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Empowering consumers with aesthetic appeal and product involvement through co-design for value enhancement

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ABSTRACT

Firms target customers who are interested to design their own product that is unique from a mass-produced product through co-design. This study aims to find whether the individual difference in visual appeal and product involvement influences the perceived value of co-design. Using convenience sampling survey method, 573 usable responses were collected and analyzed. The results indicate that product involvement partially mediates the relationship between the centrality of visual product aesthetic and perceived value of co-design. Hence, firms need to structure their co-design process for aesthetics and redefine the solution space such that it provides scope for aesthetic improvements. The firms can use social media to both identify and target customers with high product involvement and communicate value of co-designing the product through visually appealing marketing communications. Further, the co-design process should encourage customers to interact with the firm by providing adequate information about co-designing the product thus empowering them to actually design and develop unique products.

Keywords: Co-creation; Consumers' Need for Uniqueness; Mass Customization; Visual Aesthetics;

1. Introduction

Today, the technology enabled consumers have become savvy and can make informed purchase decisions. With demanding customers, firms pursue innovation to provide value to customers. With the growing purchasing power and sense of entitlement, customers just don't wait anymore for the company to create and deliver value; rather, they take control over value creation by playing a part in it (Prahalad and Ramaswamy, 2004). Consumers contribute their innovative ideas to increase the value of a product in many ways that include performing do-it-yourself (DIY) modifications to the product (Williams, 2004), participating in open innovation projects of firms which crowdsource ideas by conducting contests (Zhao and Zhu, 2012), and participating in co-design of a product (Sembada, 2018) . In all these ways, how much value gets added depends on the actual experience of the customer while participating and the quality of the resultant product. Of the surplus value created owing to their participation, how much value consumers receive depends on the trade-off between the cost, time and effort that the consumers expend in participating and the resultant benefit they receive. Among the different ways of consumer participation in value creation, mass customization aims at co-creating value through collaborative interaction between firm and consumers facilitated either by a service personnel assisting the consumer or by an online mass customization toolkit. This study aims at understanding how consumers' perceive the firm assisted value co-creation.

With the evidence of many big names in the business venturing eagerly into mass customization only to later withdraw from such venture and many others who have successfully integrated consumers in co-design, there are a lot of research questions when addressed could help out companies pursuing mass customization. In this study, we have pursued to address the research questions of (a)Does the opportunity to modify the design of a product look more attractive to consumers who give more importance to the visual appeal of a product? (b) Does the consumers' level of need for uniqueness influence the value perception of co-design, since there is a possibility of designing the product to be unique? (c) Does the customers' interest in visual aesthetics of a product and uniqueness of the product design influence their involvement in the product class? (d) Does the consumers' involvement in a product positively influence the perceived value of co-design of the product? To delve into these questions, this study developed a conceptual framework based on the extant literature on the topic. The conceptual framework was tested using primary data collected through a survey and analyzed using structural equation modeling (SEM) analysis in AMOS.

2. Theoretical foundation

Customer Co-design

When the customers co-designs a product, they are integrated into value creation process where they transform their needs and desires into concrete product specification by interacting with the firm offering the product (Franke and Piller, 2003). In the mass customization process, customers participate to modify product/ service design to suit their individualized needs through co-design, whereby they choose product features, style and fit within a finite solution space (Piller, 2005).

For manufacturing firms, engaging in mass customization makes economic sense only when they are capable of eliciting customers' individualized requirements through interaction and catering to those requirements at a cost close to mass production with the help of technology (Piller, Moeslein and Stotko, 2004). The market segment for which such an offer will be attractive may not be willing to pay the price premium (Bardakci and Whitelock, 2003). Similarly, for the segment that can afford the price premium, the limited solution space within which they need to design when opting for mass customization may not be of as much value as a typical customization that does not restrict the extent of customization. Hence, successful implementation of mass customization depends not only on managing the operations required to mass customize but on identifying segment among mass market for whom, co-designing products through customer-company collaborative interactions will be of value.

When consumers participate in co-design of a product, they get to make the product close to exactly what they want or they gain due to reduction in cost, time and energy (Nuttavuthisit, 2010). The ability of the firm in enhancing value through consumer co-creation largely depends on how well it engages customers through interactions (Grönroos, 2012).

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2.1 Perceived Value

Perceived Value is an important factor that determines the success of co-design strategy. (Broekhuizen and Alsem, 2002) In the extant literature, there is ample evidence to indicate that consumer co-design adds value to customers (Addis and Holbrook, 2001; Franke and Schreier, 2008; Merle *et al.*, 2010; Fogliatto, Da Silveira and Borenstein, 2012).

The perceived value is the consumers' evaluation of a products overall utility based on the trade-off between what they get and what they give up (Sweeney and Soutar, 2001). Consumers assess the perceived value as the difference between the perceived benefits that they get in buying the product and the perceived monetary and non-monetary sacrifices they make in procuring the product (Yang and Peterson, 2004). A consumer' s perceived value of an offering is relative to alternatives available in the market, individual preferences and the situational factors (Sánchez-Fernández and Iniesta-Bonillo, 2007).

2.2 Consumers Need for Uniqueness (CNFU)

According to the need for uniqueness theory, in general, people try to find means to be different and distinct from others (Snyder and Fromkin, 1977). Consumers need for uniqueness (CNFU) is the characteristic of purchasing, using and disposing of product in pursuit of being different from others for developing and enhancing their self and social image(Tian, Bearden and Hunter, 2001). The degree to which individuals pursue uniqueness through the expressive properties of goods is reflected in individual differences in CNFU. The distinctiveness of a co-designed product adds value to the consumer with a high CNFU (Franke and Schreier, 2008).

2.4 Product Aesthetics

The Centrality of Visual Product Aesthetics (CVPA) is the measure of how much the visual aesthetics of a product appeals to a particular consumer. The importance that consumers place on the aesthetic appeal of a product varies between individuals (Bloch, Brunel and Arnold, 2003). The extant literature has established the important role of visual attributes in influencing a consumer' s evaluation of a product (De Bondt, Van Kerckhove and Geuens, 2018). When co-designing a product, a consumer can modify a product to suit their functional, style and fit requirement within a finite solution space defined by the mass customizer (Piller, 2005).

2.3 Product Involvement

Product involvement is the level of significance of a product for a consumer based on the individual' s perception of how the product is instrumental in reaching his/her salient values and goals (Zaichkowsky, 1985). Product involvement is a stimulation that would prompt a consumer to participate in different activities related to the product that includes spending a lot of time thinking about it, interacting with the product and seeking to acquire the product (O' Cass, 2000). Consumer participation in co-design results in successful co-creation of value when customers perform in-role behavior including seeking information on co-design task, sharing relevant information with the organization, cooperating and observing rules and policies of the firm and interacting well with the firm (Yi and Gong, 2013)

2.4 Hypothesis Development

Consumers co-designing a product have the freedom to modify the features of a product that impacts its social meaning, and hence it may have an influence on their product involvement (Addis and Holbrook, 2001). The distinctiveness of a co-designed product adds value to the consumer with a high CNFU (Franke and Schreier, 2008). Aesthetic design is said to be a source of product involvement (Bloch, Commuri and Arnold, 2009). Hence, consumers with high CVPA are likely to have more product involvement. Aesthetics influence perceived value and has a stronger impact on the emotional aspects of value(Toufani, Stanton and Chikweche, 2017). The co-design process provides an opportunity to improve the aesthetic aspects of a product.

Consumers with high product involvement were found to expend more effort towards co-design activities (Yoo and Park, 2016). The relationship between product involvement and perceived value has been established in fashion product (Kim, 2005). People with high product involvement seek more variety in the products (Lin, Kuo and Lin, 2017). Since co-designing a product is a means for achieving variety, we expect that the perceived value of co-designing will be influenced by product involvement. Based on the above discussion, the following hypotheses were developed and empirically tested in our study.

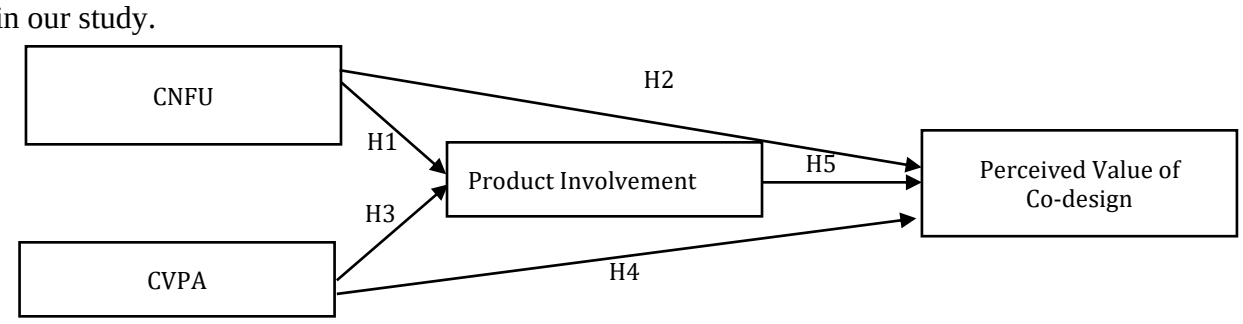

Figure 1. *The Conceptual Framework*

H1: Consumers' Need for Uniqueness positively influences the product involvement of the consumers.
H2: Consumers' Need for Uniqueness positively influences the perceived value of co-design.
H3: Centrality of Visual product Aesthetics positively influences the product involvement of the consumers.
H4: Centrality of Visual product Aesthetics positively influences the perceived value of co-design.
H5: Product involvement positively influences the perceived value of co-design.
H6: The relationship between Consumer' s need for uniqueness and perceived value of co-design is mediated by involvement in product
H7: The relationship between Centrality of Visual product Aesthetics and perceived value of co-design is mediated by involvement in product

3. Data and Methods

This study targeted consumers who were willing to buy at least one product that requires them to participate in co-design process. We used convenience sampling and collected primary data for the study using a questionnaire survey among university undergraduate and postgraduate students, research scholars, teachers, employees of government offices, IT firms, etc. Of the 1052 responses received, 573 were deemed valid after eliminating responses from consumers who would not opt for customization and those that were incomplete. The participants in the survey were requested to consider a buying scenario, where they can select any one product and specify any modification to the features of the product and receive the customized product within a short span and with only a little price increase. The product class that they would like to customize was asked to evoke and measure involvement in the product. To elicit responses related to mass customized product, the respondents were informed that there would be very little if any increase in time and cost of acquiring the product. The respondents were requested to give their responses to the questions in the

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survey with this scenario in mind. The statistical software packages SPSS and AMOS were used to carry out the analysis where we verified the measurement model and the structural model used in this study.

3.1 Measures

The instrument for measuring the constructs of the study was developed by modifying scales from the extant literature such that it fitted the context of our study. For measuring Consumers' Need for uniqueness (CNFU) 6 items from the scale developed by Tian et al. (2001) has been used. The Centrality of Visual Product Aesthetics (CVPA) has been measured using 3 items adapted from a scale developed by Bloch et al. (2003). Six Items from a scale developed by O' Cass(2000) has been adopted for measuring product involvement construct. The scale developed by Merle (2010), which has applied perceived value as a second-order construct with five underlying dimensions including product related functional value, uniqueness value, and value of self-expression and the process related values of hedonic and creative achievement values has been adopted for measuring the perceived value of co-design. All the items were measured using a 7-point Likert-type scale ranging from 1 representing strongly disagree to 7 representing strongly agree.

4. Results

4.1 Sample Characteristics

Among the 573 respondents, there were 373 males (65.1%) and 200 females (34.9 %). The age of the respondents ranges from 18 to 27 and above with most of the respondents in the age of 20 (22.1%) followed by 19 (17.3%), 27 and above (11.3%), 23 (10.6%), 22 (10.4%), 21 (8.6%), 24 (7.5%), 25 (6.5%), 18 (2.9%) and 26 (2.7%). Of the total, 414 (72.3%) were students and the remaining 159 (27.7%) were employed.

4.2 Measurement Model

We used Exploratory Factor Analysis (EFA) for verifying the factor structure of the constructs the that we have used in our conceptual model. We used Maximum Likelihood factor extraction method with Promax rotation to check the factor structure adopted from the extant literature. Based on EFA, items with communalities less than 0.25, items with cross-loadings and factor loading less than 0.3 have been removed from further analysis.

We performed a Confirmatory Factor Analysis (CFA) to establish the validity of the measurement model and the individual constructs.

Table 1. Reliability, Convergent and Discriminant Validity

	CR	AVE	MSV	CVPA	Product Involvement	CNFU	Perceived Value
CVPA	0.760	0.514	0.301	**0.717**			
Product Involvement	0.882	0.599	0.438	0.514	**0.774**		
CNFU	0.795	0.577	0.078	0.280	0.132	**0.759**	
Perceived Value	0.911	0.673	0.438	0.549	0.662	0.177	**0.821**

Note: CR = Composite Reliability; AVE = Average Variance Extracted; MSV = Maximum Shared Variance; The Bolded diagonal Values in the table are the square root of AVE of the respective constructs

We have used Microsoft Excel-based tool developed by Gaskin (2016) to estimate the validity statistics for the individual constructs. The reliability, convergent validity, and discriminant validity of all the constructs were verified to ascertain construct validity. For all the constructs, individual Composite Reliability (CR) values are greater than 0.7 (see Table 1) and hence we ascertain their reliability. When CR values of all the constructs are greater than 0.7 and Average Variance Extracted (AVE) values are greater than 0.5 and Maximum Shared Variance Values are less than AVE we can verify the Convergent validity of the constructs. For all the constructs in the study, the CR values were greater than o.7 and AVE values were greater than MSV values and above 0.5, the convergent validity of the model was established. Discriminant validity of the constructs was confirmed by verifying that the correlations between all the constructs were lower than the square root of average variance extracted for each construct (See Table 1).

The model fit statics of the ratio of Chi-square to degrees of freedom χ^2/df = 2.677 (645.095/241), Standardized Root Mean Square Residual (SRMR) = 0.0469, the Comparative Fit Index (CFI) = 0.936, the Goodness of Fit Index (GFI) = 0.910, Root Mean Square Error of Approximation (RMSEA) = 0.054 were used to assess the model fit of the overall measurement model. As all the model fit statistics cleared the cut-off criteria (Hu and Bentler, 1999), we deemed the model fit to be acceptable.

4.3 Structural Model

The hypotheses in our conceptual framework were assessed simultaneously using path analysis. The hypothesized structural model was estimated with the maximum likelihood criterion and bootstrapping was performed with 10000 bootstrap samples and bias-corrected confidence interval of 0.95.

The model fit statics of the ratio of Chi-square to degrees of freedom χ^2/df = 2.677 (645.095/241) is less than 5. The Standardized Root Mean Square Residual (SRMR) = 0.0469 is less than 0.05. The model fit indices such as the Comparative Fit Index (CFI) = 0.936, the Goodness of Fit Index (GFI) = 0.910, Tucker-Lewis Index (TLI) = 0.927 are all greater than 0.9. Even though values of Fit indices greater than 0.95 are recommended, values greater than 0.9 can be considered acceptable (Baumgartner and Homburg, 1996). The Root Mean Square Error of Approximation (RMSEA) = 0.054 is acceptable as value of RMSEA less than 0.06 is recommended. Hence, the model fit of the hypothesized structural model was deemed to be fit.

Table 2. Total, Direct and Indirect Effects of the Hypothesized Model

Hypotheses		Bootstrap				
		Effect	Standard Error	Upper limit of confidence interval	Lower limit of confidence interval	Significance
	Total Effect CVPA → Perceived Value	0.422	0.069	0.300	0.573	significant

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	CNFU → Perceived Value	0.012	0.034	-0.050	0.054	Not significant
	Direct Effect					
H1	CNFU → Product Involvement	-0.008	0.033	-0.071	0.057	Not significant
H2	CNFU → Perceived Value	0.016	0.029	-0.037	0.077	Not significant
H3	CVPA → Product Involvement	0.480	0.026	0.344	0.643	significant
H4	CVPA → Perceived Value	0.214	0.060	0.103	0.337	significant
H5	Product Involvement → Perceived Value	0.433	0.076	0.296	0.594	significant
	Indirect Effect					
H6	CNFU → Perceived Value through Product Involvement	-0.003	0.014	-0.030	0.027	Not significant
H7	CVPA → Perceived Value through Product Involvement	0.208	0.045	0.136	0.314	significant

The total, direct and indirect effects in the model were assessed by performing bootstrapping. The estimate of the effect size, standard error, lower and upper bound of bootstrap confidence interval are given in table 2. The significance of an effect was assessed based on whether the confidence interval contained zero. As shown in table 2, the total, direct and indirect effects of CNFU on the perceived value of co-design were not significant since the bootstrap confidence interval contained zero and hence the hypotheses, H1, H2, and H6 were not supported. But the other paths were significance and hence hypotheses H3, H4, H5, and H7 were supported.

As we could not find support for the relationships of Consumers' need for uniqueness with other variables in the hypothesized model, we tested a reduced structural model with CVPA, Product involvement, and Perceived Value constructs.

Table 3. Total, Direct and Indirect Effects of Reduced Model

Hypotheses		Bootstrap				
		Effect	Standard Error	Upper limit of confidence interval	Lower limit of confidence interval	Significance
	Total Effect					
	CVPA → Perceived Value	0.546	0.060	0.422	0.656	significant
	Direct Effect					
H3	CVPA → Product Involvement	0.512	0.057	0.397	0.620	significant
H4	CVPA → Perceived Value	0.281	0.068	0.146	0.414	significant
H5	Product Involvement → Perceived Value	0.518	0.064	0.384	0.636	significant
	Indirect Effect					
H7	CVPA → Perceived Value through Product Involvement	0.265	0.041	0.195	0.358	significant

For the reduced model, the model fit was acceptable. The Chi-square to degrees of freedom ratio was 2.998; CFI = 0.936GFI = 0.914; AGFI = 0.890; TLI = 0.926; RMSEA = 0.059 and SRMR = 0.0469. The results of the mediation analysis for the reduced model are shown in Table 3. As shown in table 3, both direct effect of CVPA on perceived value and indirect effect of CVPA on perceived value through product involvement were significant indicating partial mediation.

The overall model demonstrated acceptable fit as CFI = 0.936; GFI = 0.910; TLI = 0.927 all above 0.90. The ratio of Chi-square to degrees of

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freedom value of 2.677 was acceptable since it was less than 5. The RMSEA value was 0.054 is acceptable since it is less than 0.06. Hence, we deemed the overall model fit of the structural model to be acceptable.

5. Discussion

The results of the study provided general support for the reduced model. The direct effects of CVPA on product involvement (H1), CVPA on perceived value (H2), and product involvement on the perceived value of co-design (H3) are significant. The total effect of CVPA on perceived value is significant. The mediation analysis indicates that both direct and indirect effect of CVPA on the perceived value of co-design is significant supporting hypothesis H4 and suggesting partial mediation.

The direct effect of Centrality of Visual Product aesthetics (CVPA) on the perceived value of co-design was found to be positive supporting the findings of similar studies (Dellaert and Stremersch, 2005; Toufani, Stanton and Chikweche, 2017). Thus, we find that for customers who give more importance to the visual aesthetic appeal of a product perceive greater value in the co-designed product.

Apart from this direct relationship, we find that CVPA also positively influences perceived value through product involvement. The findings that CVPA indirectly influences perceived value of co-design indicates that when a consumer with high product involvement are presented with visually appealing content about the product and are given the opportunity to improve the aesthetics of the product through co-design, they will perceive such offering to be of great value.

Visual appeal is important for consumers who would opt for co-designing. Hence while defining the solution space, firms should provide enough scope for aesthetic enhancements. If firm uses online toolkit for facilitating interaction with the customers, then the toolkit should be designed with aesthetic appeal. Whether using a toolkit or assisted by the firm' s personnel, the customer should have the facility to have a visual inspection of the final product.

Similar to the findings of Kim (2005), we find customers who are highly involved with a product perceive more value in co-design. Thus, firms should target consumers who are highly involved in the product for co-design. With the increasing popularity of social media such as Facebook, Twitter, and Instagram, marketers can leverage these platforms to elicit favorable behavior from consumers right from creating awareness to encouraging purchase (Coulter and Roggeveen, 2012). The consumers with high product involvement may be identified by following blogs, discussion forums and social media where they discuss, ask and resolve queries, give suggestion, provide displays related to the product class they are involved with. By interacting with these customers, and by presenting them with visually appealing advertisements, mass customizers can position the co-design option as an offering with high value proposition.

The partial mediation results found in our study indicates that there may be other mediating variables that intervene in the relationships between CVPA and perceived value of co-design which future researchers can look into. Also, the role of CNFU in influencing the perceived value of could not be established as the empirical results using the data collected did not offer support for the relationship. Hence future studies should look into the role of CNFU. Including a lot of customers who have high need for uniqueness in the sample could possibly help to understand the relationship.

6. Conclusion

The mass customization offer caters to consumers who are buying mass produced standard off-the-shelf products and find them only good enough to meet their major requirements. If the customer has to look for a product very close to their individualized need among a huge variety of standard products available in the market, their search cost is likely to be very high. Among such customers, we expected that consumers who give high importance visual appeal and highly involved with the product class are likely to perceive greater value in an offer that provides an opportunity for them to co-design the product. Our empirical results suggest that consumers with high Centrality of Visual Product Aesthetic perceive more value in co-design offer. Further, people with high CVPA get more involved with the product and through that involvement, their perceived value of codesign.

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List of Symbols and Abbreviations

χ^2 - Chi-square
df – degrees of freedom
DIY - do-it-yourself
CNFU - Consumers’ Need for Uniqueness
CVPA - Centrality of Visual Product Aesthetics
EFA - Exploratory Factor Analysis
CFA - Confirmatory Factor Analysis
CR – Composite Reliability
AVE - Average Variance Extracted
MSV - Maximum Shared Variance
SRMR - Standardized Root Mean Square Residual
CFI - Comparative Fit Index
GFI - Goodness of Fit Index
TLI – Tucker – Lewis Index
RMSEA - Root Mean Square Error of Approximation