

THE IMPACT OF CUSTOMER INVOLVEMENT IN NEW PRODUCT DEVELOPMENT WITH SPECIAL REFERENCE TO BISCUITS MANUFACTURING COMPANIES IN WESTERN PROVINCE, SRI LANKA

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Abstract

New Product Development (NDP) in Sri Lanka plays an important role as customers have become a vital part of the innovative product development process nowadays. Therefore understanding how customers are involved in developing innovative products is pivotal in today's dynamic market environment. There is a significant academic interest in recent literature on customer involvement concerning new product involvement in developed countries. However, there are limited studies related to developing countries like Sri Lanka. Therefore the main purpose of this study is to identify the impact of customer involvement in new product development with special reference to biscuit manufacturing companies in Sri Lanka. This study used an explanatory research design and a deductive research approach. By using stratified random sampling method, data were collected from 105 respondents and the results indicated that there was a positive impact on independent variables information source (CIS), customer involvement as co-developers (CIC), and customer involvement as innovators (CII) on the New Product Development.

1. INTRODUCTION

Continuous creation of innovation is widely acknowledged as a primary source of competitive advantage in many industries in long run. According to Fang, (2008) the growing involvement of product users in manufacturers' new product development (NPD) process has significantly impacted business

marketplaces recently. Therefore companies are increasingly finding methods to actively incorporate customers in their innovation projects (Alam, 2002). By collaborating with customers companies try to build goods or develop methods or innovative ideas that could be potentially transferred into a product or a service that satisfies target market requirements. As a result, customers are increasingly adopting new roles by actively being involved with firms' innovation procedures or independently producing new products in place of their traditional roles as purchasers as tailor made products (Cui & Wu, 2018).

1.1 Research Problem

According to Sriskandarajah & Ariyawardana, (2009), there are numerous researches who has focused on customer role in business mainly in industrialized countries'. Too far, however, there are less research has been done on customer involvement in developing countries Fang, (2008). As Sri Lanka is a developed country; it is significant to take the right decision on new product development. If not, companies and country as whole, have to face various economic problems (Jayasinghe, 2021). It can be identified that one of the finest ways to boost organization profits is through the launch of new items (Alam, 2002). But as is generally known, many newly introduced products are failed due to many reasons across the world, including in Sri Lanka. According to Jayasinghe, (2021) the failure rate for new products ranges from 80 to 90 percent. Usually, the new product launching process is not a simple process. Therefore it is common for companies to fail many of their new products in all over the world. When done

properly, it can be identified as a thrilling endeavor for companies.

Investigating the best effort for new product development is a key success factor of NDP (Alam, 2002). Therefore, it is important to have a thorough analysis of customer perceptions of products and study how they react to new products and product expansions. However, A few researchers have characterized the customer roles that can be played in innovation, going beyond the scope of customer involvement (Cui & Wu, 2018).

Wijesinghe, (2012) stated, in the Sri Lankan economy Fast Moving Consumer Goods (FMCG) contributed more to the economic development and biscuit manufacturing brings more export income to the country. As there is intense competition in this market biscuit manufacturing companies should develop their products. However, it can be identified that there is little systematic research about biscuit manufacturing companies in Sri Lanka. Jayasinghe, (2021) stated that there is limited research in NDP in Sri Lanka. Also, those studies that use NDP focused on different aspects and there are limited studies on customer involvement in NDP (Nambisan, 2002). Therefore it is worthwhile to study in this field by using biscuit manufacturing companies like CBL and Maliban Biscuit, Sunrich Confectionery (Pvt) Ltd, Little Lion Associates (Pvt) Ltd, and Sachi Biscuit (Pvt) Ltd which are related to the Western province in Sri Lanka.

Moreover, Cui & Wu, (2016) stated, that manufacturing companies failed to take into account details about particular customers, like their motivations or connections to the business. Theoretical development and empirical verification of the circumstances under which businesses may overcome these difficulties and reap the rewards are, however, lacking in the current study (Lin & Huang, 2013). Therefore this study attempts to provide a more thorough knowledge of the impact of consumer involvement to NPD outcomes in light of the aforementioned gaps in the literature.

1.2 Research Questions

The main research questions for this study can be postulated as follows,

- What is the impact of customer involvement as an information source in NPD of biscuit manufacturing companies?
- What is the impact of customer involvement as co-developers in NPD of biscuit manufacturing companies?
- What is the impact of customer involvement as innovators in NPD of biscuit manufacturing companies?

2. LITERATURE REVIEW

2.1 New Product Development

In today's market environment with intense competition, new product development (NPD) has become an essential factor for a company's survival.

Traditionally NPD used to be an internal activity of business organizations (Joshi & Sharma, 2004). However modern organizations now extend their NDP process outside of organizational boundaries and include customer actions that are not directly controlled by businesses (Liu & Tsai, 2009). Incorporating customers' contributions in NPD operations is increasingly seen as a requirement in this volatile business environment. Mainly customer involvement can be gained for new product development standard processes by generating new ideas, idea screening, conceptual testing, and business analysis (Joshi & Sharma, 2004). Further customer involvement can be gained for test markets, sales and marketing, and product launches (Nambisan, 2002).

Additionally, the variety of customer needs and wants can be considered because the market is versatile and it is harder for a company to comprehend the needs and wants of its total target (Nambisan, 2002). If customer needs are varied, that makes it more difficult for companies to create effective new goods (Von Hippel & Katz, 2002).

According to Chandy & Tellis, (2000), there are various control variables in this regards such as firm characteristics, firm size and firm R&D intensity were taken into account

NPD used to be an internal activity of businesses, but it is now extending outside of organizational boundaries to include customer actions that are not directly controlled by businesses (Liu & Tsai, 2009). Although this transformation in innovation practice offers

businesses fantastic prospects, managing the resulting corporate and strategic change can be difficult (Cui & Wu, 2016). Customer involvement is becoming increasingly significant in marketing theory and practice as the new source of competitive advantage (MCBEE & KRUGER, 1971).

However, it can be difficult to translate varied customer information into new and innovative items.

There are multiple ways that customers can be involved in NDP. In this study following part of the literature focuses on three forms of customer involvement for NDP as an information source (CIS), customer involvement as co-developers (CIC), and customer involvement as innovators (CII) (Fang, 2008).

2.2 Customer Involvement as an Information Source (CIS)

Companies can use customers for NDP as an information source to collect information to make effective decision about NDP and using it to create products that cater to customer needs and wants (Cui & Wu, 2016).

Customer information can be used to exploring new ideas and CIS include customer feedback gained with the exploitation of previous market experiences (Cui & Wu, 2016). Information can be collected using marketing research techniques including interviews, focus groups, and market surveys (Abbie Griffin, 1993).

2.3 Customer Involvement as Co-developers (CIC)

According to literature, the value co-creation process in a company involves external customers as well as it includes inside organizational procedures (Grönroos & Voima, 2013).

As per Nambisan (2002), customers can participate for making decision about product design and develop tasks as co-creators, such as validating product architectural decisions, defining product interface specifications, designing and prioritizing product features and establishing development process priorities and metrics (Liu & Tsai, 2009). Customer assistance enables the manufacturing company to gather a large amount of data and analyze and comprehend the product's various facets.

According to Lettl et al., (2008) advanced users can provide a diversified knowledge regarding product design and , and customer participation increases new product varieties (Al-Zu'Bi & Tsinopoulos, 2012).

2.4 Customer Involvement as Innovators (CII)

Customer who participate as innovators (CII), can create their own products through which the companies will subsequently embrace and sell in the market (Nambisan, 2002).

CII allows customers to have more possibilities for satisfying their unique customer wants (Franke & Schreier, 2002) as it are permitted to create products that are customized to match with their specific requirements. By giving customers accessibility to NPD process and technical support, businesses share specific technology knowledge with their customers.

To work as an innovator, customers also required certain level of production knowledge (Nambisan, 2002). Therefore involvement from the manufacturing department to is significant.

2.5 Customer Involvement as Information source, Customer Involvement as Co-developer, Customer Involvement as Innovator and New Product Development

Due to the fact that the knowledge management processes in CIS, CIC, and CII are helpful for utilizing various types of customer knowledge, the nature of customer knowledge might have an impact on the firm's possibility of using various forms of customer participation (Cui & Wu, 2016).

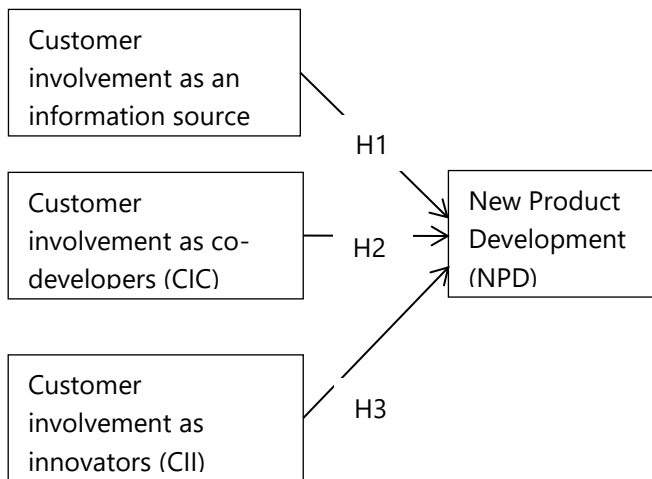
Although CIS, CIC, and CII can all refer to varying levels of involvement, see them as distinct types since they each make use of customer knowledge in unique ways. (Liu & Tsai, 2009). According to Lin & Huang, (2013) findings specifically show that the contingent impacts of CIS and CIC differ in that CIC is more potent when the NPD approach is characterized by reduced experimentation while CIS is more favorable for new product outputs when firms employ a more experimental NPD strategy (Cui & Wu, 2017).

3. METHODOLOGY

The systematic and theoretical analysis followed by the research in order to achieve the research objectives and approach used in the field of research is known as methodology. It includes a methodological analysis of the body of techniques and guiding ideas related to the field of study.

3.1 Conceptual Framework

Figure 1 Conceptual Framework



3.2 Hypothesis of the Study

Hypotheses can be identified as a logical relationships between independent variable to dependent variable that are expressed as testable propositions. It is anticipated that solutions to the issue will be discovered through testing the hypotheses and verifying the conjectured relationships. Hypotheses for this study can be identified as follows,

H1: There is a significant relationship of customer involvement as an information source on new product development

H2: There is a significant relationship of customer involvement as co-developers on new product development

H3: There is a significant relationship of customer involvement as innovators on new product development

Based on the stated hypotheses following table explains the operationalization of above variables.

3.3 Operationalization

Table 01: Operationalization

Variables	Dimension
Customer Involvement as an Information Sources (CIS)	Key information source
	Information transferred
	Needs & preferences
	Used information
Customer Involvement as co-developers (CIC)	Involvement as co-developers
	Actively involved
	Interacted with NPD process
	Feedback & input
Customer Involvement as an Innovators (CII)	Product design
	Customers opportunities
	Design prototypes
	Design products customized
New product innovativeness	Ordinary or novel of the industry
	Challenge of existing idea
	Offer of new ideas
	Interesting
	Creativity
	Higher quality
New product advantage	Fulfilled customer needs
	Unique benefits
	Better performance
	Return on investment
New product performances	Sales & profit
	Market share

Source: (Jeppesen, (2005);Cui & Wu, (2016), Lin & Huang, (2013))

3.4 Research Design

Explanatory research defined as an attempt to connect ideas to understand cause and effect, meaning researchers want to explain what is going on. The researcher employed the deductive method, which involves formulating theories and hypotheses and designing a research strategy to test them. The study was an applied, quantitative type deductive study.

The questionnaires are being used by the researcher as a means of data collection.

3.5 Research Method

The researcher's chosen research method for this study was the survey method. Setting data collecting goals, planning the survey, creating a valid and reliable survey instrument, administering the survey, managing and analyzing survey data, and reporting results were all mentioned in the survey system. The survey method used in this study is a questionnaire. The questionnaire consists of 29 questions and contains all the information received from the managers and new product development members in the biscuit manufacturing companies in the western province of Sri Lanka.

3.6 Population & Sampling

There are several biscuit manufacturing companies in Sri Lanka and the western province area was chosen for this study since there are many biscuit manufacturing companies located in Western province, due to time constraints. As a result, this study has selected the western province to select the population. The population of this study is members from companies in the biscuit manufacturing industry in western province.

The sample from the population was selected based on the proportional stratified random sampling technique. The study selected five biscuit manufacturing companies in the western province as a sample. These biscuit manufacturing companies have a large membership. Researchers chose members from companies at random to collect data from analysis units. The sample size is 150.

4. DATA ANALYSIS AND RESULTS

4.1 Sample Profile

The study area consists of five biscuit manufacturing companies in the Western province. Moreover, Google form was used to obtain the sample data. This part consists with respondent's gender, age, name of the company, position and work experience of the biscuit manufacturing company.

The statistics show that 61.0% of respondents are male, and that 39.0% are female. A total of 105 respondents made up the sample. According to the survey, there are four age groups in the sample. Among them 17.1% represents the below 25 age categories, it's about the 18

respondents from the total sample. The age group of 26 – 35 represents 40% and it is the highest percentage of the age category. 37.1% represent the 36 – 55 age categories. The lowest percentage of the age category is above 55. It represents 5.7% from the sample.

The following table describe the frequency of members and percentage of members representing from each company.

Table 02: Company of the respondents

Name of the Company	Frequency	Percentage
Ceylon Biscuit Limited	39	37.1%
Maliban Biscuit Manufactories Limited	36	34.3%
Sunrich Confectionery (Pvt) Limited	14	13.3%
Little Lion Associates (Pvt) Limited	13	12.4%
Sachi Biscuit (Pvt) Limited	3	2.9%
Total	105	100

Source: Survey Results (2023)

As per the survey results of respondents job position within the biscuit manufacturing companies the above executive level takes 9.5%, staff level represent 66.7% and 23.8% are represented by others who participated the new product development process.

Further work experience years of the biscuit manufacturing company have been calculated and results shown that there are 24.8% respondents who are having less than 01 year experience, between 1 – 5 years 49.5%, between 5 – 10 years 21.0% and above 10 years 4.8%.

4.2 Validity Test

Table 03: Results of the Validity Analysis

Variable	KMO Value	Sig. Value	Decision
Independent variable			
CIS	0.745	.000	Accepted
CIC	0.677	.000	Accepted
CII	0.766	.000	Accepted

Dependent variable			
NPI	0.686	.000	Accepted
NPA	0.752	.000	Accepted
NPP	0.653	.000	Accepted

Source: Survey Results (2023)

According to above table KMO for CIS is 0.745, CIC is 0.677, CII is 0.766, NPI is 0.686, NPA is 0.752 and NPP is 0.653. According to the findings of Bartlett's spherical test, each component is significant at 0.000, which is less than 0.05. In this study, the KMO measure of sample adequacy is more than 0.5 for all variables. This instrument has been verified as a result. These findings support the notion that factor analysis is suitable.

4.3 Reliability Test

Table 04: Results of the Reliability Analysis

Variable	No of items	Cronbach's Alpha	Decision
Independent Variables			
CIS	04	0.791	Accepted
CIC	04	0.743	Accepted
CII	04	0.791	Accepted
Dependent Variables			
NPI	05	0.715	Accepted
NPA	04	0.767	Accepted
NPP	03	0.709	Accepted

Source: Survey Results (2023)

The questionnaire can be regarded as credible because the Cronbach's alpha for every independent and dependent variable was above 0.7. It can be said that the study's questionnaire was trustworthy. The CIS has 0.791 Cronbach's Alpha and approximately CIC and CII have 0.743 and 0.791 Cronbach's Alpha to measure the reliability of this study. Also, the dependent variable NPD is indicated by three dimensions NPI, NPA, and NPP those variables are reliable in 0.715, 0.767 and 0.709 according to Cronbach's Alpha model. This means that

every component of the study's construct exhibits a steady and consistent result.

4.4 Descriptive Analysis

Table 05: Results of Descriptive Analysis

	N	Mean	Std. Deviation	Skewness	Std. Error
CIS	105	4.4714	.41503	.031	.236
CIC	105	4.5143	.42999	-.506	.236
CII	105	4.5048	.42174	-.116	.236
New Product Development	105	4.5278	.32081	-.267	.236
Valid N	105				

Source: Survey Results (2023)

There are no statistically significant differences between the mean values of each variable, according to the statistics. CIS in New Product Development the lowest mean value (M=4.4714, SD=0.41503) and highest mean value represent by CIC variable (M=4.51343, SD=0.42999). Mean value of CII is M=4.5048, SD=0.42174. According to the table above, the skewness of the CIS, CIC, and CII is shown 0.031, (-.506), (-.116) respectively. According to the statistics one variable has shown positive Skewness and other two variables has shown negative Skewness. However, the independent variables mentioned above are in a good position relative to the new products development.

4.5 Correlation Analysis

Table 06: Correlation of CIS and New Product Development

CIS	Pearson Correlation	1	.406**
	Sig.		.000
New Product Development	Pearson Correlation	.406**	1
	Sig.	.000	

** . Correlation is significant at the 0.01 level.

Source: Survey Results (2023)

According to this table Correlation coefficient between CIS and New Product Development is 0.406. Accordingly, there is weak positive relationship between CIS and New Product Development. The respective level of significant of the mentioned above correlation coefficient is 0.000. Therefore, this study accepted hypothesis one (H1), there is a correlation between CIS and New Product Development. All in all, it can be concluded that there is a statistically significant relationship between CIS and New Product Development in biscuit manufacturing companies.

Table 07: Correlation of CIC and New Product Development

CIC	Pearson Correlation	1	.417**
	Sig.		.000
New Product Development	Pearson Correlation	.417**	1
	Sig.	.000	

** . Correlation is significant at the 0.01 level.

Source: Survey Results (2023)

According to this table Correlation coefficient between CIC and New Product Development is 0.417. Accordingly, there is weak positive relationship between CIC and New Product Development. The respective level of significant of the mentioned above correlation coefficient is 0.000. Therefore, this study accepted hypothesis two (H2), there is a correlation between CIC and New Product Development. All in all, it can be concluded that there is a statistically significant relationship between CIC and New Product Development in biscuit manufacturing companies.

Table 08: Correlation of CII and New Product Development

		CII	New Product Development
CII	Pearson Correlation	1	.458**

	Sig.	.000
New Product Development	Pearson Correlation	.458**
	Sig.	.000

** . Correlation is significant at the 0.01 level.

Source: Survey Results (2023)

Lastly, this table Correlation coefficient between CII and New Product Development is 0.458. Accordingly, there is weak positive relationship between CII and New Product Development. The respective level of significant of the mentioned above correlation coefficient is 0.000. Therefore, this study accepted third hypothesis (H3), there is a correlation between CII and New Product Development. All in all, it can be concluded that there is a statistically significant relationship between CII and New Product Development in biscuit manufacturing companies.

4.6 Multiple Regression

A strong and adaptable method for examining associative links between a metric dependent variable and one or more independent variables is regression analysis. As there are multiple independent variables multiple regression analysis was chosen and this examine how independent variables (CIS, CIC, and CII) have an impact on the new product development.

Table 09: Result of Multiple Regression Model Summary

Model Summary				
Model	R	R Square	Adjusted Square	RStd. Error of the Estimate
1	.606 ^a	.368	.349	.25883

Source: Survey Results (2023)

The regression analysis model summary is shown in the above table. It demonstrates the extent to which independent factors can account for the variance of the dependent variable. The degree of change in the dependent variable is also determined by the Adjusted

R Square, which adjusts for the number of independent variables utilized.

The Adjusted R square is 0.368 (36.8%), as seen in the model summary table above. Consequently, it can be said that CIS, CIC, and CII are too responsible for 36.8% of the variations in new product development disclosure.

Table 10: Anova Table

ANOVA ^a					
Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	3.937	3	1.312	19.590	0.000 ^b
Residual	6.766	101	.067		
Total	10.704	104			

Source: Survey Results (2023)

The significance of the model as a whole is measured in the table above. The value must be less than 0.05. The regression model is significant, as shown by the ANOVA table, because the significant P-value is 0.000, which is less than 0.05 alpha levels. Hence, it is possible to see how well the regression model fits the model.

Table 11: Coefficients Table

Coefficients ^a					
Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error			
(Constant)	1.597	.384		4.155	0.000
CIS	.203	.064	.263	3.162	0.002
CIC	.207	.062	.278	3.345	0.001
CII	.242	.064	.318	3.785	0.000

Source: Survey Results (2023)

The B coefficient for CIS is 0.203. it indicates that increasing 1 unit of CIS causes to decrease new product development disclosure 0.203 units while other

independent variables remain constant. The significant value is 0.002 at a 95% confidence level.

The B coefficient for CIC is 0.207. it indicates that increasing 1 unit of CIC causes to decrease new product development disclosure 0.207 units while other independent variables remain constant. The significant value is 0.001 at a 95% confidence level.

The B coefficient for CII is 0.242. it indicates that increasing 1 unit of CII causes to decrease new product development disclosure 0.242 units while other independent variables remain constant. The significant value is 0.000 at a 95% confidence level.

Based on the above results, the regression equation is,

$$\text{New Product Development} = 1.597 + 0.203(\text{CIS}) + 0.207(\text{CIC}) + 0.242(\text{CII})$$

According to the results of correlation analysis, correlation coefficient value of CII is 0.458. It is between 0.3 to 0.5. Hence CII is significantly and moderate positively affected for the new product development in biscuit manufacturing companies. And also, as per regression analysis result, significant value of CII is 0.000. Therefore, third hypothesis is also accepted.

Table 12: Hypotheses Summary

Hypothesis	Decision
H1: There is a significant relationship of customer involvement as an information source on new product development	Accepted
H2: There is a significant relationship of customer involvement as co-developers on new product development	Accepted
H3: There is a significant relationship of customer involvement as innovators on new product development	Accepted

5. CONCLUSION

This study's main objective was to investigate the impact of customer involvement in new product development of biscuit manufacturers in Western Province. The study looked at the effects of each method of customer involvement in new product development implementation and determined which method was the most important. The findings of the correlation analysis showed a considerable and highest positive relationship

between CII and the new product development. Moreover, CIS and the development of new products were found to have a good association. Also, a favorable association between CIC and the development of new products was discovered. These findings demonstrate that one of the most important success factors in the firm's knowledge acquisition is the development of deep inter-organizational ties during consumer involvement in NPD. The findings of this study provide managers with a number of insights for biscuit manufacturing companies that choose to involve customers in NPD operations or enhance NPD performance by customer participation activities. On the other hand, close customer interactions are beneficial for boosting efficiency and effectiveness, specifically if businesses conduct consumer engagement activities during NPD processes.

5.1 Recommendation

This study has demonstrated the value of categorizing the several ways that customers are involved in NPD. Here, it was demonstrated that there was interaction between the people on the new product development team and the customers. According to research findings, a few recommendations may be made to biscuit manufacturing organizations regarding how to involve customers in their organizational work of new product development.

Recommend manufacturing or any other companies can use customer as innovators. Because customers are known variations of products better than others. When active customer interaction becomes more prevalent, businesses must choose which strategy to use. The researcher's findings offer recommendations for choosing the appropriate strategy. Particularly, both CIC and CII are preferred when the company deals with diverse consumer needs.

The results of this study can be used to create useful recommendations for businesses to use in their new product development process. Overall new product development task is highly complex activity. This research provides the significance of customer involvement in NPD. Food industries are always change. Then they should identify customer' preferences better than their rivals. This research recommend three forms of customer involvement

5.2 Suggestions for Future Research

The results imply that customer co-creation may have a substantial impact on organizational design in addition to altering the role of customers. The results of this study offer numerous directions for further investigation. First, additional research is required to simultaneously evaluate various forms of client interaction and better comprehend their variations. This framework can be expanded in a variety of ways to investigate how businesses choose their various consumer involvement strategies. And also, future research can examine from marketing management members, because in this research only consider new product development members.

Further research could also look at other organizational and strategic aspects that might encourage customer involvement from the firm's point of view. For instance, the company's innovation strategy, which may place a focus on product quality, cost, or development speed, how product awareness is raised, and other organizational factors like culture, may also affect how it uses various methods for involving customers.

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