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Impact of factors of product modification on customer satisfaction Special reference to Apple & Samsung in Northern Region, Sri Lanka

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ABSTRACT

The business becomes highly globalized & competitive in nature, & all the firms are trying to tackle different conditions in acquiring & retaining customers. Product modification is one of the tools used by firms to maintain a competitive edge. The purpose of this study is to examine the effect of product modification on customer satisfaction in the mobile phone industry in the Northern region, Sri Lanka by considering Apple & Samsung companies. Size, colour, design, model, & other features are served as the predictor factors in this study. A structured questionnaire with a five-point Likert scale was used to collect the data. 300 customers were selected as samples & descriptive statistics were used to give general observation of the data. To investigate the relationship & effects of the variables Pearson correlation, simple regression, & multiple regression analysis were used. Results of the study showed that there is a very strong significant relationship between product modification & customer satisfaction & indicated that 90% of the level of customer satisfaction is predicted by product modification & the remaining 10% is determined by other factors. Findings of the study also manifested that all independent variables (Size, Colour, Design, Model, Other features) explained the variation in customer satisfaction by approximately 91% & all the independent variables have a significant impact on customer satisfaction. The results also concluded that Samsung effectively implements product modification strategies towards customer satisfaction than Apple in the Sri Lankan context. This study recommends that the mobile phone companies, which are running their businesses in Sri Lanka, should highly focus on the strategies to modify their products.

KEYWORDS:*Product Modification, Customer Satisfaction, Mobile Phone Industry*

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1 INTRODUCTION

1.1 Background of the Study

Tycoons of this digitalized world are trying to implement the best strategies to satisfy their customers, since they are the base for their developments. The rising use of mobiles is likely due to the end of three decades of civil war in the north & east of the country. Mobile ownership is the highest amongst 16 to 35-year-olds in Sri Lanka (Mobile phones – Networks & prices in Sri Lanka, 2019). In 2018, the number of mobile subscriptions in Sri Lanka was 24.43 million out of 21.67 million population (Number of mobile cellular subscriptions in Sri Lanka from 2000 to 2018).

In the beginning, there were only a few mobile phone brands available in Sri Lanka. Due to the unimagined development in the mobile phone industry, people are being bombarded by different modified technologies & strategies of mobile phone vendors in Sri Lanka. The disease of mobile mania is spreading all over the country with a heavily boosted penetration rate. The present generation is sunk into the lust for the usage of mobile phones. Even though the early development of this industry was a boon for society, the present consequences have become a bane for the wellbeing of society. This industry highly relies on the modification factors to beat the competition by gaining a competitive advantage. Mobile phone companies modify their products & those features very frequently. The mobile phone was introduced to the globe just to make the call & to pass the messages, but now it keeps the globe within it. This study examines how the mobile phone companies' product modification strategies satisfy Sri Lankan customers. Even though there are many brands available in Sri Lankan mobile phone industry, this study considers the top two brands in the world, Apple & Samsung.

Customer satisfaction is the point, where customer expectation & customer perceived value are met. The focus is on anticipating customer needs & wants. Satisfaction means that a person's feelings of pleasure or disappointment resulting from comparing a product are perceived performance (or outcome) in relation to his or her expectation (Parasuraman et al; 1988). In the mobile phone industry, companies have been trying to retain customers by providing a high level of satisfaction from the usage of their products, since the market is filled by very intense competition.

Nowadays, the lifestyle of the people makes everyone have a mobile phone in their hands. People give special consideration to the features of these products. Companies are trying to make required modifications in their products from time to time to overtake the competitors. Therefore, this study would like to identify the effect of product modification on customer satisfaction by considering Apple & Samsung mobile phones, & to identify the best company in satisfying customers through the effective implementation of product modification strategies.

Philip Kotler (2010) defines product modification as any deliberate alteration

for the physical attributes of a product or its packing. The purpose of the product modification is to maintain existing demands, attract new users, & face the competitors effectively. It helps in increasing the sales of the enterprise which results in an increase in the profits of the enterprise.

1.2 Problem Statement

After the end of ethnic war in Sri Lanka, mobile phone industry seems a red ocean, & companies have been fighting vigorously to attract & retain their customers. These companies are always trying to provide distinct features & benefits to the customers to keep their competitive edge. The changes in mobile phones are numerous within the short term. Thus, this study focuses on how the product modification factors affect the satisfaction level of customers.

There is a dearth of studies on product modification. Many researchers investigated product innovation, product modularization, & product development (Piran et. al., 2016; Iyer & Soberman, 2000; Antonio et. al., 2007; Crippen & Oates, 2015; Chen, 2018; Caridi et. al., 2012). No local studies have been found as a comparative study in a similar sample area & it is identified as the research gap for this study. Although the Northern Region of Sri Lanka has severely been affected by the war, it becomes a rapidly emerging market for the mobile phone industry in the last decade due to the end of the ethnic war. Also, frequent changes in the features of mobile phones are infinite, since the market is identified as a red ocean. Therefore, this study intends to analyze the impact of product modification on customer satisfaction in the Northern Region mobile phone industry of Sri Lanka.

1.3 Research Objectives

I. To examine the impact of product modification factors on customer satisfaction in the Sri Lankan Mobile Phone Industry.
II. To identify the most influencing product modification factor on customer satisfaction in the Sri Lankan Mobile Phone Industry.
III. To evaluate which company implements product modification strategies more effectively than other in the Sri Lankan Mobile Phone Industry.

1.4 Significance of the study

This study provides valuable information about the effect of product modification factors on customer satisfaction with regards to mobile phone companies specifically in the context of the Northern Region, Sri Lanka. It will be useful for the firms in the mobile phone industry to focus & work hard on product modification components to satisfy their customers & will take remedial actions on those issues which need improvement. Moreover, the research can serve as an aspiring board for those who want to undertake further research in this area.

2 RESEARCH METHODOLOGY

2.1 Conceptual Framework

Figure 01 shows the conceptual framework of this study. Since the definition of product modification says any substantial change made to the attributes (size, shape, colour, style, price, etc.), the researcher selected five dimensions as size, colour, design for shape, model for style & other features.

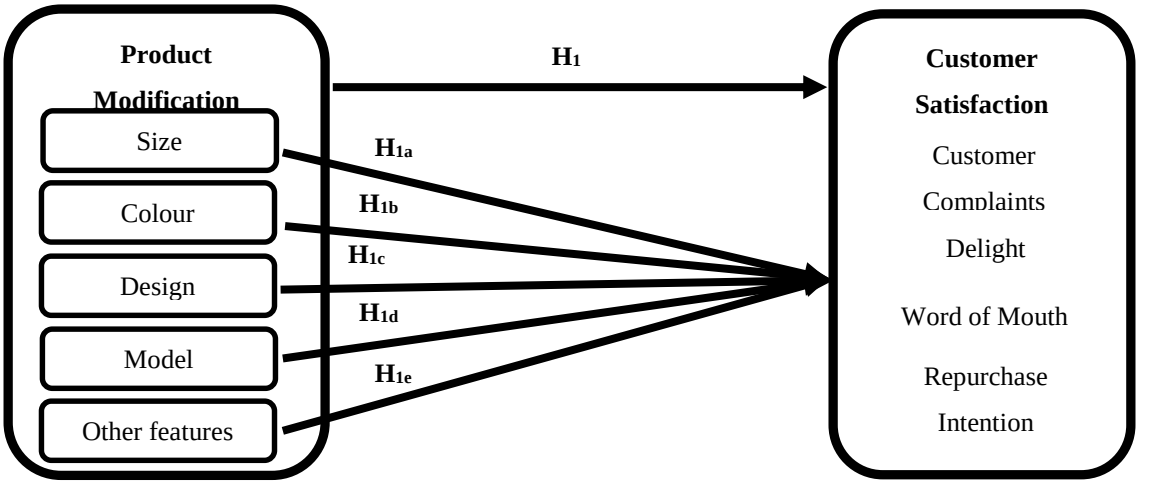

Figure 01: Conceptual Framework (Source: Developed by the researcher)

2.2 Research Hypotheses

H_1: Product modification has significant impact on Customer satisfaction.
H_{1a}: Size has significant impact on customer satisfaction.
H_{1b}: Colour has significant impact on customer satisfaction.
H_{1c}: Design has significant impact on customer satisfaction.
H_{1d}: Model has significant impact on customer satisfaction.
H_{1e}: Other features have significant impact on customer satisfaction.
(Source: Vannarajah & Jude Leon, 2011, Krishanth, 2015)

2.3 Research Approach & Design

In this study, the quantitative research approach is applied to examine the impact of product modification on customer satisfaction by using the deductive to prove the relationship between these variables by getting support from statistical facts & figures.

2.4 Population & Sample

The population for this study is identified as the mobile phone users in Northern Region, Sri Lanka. 300 customers are selected as sample size as indicated in Table 01.

Table 01: Sample Quota

Name of District		**Sample Quota**
Jaffna	Apple	50
	Samsung	50
Vavuniya	Apple	50
	Samsung	50
Mannar	Apple	50
	Samsung	50
Total		300

2.5 Sampling Technique

There are five districts in Northern Region, Sri Lanka. The cluster sampling method is used to select three districts, where the people are culturally mixed & then stratified random sampling is used to select the samples from Apple & Samsung customers (Apple customers & Samsung customers are identified as two different strata).

2.6 Data Source

Both primary & secondary data sources were used for this study. Five-Point Likert Scale Questionnaires were served as the primary source & journals, publications, reports & other online information were used as secondary sources.

2.7 Method of Data Analysis

Descriptive statistics were used mainly to organize & summarize the demographic data of the respondents, correlation coefficients were used to show the relationship between product modification & customer satisfaction & multiple regression analysis tested the impact of product modification variables on customer satisfaction.

3 RESULTS & DISCUSSION

3.1 Descriptive Statistics

Table 02: Sampling Profile

Factors	**Frequency**	**Percentage %**
Preferable Brand: Apple	150	50.0%
Samsung	150	50.0%
Gender: Male	162	54.0%
Female	138	46.0%
Civil Status: Single	140	46.7%
Married	144	48.0%
Others	16	5.3%
Distribution of Age: Below 18	20	6.7%
18-30	155	51.7%
31-55	109	36.3%
Above 55	16	5.3%
Employment: Employed	142	47.3%
Unemployed	103	34.4 %
Retired	55	18.3%

Table 02 shows the frequency of sample size on preferable brands, districts, gender, civil status, age, & employment. An equal number of samples is considered between Apple & Samsung as 150 customers per company. 54% of the sample is male & the remaining 46% is female, which shows a

relatively equal contribution from each gender category. Approximately 95% of the sample is dropped under single & married & others category remains with 5% only. Based on the distribution of age, 88% of the sample between 18 to 55. On average, half of the sample is employed & the other half is shared by unemployed & retired categories.

3.2 Reliability Test

Based on the result portrayed in Table 03, the value of the Cronbach's alpha for each variable between the range from 0.761 to 0.867 & the overall value is 0.836, which specifies that the scales used in the questionnaire satisfactorily measured the constructs & suggested good internal consistency of the items.

Table 03: Reliability statistics

Items	**Number of Indicators**	**Cronbach's alpha**
Size	02	0.784
Colour	02	0.867
Design	02	0.769
Model	02	0.796
Other Features	02	0.852
Customer satisfaction	08	0.761
Overall alpha		0.836

3.3 Hypotheses Testing

3.3.1Correlation Analysis

Table 04 shows that the correlation value between product modification & customer satisfaction is 0.950 at 0.05 significant level, which means there is a very strong significant relationship between these variables.

Table 04: Pearson Correlation Analysis

	Customer Satisfaction
Product Modification	.950**

** denotes at 5% significant level

3.3.2 Simple Regression Analysis

Table 05.ashows that R square value is 0.90, which indicates that 90% of the level of customer satisfaction is predicted by product modification & the remaining 10% is determined by other factors. Further, the probability value of F-statistic is less than 0.01, which shows that the model with product modification is highly significant.

Table 05.b indicates that when product modification increases by one unit, customer satisfaction will increase by 0.94 & also it depicts that the product modification has significant impact on customer satisfaction. Therefore, H_1 is accepted & objective I is also reached.

Table 05.a: Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	F-statistic	P-value
1	.950[a]	.903	.903	.12980	2769.958	.000[b]

a. Predictors: (Constant), Product Modification

Table 05.b: Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.247	.076		3.226	.001
	Product Modification	.948	.018	.950	52.630	.000

a. Dependent Variable: Customer Satisfaction

3.3.3 Multiple Regression Analysis

Table 06.aindicates that the R square value is 0.91, which defines that all independent variables (Size, Colour, Design, Model, Other features) explained the variation in customer satisfaction by approximately 91%. & remaining 9% of the variation is determined by other factors.

Table 06.breflects that, when size, colour, design, model, other features increase by one unit, customer satisfaction will increase by 0.187, 0.256, 0.163, 0.212 & 0.145 respectively & also it explained that all the independent variables have significant impact on customer satisfaction at 1%. Therefore, H_{1a}, $H_{1b,}$ $H_{1c,}$ H_{1d} &$H_{1e}$are accepted.

$$\mathbf{Y = 0.188+0.187X_1+0.256X_2+0.163X_3+0.212X_4+0.145X_5}$$

3.3.4 Testing Multicollinearity

This equation indicates that among these independent variables, colour is the most influencing factor on customer satisfaction in Sri Lankan mobile phone industry. By this result, objective II is achieved.

In Table 06.c, F value is approximately 622, which shows that the multiple regression model with size, colour, design, model, other features is highly significant.

Table 06.a: Model Summary

Model	R	R Square	Adjusted R Square	Std. Errorof the Estimate
1	.956[a]	.914	.912	.12320

a. Predictors: (Constant), Size, Colour, Design, Model, Other features

In this study, the results of collinearity statistics analysis are showed in Table 07 as variance inflation factors (VIF) value

Table 06.b: Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.188	.085		2.211	.028
	AVERSI	.187	.021	.280	9.021	.000
	AVRCO	.256	.013	.347	19.498	.000
	AVERDE	.163	.021	.257	7.739	.000
	AVERMO	.212	.017	.290	12.435	.000
	AVEROF	.145	.016	.169	9.277	.000

a. Dependent Variable: Customer Satisfaction

Table 06.c: ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	47.223	5	9.445	622.216	.000[b]
	Residual	4.463	294	.015		
	Total	51.686	299			

a. Dependent Variable: Customer Satisfaction

b. Predictors: (Constant), Size, Colour, Design, Model, Other features

ranges from 1.078 to 3.764 & tolerance value ranges within the value of 0.266 to 0.928, which indicate that there is no multicollinearity problem.

Table 07: Multicollinearity

Variable	**Tolerance**	**VIF**
Size	.305	3.279
Colour	.928	1.078
Design	.266	3.764
Model	.539	1.854
Other Features	.884	1.131

3.3.5 Normality Test

The result of Shapiro-Wilk W test given in Table 08 reveals that residual of the above multiple regression model (Table 07.a &07.b) distributed normally, since the probability value of the test is proximity to zero.

Table 08: Shapiro-Wilk W test for normal data

Variable	W	v	z	P-value
Residual	0.98397	3.414	2.882	0.00197

3.3.6 Homoscedasticity

Table 09 depicts the White's test for homoscedasticity of the residual of

multiple regression model. The result portrays that the variance of the multiple regression model is constantly distributed at 1% significant level.

Table 09: White's test

Variable	Chi-square	P-value
Residual	31.73	0.0044

3.3.7 Levene's Test

In **Table 10**, the result of Levene's test shows that the variance in product modification between Apple & Samsung is equally distributed, while the variance in customer satisfaction between Apple & Samsung is not equal at 5% significant level. Therefore, the appropriate t-test (two sample t-test, welch t-test) has been applied to find the mean difference between Apple & Samsung in relevant to product modification & customer satisfaction.

Table 10: Levene's Test for Equality of Variances between Apple & Sample

Variable	F-statistics	P-value	Equal Variance
Product Modification	9.174	.003	Yes
Customer Satisfaction	1.221	.270	No

According toTable 11, there is a significant mean difference (0.21) between Apple & Samsung in implementing product modification strategies towards customer satisfaction.

The results of t-test indicate that Samsung effectively implements product modification strategies towards customer satisfaction than Apple in the Sri Lankan context. Therefore, objective IIIis also achieved with this result.

Table 11: Independent Samples Test

Variable	Mean		Mean Difference	Independent sample test	
	Apple	Samsung		t-statistics	P-value
Product Modification	4.12	4.33	-0.21	-4.550	0.000
Customer Satisfaction	4.15	4.36	-0.21	-4.629	0.000

Note. Two sample t-test was applied for product modification & Welch sample t-test was applied for customer satisfaction.

4 CONCLUSIONS

This study has investigated how product modification influences customer satisfaction in the Sri Lankan mobile

phone industry: it has also examined how each product modification factors (i.e. size, colour, design, model & other features) affect customer satisfaction. The results revealed that the product modification has a significant impact on customer satisfaction in the Sri Lankan mobile phone industry, thus the mobile phone industries can achieve customer satisfaction via successful & updated product modification strategies in Sri Lankan contexts.

The findings also depicted that all these five variables have significant positive impact on customer satisfaction, & colour is the most influencing factor among others because customers may think that colour decides the attractiveness & appearance of the mobile phone. Other features other than size, colour, design & model have the lowest influence on customer satisfaction, which reveals that Sri Lankan customers prefer modifications on size, colour, design & model regardless of other features. There is a significant mean difference between Apple & Samsung & it reveals that Samsung effectively undertakes product modification strategies than Apple in Sri Lankan contexts.

Sri Lankan mobile phone companies should be very careful in changing colours of the mobile phones. Unfavourable colour changes may be a cause for diminishing the level of customer satisfaction, since colour is the most influencing factor. Players in Sri Lankan mobile phone industry may learn from the strategies implemented by Samsung, since it shows greater impact.

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