramaseshan (2013) ^[5] in his research paper stated that customer loyalty is a degree to which customers pay no attention to the competitor's advertisement efforts and ignore them, have rare price sensitivity, and advertise the company and its products and services among relatives and friends.

According to loyalty is a psychological character formed by sustained satisfaction of the customer coupled with emotional attachment formed with a service provider that leads to a state of willingly and consistently being in a relationship with preference.

Opines that customers are the center of organizations' cognizance, their loyalty reduces marketing costs, attracts new customers, and gains a competitive advantage over organizations.

P. Ambika and Dr. K. Kumar (2020) ^[2] studied the influence of brand determinants on consumer brand preference in the television industry and found that brand awareness, brand association, brand trust, and satisfaction have a positive impact on consumer brand preference.

Devi Rosana Leonata (2015) ^[6] studied the relationship between customer satisfaction and customer loyalty in an online environment and analyzed that customer satisfaction has a positive significant relationship with customer loyalty in an online environment.

Studied the impact of advertisement on customer loyalty to a brand and concluded that factors such as brand satisfaction and trust directly and quality, image, and brand indirectly through mediator variables influence customer's loyalty.

Taherdoost, Sahibuddin, Jalaliyoon (2020) ^[3] studied the Exploratory Factor Analysis (EFA) in their research paper. Their research intended to provide the fundamental information about EFA with a stepwise and user-friendly guideline. The paper suggests a five-step guide for implementation of exploratory factor analysis which includes: (1) evaluation of sample size adequacy using correlation

matrix, Kaiser-Meyer-Olkin (KMO), and Bartlett's Test techniques, (2) choosing factor extraction methods such as principal components analysis, principal axis factoring, image factoring, maximum likelihood, alpha factoring, unweighted least squares, generalized least squares and canonical, (3) selecting factor retention methods using a cumulative percentage of variance, K1 - Kaiser's, Scree Test, minimum average partial approaches and parallel analysis, (4) selection of rotational method, whether orthogonal rotations or Oblique rotation and finally, (5) interpretation and labeling of factors.

3. Research Methodology

The study is based on primary data. The data has been collected through framing the questionnaire and doing the online survey. The questions were designed in such a way that it explains the purpose of the questionnaire.

The main focus of this study was to test the effect of after-sale service, value for money, customer satisfaction, recommendation, and trust in the television brand. So, the questions designed for the study were formulated as closed-ended. The questionnaires consist of 24 questions. The questionnaire is framed in such a way that it collects the demographic data of the customers and the different factors which affect the brand loyalty of television.

The data collected were analyzed using Statistical Packages SPSS, version 20, and Microsoft Excel. The various data analysis techniques used in this study such as descriptive analysis, reliability test, factor analysis, and multiple logistics regression.

4. Results and Discussions

4.1 Respondents demographics

Data collected on the respondents was obtained in the areas of gender, age group, region, employment status, and annual income. The purpose of this profile was to obtain a visualization of the background information of the respondents.

Out of the 163 respondents, 95 are males and 68 are females. This represents 58.3% males and 41.7% females respectively. Out of the 163 respondents, 123 respondents belong to the 18-30 age group, 17 respondents belong to the 30-40 age group, 10 respondents belong to the 40-50 age group, 9 respondents belong to the 50-60 age group, 3 respondents belong to below 18 age group and 1 respondent belongs to above 60 age group.

Out of the 163 respondents, 91 belong to the urban region and 72 belong to the rural region. This represents 55.8% urban and 44.2% rural respondents respectively. Out of the 163 respondents, 99 are students, 43 are doing service, 13 are unemployed, 5 are self-employed and 3 are doing some other kinds of stuff.

Out of the 163 respondents, 73 respondents belong to the below 50000 income group, 24 respondents belong to 51000 - 99000 income group, 19 respondents belong to 100000 - 250000 income group, 18 respondents belong to 251000 - 500000 income group and 28 respondent belongs to above 500000 income group.

4.2 Descriptive analysis

Data collected on the respondents was also obtained in the areas of the current television brand of the respondent, source of information, future preference of television brand, and features influencing television purchase. The purpose of this profile was to obtain an analytic picture of these attributes and

to achieve one of the objectives of this study by analyzing the features influencing customers while purchasing a television.

4.2.1 Current television brand

Out of the 163 respondents, 35 respondents are having Sony TV, 30 respondents are having LG TV, 19 respondents are having Videocon TV, 16 respondents are having Samsung TV, 9 respondents are having Panasonic TV, 9 respondents are having Sansui TV, 8 respondents are having Mi TV, 8 respondents are having Onida TV, 4 respondents are having BPL TV, 3 respondents are having Haier TV, 2 respondents are having each Vu, TCL and Philips TV, 1 respondent is having Hisense TV and 15 respondents are having other television brands.

4.2.3 Source of information

Out of 163 respondents, 57 respondents had bought current TV due to recommendation, 30 respondents got the information about current TV from each internet and advertisement, 25 respondents got the information about current TV from social media platforms, 2 respondents got the information about current TV from newspaper and 38 respondents got the information about current TV from other sources.

4.2.4 Future television brand

Out of the 163 respondents, 63 respondents are willing to buy Sony TV, 22 respondents are willing to buy LG TV, 4 respondents are willing to buy Videocon TV, 25 respondents are willing to buy Samsung TV, 6 respondents are willing to buy Panasonic TV, 1 respondent is willing to buy Sansui TV, 18 respondents are willing to buy Mi TV, 22 respondents are willing to buy Onida TV, 4 respondents are willing to buy Haier TV, 3 respondents are willing to buy each Vu and Philips TV, 2 respondents are willing to buy each TCL and BPL TV and 10 respondents are willing to buy other television brands.

4.2.5 Features influencing television purchase

Respondent's data reveals that while purchasing a new television brand, the customers prefer blur-free picture features and smart features as the first choice with 109 and 107 respondents rated them as very important specifications. Then, the customers prefer HDR features and operating system as the second choice with 99 and 95 respondents rated them as very important specifications. The customers also prefer 4K resolution, TV panel, and screen size as important specifications while purchasing a new television.

4.3 Reliability analysis

Reliability analysis was conducted on each variable of the survey. The reliability of variables was accessed by computing the Cronbach's alpha coefficient. For scale acceptability, Hair et.al suggested that Cronbach's alpha coefficient should be greater than 0.6. If each category obtains the value of 0.6, it means that the questions in each category are understood by most of the respondents. On the other hand, if the findings are far away from the expected value of 0.6, this might be caused by respondents' different perceptions toward each question of the category.

The study yielded the value of Cronbach's alpha values for all variables of customer loyalty as well as for features influencing television purchases greater than 0.6 as shown in Table no. 1 and Table no. 2 and this indicates that the questions in each of these categories are well understood by

the respondents. The questions have measured what they were designed to measure.

Table 1: Reliability Statistics for Factors Affecting Customer Loyalty

Number of Items = 6	Cronbach's Alpha = 0.744
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Table 2: Reliability Statistics for Features Influencing Television Purchase

Number of Items = 7	Cronbach's Alpha = 0.872
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4.4 Correlation analysis

Correlation analysis was performed for measurement of association, relationship, or correlation between independent variables viz. customer satisfaction, level of satisfaction, value for money, after-sales service, customer trust, and customer recommendation with dependent variable namely customer loyalty to ascertain whether they are positively or negatively related, or not related in any way whatsoever. Pearson's correlation coefficient was used in this study to measure the strength and significance of relationships between dependent and independent variables.

Table 3: Correlation Analysis of Independent Variables

Category	Independent Variables	Correlation Coefficient	p-value
Customer Loyalty	Customer Satisfaction	0.643	0.000
	Level of Satisfaction	0.673	0.000
	Value for Money	0.143	0.070
	After-sales Service	0.613	0.000
	Customer Trust	0.576	0.000
	Customer Recommendation	0.594	0.000

From Table no.3, we can infer that independent variables viz. customer satisfaction, level of satisfaction, after-sales service, customer trust, and customer recommendation are significantly correlated with the dependent variable namely customer loyalty at a 1% level of significance. On the other hand, the factor value for money is not significantly correlated with customer loyalty as the p-value is greater than 0.01.

4.5 Factor analysis

There are numerous measures available for examining the appropriateness of data to run the factor analysis. The Kaiser-Meyer-Olkin (KMO), one of the most popular tools for measuring sampling adequacy was used in this research to determine whether the study variables are suited for factor analysis. It is a measure of homogeneity of the variable. Kaiser stated that if the KMO is 0.5 or higher, the sampling is adequate.

Table 4: Kaiser-Meyer-Olkin (KMO) measure of adequacy

Name of category	Kaiser-Meyer-Olkin (KMO)	Bartlett's Test of Sphericity
Customer Loyalty	0.793	0.000

The Kaiser-Meyer-Olkin measure of sampling adequacy is greater than 0.5 for all the categories. Bartlett's test also validated the sampling adequacy with a significant value of 0.000. From the KMO test, we conclude that questions in each of the categories belong together as the KMO for all the variables is above the cut-off point of 0.5. It also explains the adequacy of the data to run factor analysis.

Factor analysis was run by using principal component analysis according to items in each category. Factor loading is

the correlation between a variable and a factor that has been extracted from the data.

Table 5: Factor analysis representing factor loadings of all variables

Factors	Factor loading
Customer Satisfaction	0.674
Level of Satisfaction	0.668
Value for Money	0.546
After-sales Service	0.629
Customer Trust	0.807
Customer Recommendation	0.762

As it is evident from Table no.5, the factor loadings for each of the items in the categorized variables are greater than the minimum requirement of 0.5. It could be inferred that the items tap the factors and can measure the variables which they were designed to explain.

4.6 Regression analysis

Multiple logistic regression techniques were used to examine the relationships between the dependent variable customer loyalty and customer satisfaction, level of satisfaction, value for money, after-sales service, customer trust, and customer recommendation as independent variables.

$$\hat{p} = \frac{\exp(-0.218 X_1 + 0.130 X_2 + 0.506 X_3 + 0.266 X_4 + 0.037 X_5 - 22.351 X_6)}{1 + \exp(-0.218 X_1 + 0.130 X_2 + 0.506 X_3 + 0.266 X_4 + 0.037 X_5 - 22.351 X_6)}$$

$$\log\left(\frac{\hat{p}}{1-\hat{p}}\right) = -0.218 X_1 + 0.130 X_2 + 0.506 X_3 + 0.266 X_4 + 0.037 X_5 - 22.351 X_6$$

4.7 Model assessment

Table no.14 displays the likelihood ratio test. The -2 log likelihood for the constant-only model obtained by fitting the constant-only model is 225.966 and the -2 log likelihood for the overall model was 147.523.

Thus the value of the likelihood ratio test is

$$G = 225.966 - 147.523 = 78.443$$

Here we are testing the null hypothesis:

H₀: $\beta_j = 0$; For all $j = 1, 2, \dots, 6$ Vs

H₁: $\beta_j \neq 0$; For at least one $j = 1, 2, \dots, 6$

The results in Table no.6 show that at least one of the predictors' regressions coefficient is not equal to zero because of the small p-value = 0.000 which is less than 0.01. This would lead us to reject in favour of H₁ and we conclude that at least one of the predictors' regressions coefficient is different from zero.

Table 6: Likelihood Ratio Test

Model	Model Fitting Criterion	Likelihood Ratio Test		
	-2 Log Likelihood	Chi-Square	df	Sig.
Intercept Only	225.966	78.443	6	0.000
Final	147.523			

4.8 Model accuracy

From Table no.7, we conclude that 100% of all respondents who are loyal customers are correctly classified. 46.8% of all respondents who are not loyal customers are correctly classified and 53.2% are incorrectly classified. The overall correct percentage was 79.8% which reflects the model's overall explanatory strength.



Fig 1: Showing Dependent and Independent Variables

Figure no. 1 shows the dependent and independent variables along with their notation. Using SPSS 16.0, we have constructed the following multiple logistic regression model for customer loyalty as the response variable where \hat{p} is the expected probability that the outcome is present as mentioned earlier.

Table 7: Classification Table for Model Accuracy

Observed		Predicted		
		Customer Loyalty		Percentage Correct
		No	Yes	
Customer Loyalty	No	29	33	46.8
	Yes	0	101	100
Overall Percentage		17.8	82.2	79.8

4.9 Model testing

After constructing the multiple logistic regression model for customer loyalty and model assessment, we tested the model with random observations from the data and compared the predicted customer loyalty with the observed customer loyalty. The purpose of the model testing was to ensure the model's accuracy. So, out of 163 observations, 30 observations were chosen randomly without replacement. Customer loyalty of 24 respondents out of the sample of 30 respondents was predicted correctly by the model. Hence, the model testing satisfied the true accuracy of the model i.e. 79.8%.

5. Conclusion

1. The Cronbach's alpha values for all variables of customer loyalty as well as for factors influencing television purchases are greater than 0.6. This indicates the questions in each of these categories are well understood by the respondents and have measured what they were designed to measure.
2. From the study it is revealed that most of the respondents are having Sony TVs and LG TVs compared to other brands like Samsung, Videocon, etc. The major source of information about different television brands was found to be a recommendation from friends and relatives. The

study also found that most of the respondents are willing to buy Sony TV in the future.

3. From the study, we found that a TV with smart features and a blur-free picture is the most preferred specification when purchasing a new TV. So here television companies can get information about the customer preference at the time of buying a television.
4. The results of correlation analysis are as follows:
 - i) Customer satisfaction has a significant role in customer loyalty.
 - ii) Level of satisfaction has a significant role in customer loyalty.
 - iii) Value for money has an insignificant role in customer loyalty.
 - iv) Customer satisfaction has a significant role in customer loyalty.
 - v) Customer trust has a significant role in customer loyalty.
 - vi) Customer satisfaction has a significant role in customer loyalty.
5. The factor loadings for each of the items in the categorized variables are greater than the minimum requirement of 0.5. It could be inferred that the items tap the factors and can measure the variables which they were designed to explain.
6. The multiple logistic regression model accuracy was found to be 79.8% i.e. the model is predicting the true customer loyalty with the accuracy of 79.8% using the factors *viz.* customer satisfaction, level of satisfaction, value for money, after-sales service, customer trust, and customer recommendations.

6. Limitations of the study

Like other empirical studies, this study is too has its limitations. Our sample consists of only 163 respondents which may limit the generalization of the study. More so, more factors like cost influence can be included in the questionnaire for customer loyalty of television users.

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8. References

1. Safi F. The relationship between customer satisfaction and customer loyalty: Emotional brand image as a moderating variable. Case study: An applied study on (Airtel) for telecom services in India. *International Journal of Scientific and Research Publications*; c2017, p 64-71.
2. Ambika P, Kumar. Influence of brand determinants on consumer brand preference in television industry. *The International Journal of Analytical and Experimental Model Analysis*. 2020;XII(I)1379-1389.
3. Taherdoost H, Sahibuddin S, Jalaliyoon N. Exploratory factor analysis: concepts and theory; c2020, p375-380.
4. Demir MO, Yuzbasioglu N, Bezirci M. A review if the relationship between brand loyalty, customer satisfaction and commitment using structural equation modeling within the internal control process. *African Journal of Business Management*. 2013;7(13):1067-1078.
5. Ramaseshan B, Rabbaneer FK, Hui LTH. Effects of customer equity drivers on customer loyalty in B2B context. *Journal of Business & Industrial Marketing*. 2013;28(4):335-346.
6. Leonata DR. The relationship between customer satisfaction and customer loyalty in online environment. *iBuss management*. 2015;3(2):173-185.
7. Alwan IM, Irhalf NH, Abdullah AN. Analysis and testing of the most important factors affecting (COVID-19). *Periodicals of engineering and Natural sciences*. 2020 Dec 6;9(1):3-10.
8. Chattopadhyay P. A comprehensive study on organized retailing with references and customer preferences and customer loyalty in India context. *International journal of trend in scientific research and development (IJTSRD)*. 2019;3(3):410-414.
9. Montgomery DC, Peck EA, Vining GC. *Introduction to linear regression analysis*. Fifth edition. Wiley series in probability and statistics; c2012, p 421-442.
10. Anderson TW. *An Introduction to multivariate statistical analysis*. Third edition. A John Wiley and sons, inc. publication; c1918, p 459-482, 569-591.
11. Cronbach L. Coefficients of alpha and the internal structure of tests. *Psychometrika*. 1951;16(3):297-332.
12. Sylvere N, Mungatu J, Ndengoc M. Multiple logistic regressions modeling on risk factors of diabetes case study of GITWE hospital. *International Journal of Mathematics and Physical Science Research*. 2013;56:22-4.
13. Hosmer DW, Lemeshow S. *Applied logistic regression*. Second edition. New York: John Wiley & sons Inc; c2000, p 31-43.
14. Thomas B, Tobe J. *Anticipate: Knowing What Customers Need before They Do*; c2013. Available: <http://site.ebrary.com/lib/samk/home.action>.
15. Bhagat M. Effect of service quality and customer satisfaction on customer loyalty of cellular services providers in Ahmedabad. *Indian journal of research*. 2014;3(8):191-193.
16. Zewude BT, Ashine KM. Binary logistic regression analysis in assessment and identifying factors that influence students academic achievement: The case of college of natural and computational science, Wolaita Sodo University, Ethiopia. *Journal of education and practice*. 2016;7(25):3-7.
17. Tai AK, Medba S. The antecedents of customer loyalty: an empirical investigation in life insurance context. *Journal of competitiveness*. 2013;5(2):139-163.
18. Berg O, Strand E, Sandell V. Service quality, customer satisfaction and brand loyalty bin the Swedish subscription video on demand-industry; c2019.
19. Bharathi N, Bharathi V. A study on consumer behaviour towards TV brands special reference to LG television. *International journal of scientific research and review*. 2019;8(1):386-392.
20. Magatef SG, Tomalieh EF. The impact of customer loyalty programs on customer retention. *International Journal of Business and Social Science*. 2015;8(1):78-91.
21. Pal B, Sinha R, Saha A, Jaumann P, Misra S. Study the Customer Targeting Framework: Scalable Repeat Purchase Scoring Algorithm for Large Databases. *Proceedings of 4th International Conference on Machine Learning and Computing IPCSIT*, © (2012), IACSIT Press, Singapore. 2012;25:143-146.