

# Effects of Perceived Quality Individuality on Brand Image and Customer Buying Behavior - Focus on Servitization of Manufacturing Industry

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## Abstract

**Background/Objectives:** The purpose of this study is to identify how the product and service individuality affects brand image and consumer behavior for domestic companies that do production, sales or service for industrial product.

**Methods/Statistical Analysis:** We selected domestic producers of multifunction office products as our subjects for study. Additionally, from December 2014 to February 2015, we collected 356 cases of self-administrated survey via various methods including visiting, fax, email and etc. Finally, we selected 330 cases after removing those with significant missing or insincere responses and utilized SPSS22.0 and AMOS 22.0 to conduct exploratory factor analysis and measurement model analysis.

**Findings:** This research was conducted to identity effects of perceived quality individuality (product individuality, service individuality) on brand image and customer buying behavior for domestic companies that do production, sales or service for industrial product. After fully understanding the concept and dimension of each variable from past studies, we utilized the results of validity and reliability testing of all measurements in our final analysis. According to structural equation modeling analysis, we came up with following conclusion on our hypotheses. Firstly, product individuality was found to have positive effect on brand image. Secondly, service individuality was found to have positive effect on brand image. Thirdly, brand image was found to have positive effect on customer buying behavior. Fourthly, product individuality was found to have positive effect on customer buying behavior. Fifthly, service individuality was found to have positive effect on customer buying behavior. Finally, brand image was found to have mediation effect on the relationship between perceived quality individuality and customer buying behavior. **Improvements/Applications:** These results emphasize the importance of brand image enhancement activities for domestic production and sales of industrial products and are meaningful in the sense that we were able to gain practical business intuitions via empirical study on products of particular brands.

**Keywords:** Brand Image, Customer Buying Behavior, Industrial Product, Perceived Quality Individuality, Product Individuality, Service Individuality

## 1. Introduction

Historically, the brand image has been greater importance for customer product marketing<sup>1</sup> while performance of products and quality of products and services has been greater importance for industrial product marketing<sup>2</sup>. However, recently, in the midst of industrial product market where companies have to compete against leading global brands and fast growing low-priced products from

countries like China, there have been increasing number of studies on the relationship between brand image and customer buying behavior<sup>3</sup>. This paper proposes practical suggestions for establishing industrial product brand marketing strategy by conducting empirical study on the structural relationship among product individuality, service individuality, brand image, consumer buying behavior specifically in domestic multifunction office products market, which is one of industrial product group.

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## 1.1 Quality Individuality, Perceived Quality, Product and Service Quality

Quality is defined as business strategy that satisfies internal and external customers by fulfilling their expectation of certain product/service<sup>4</sup>. In<sup>5</sup> defined quality as combination of various characteristics related to marketing, technology, manufacturing and maintenance, which fulfill customers' expectation while using the product or service<sup>5</sup>. Moreover, in<sup>6</sup> claimed that perceived quality should be defined as not only an overall emotion related to a certain brand but also reliability and quality that customers perceived from the brand. Also, they argued that customers recognize overall quality of certain product comprehensively. Defined perceived quality as customers' personal evaluation of the brand's superiority, in other words, subjectively recognized level of quality by the customers, which is irrelevant to objectively determined level of quality<sup>7</sup>.

Product quality is determined by the product's durability, reliability, precision, operational convenience, reparability, brand's reliability, price and other characteristics, which are influenced by the product's design, material, manufacturing technology, tools for measuring quality and management philosophy<sup>8</sup>. Hence, product quality is subjective evaluation made by the customer rather than something that can be objectively measured<sup>9</sup>. In<sup>10</sup> also argued that service quality is subjective judgment originated from the difference between the quality of the expected and actually provided service. Similarly, In<sup>11</sup> claimed that consumers recognize the service quality by comparing what they expected before they purchased that service and what they received through that service.

## 1.2 Brand Image

In<sup>12</sup> defined brand image as customer's perception and impression of that brand. In<sup>13</sup> stated that brand image can be defined as combination of customer's subjective impression and emotion about physical attributes of a product and overall image of that product conveyed to the customer as that product's brand become more popular. Also, argued that brand image can be defined as customer's subjective feelings or impression, and objective thoughts formed by various characteristics of product/service/brand<sup>14</sup>.

## 1.3 Customer Buying Behavior

Customer loyalty is defined as a satisfied customer's willingness to purchase or use specific product/service

continuously and repetitively<sup>15</sup>. In<sup>16</sup> defined customer loyalty as a customer's strong attachment to a product/service/brand and act of recommending that product/service/brand to other.

## 2. Proposed Work

### 2.1 Research Model

In order to identify effects of perceived product individuality on brand image and customer buying behavior within domestic multifunction office products market, we suggested a research model as demonstrated in Figure 1.

### 2.2 Research Hypotheses

#### 2.2.1 Relationship between Perceived Quality Individuality and Brand Image

After testing the hypothesis that improvement in perceived quality leads to greater brand equity in<sup>17</sup> claimed that when perceived service quality improves customers have more direct influence on brand image stated that high perceived service quality makes customers to choose that brand<sup>17</sup>.

Based on the past studies mentioned above, following hypotheses are formulated to identify the effects of perceived quality individuality on brand image.

H1: Quality individuality will have positive effect on brand image.

H2: Service individuality will have positive effect on brand image.

#### 2.2.2 Relationship between Brand Image and Customer Buying Behavior

The brand image plays an important role as it has both direct and indirect effects on customer buying behavior and brand loyalty<sup>18</sup>. The establishment of positive image

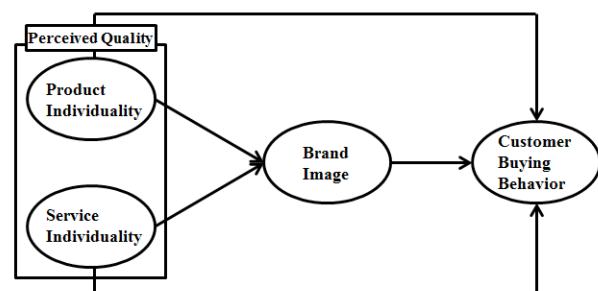


Figure 1. Research model.

and awareness of a company's brand in consumers' minds have strong influence on consumer response.

Based on the past studies mentioned above, following hypothesis is formulated to identify the effects of brand image on consumer buying behavior.

H3: Brand image will have positive effect on customer buying behavior.

### 2.2.3 Relationship between Perceived Quality Individuality and Customer Buying Behavior

In<sup>19</sup> argued that mutual relationship between the quality of service product and service provider is essential to customer satisfaction about the overall quality of the provided service. Moreover, in<sup>20</sup> claimed that service quality affects the service providers' business management and their consumers' behavior thereby ultimately influencing their business performance.

Based on the past studies mentioned above, following hypotheses are formulated to identify the effects of perceived quality on consumer buying behavior within industrial products market.

H4: Quality individuality will have positive effect on consumer buying behavior.

H5: Service individuality will have positive effect on customer buying behavior.

### 2.2.4 Mediation Effect of Brand Image

Unique and strong impression of a brand that customers have is a psychological factor that differentiates the quality of that specific brand's from that of others and has positive effect on consumer buying behavior, unrecognized values and loyalty<sup>21</sup>.

Based on the study mentioned above, we formulated the following hypothesis to identify the effects of brand image on the relationship between perceived quality individuality and consumer buying behavior.

H6: Brand image will have significant mediating effect on the relationship between perceived quality individuality and customer buying behavior.

## 2.3 Research Methods

### 2.3.1 Population and Sample Characteristics

In order to identify mutual relationship between brand image and customer buying behavior for particular domestic industrial product brands, we selected domestic

producers of multifunction office products as our subjects of study. Additionally, from December 2014 to February 2015, we collected 356 cases of self-administrated survey via various methods including visiting, fax, email and etc. Finally, we selected 330 cases after removing those with significant missing or insincere responses and utilized SPSS22.0 and AMOS 22.0 to conduct exploratory factor analysis and measurement model analysis.

### 2.3.2 Measurement and Operational Definition of Variables

By referring to what<sup>8</sup> suggested in their studies, we included four questions (print quality, customer satisfaction, product quality, information security) in perceived product individuality section. By referring to what<sup>2</sup> suggested in their studies, we included five questions (service technician's ability, problem solving ability, fulfillment of promise, attitude and time taken before arrival) in perceived service individuality section. Then, by referring to what<sup>12</sup> suggested in their studies, we included five questions (market centric, customer centric, professionalism, provision of necessary solution, environmental friendliness) in brand image section. Based on what<sup>15</sup> suggested, consumer buying behavior section comprises two questions (Intention of Repurchase, Intention of Recommendation). Survey comprises 16 questions. Variable survey questions were answered based on 10 point likert-scale where higher score signifies higher degree of agreement. Table 1 summarizes the composition of survey.

## 2.4 Empirical Analysis

### 2.4.1 Data Collection

Table 2 lists the characteristics of samples. The majority of the companies' locations were Seoul and Gyeonggi-do 57.0% and 59.1% of the companies had less than 20 employees. 58.4% of the companies experienced service frequency of less than once of month and 86.0% of

**Table 1.** Composition of survey

Measurement variables	No of questions	Preceding studies -- Ref
1.Product Individuality	4	[8]
2.Service Individuality	5	[9, 10]
3.BrandImage	5	[12, 13]
4.Customer Buying Behavior	2	[15, 16]
Total	16	-

**Table 2.** The characteristics of samples

Categories		Frequencies	%
Business Area	Seoul ·Gyeonggi	188	57.0
	Chugucheong Province	44	13.3
	Gyeongsang Province	62	18.8
	Jeolla Province	36	10.9
	Total	330	100
No of Employees	Less than 20	195	59.1
	20~299	90	27.3
	More than 300	45	13.6
	Total	330	100
Service Frequencies	Less than 1 month1 time	193	58.4
	1~3	127	38.4
	More than 4	10	3.3
	Total	330	100
Troubles Solving Period	Less than 1 day	284	86.0
	1~3	44	13.4
	More than 4	2	0.6
	Total	330	100

the companies had less than one day of trouble solving period.

### 2.4.2 Validity and Reliability Analysis

We performed exploratory factor analysis for testing the validity, principal component analysis for variable selection and orthogonal rotation for simplification process. Our analysis is based on those components with eigen values greater than 1.0 and loadings greater than 0.40. We initially chose product individuality, service individuality, brand image, customer buying behavior as the key variables based on previous studies. Then, we decided to use all four variables in our analysis based on our reliability testing results for each variable where all four variables were identified to be reliable with Cronbach'  $\alpha$  values falling within 0.878 and 0.970 (defining Cronbach'  $\alpha > 0.8$  as reliable) as shown in Table 3.

### 2.4.3 Measurement Model Analysis

We performed measurement model analysis to test the goodness of fit for the selected measurement model and, validity and reliability of measurement metrics. Table 4 to assess the fitness of data we used CMIN/DF (<3.0, GFI·AGFI· CFI·NFI·TLI (>0.9), RMR·RMSEA (<0.05). After eliminating PI.1, PI.6, PI.7, PI.8 from product individuality based on their SMC values, our analysis showed t values greater than 1.965, and SMC values greater

**Table 3.** Exploratory factor analysis and reliability test

MV	PI	SI	BI	CBB	Ca
PQ.5	.935				.970
PQ.2	.933				
PQ.4	.931				
PQ.3	.779				
SQ.5		.856			.944
SQ.4		.849			
SQ.3		.846			
SQ.2		.843			
SQ.1		.791.			
BI.1			.831		.906
BI.4			.806		
BI.2			.773		
BI.3			.749		
BI.5			.740		
Rec				.821	.878
Rep				.794	
OV	4.097	3.749	3.733	1.666	
V%	25.606	23.434	23.330	10.411	
AV%	25.606	49.040	72.370	82.781	

Ref 1) PQ: Product Quality Ref 2) PQ: Service Quality

Ref 3) BI: Brand Image Ref 4) Rec: Recommended

Ref 5) Rep: Repurchase Ref 6) Ca: Cronbach'  $\alpha$

Ref 7) OV: Original Value Ref 8) V%: Variance %

Ref 9) AV%: Accumulation Variance %

**Table 4.** Goodness of fit of measurement model

Measure	SRW	SE	t-value	p	CR	AVE
PQ	2	.999	-	-	.966	.877
	3	.972	.033	23.532	***	
	4	.998	.005	214.649	***	
	5	.987	.009	106.778	***	
SQ	1	.826	-	-	.939	.756
	2	.802	.063	17.551	***	
	3	.889	.057	21.046	***	
	4	.933	.052	22.473	***	
	5	.929	.053	22.288	***	
BI	1	.866	-	-	.929	.723
	2	.821	.005	18.754	***	
	3	.784	.048	17.394	***	
	4	.845	.052	19.683	***	
	5	.747	.054	16.138	***	
Rep	.908	-	-	-	.886	.795
Rec	.864	.058	17.724	***		
Goodness of fit – Measurement model	<Initial / Final model> Chi-Square=163.704, df=98, p=.000,CMIN/DF=1.670 GFI=.945, AGF=.923, CFI=.990, NFI=.976, IFI=.990 TLI=.988, RMR=.043, RMSEA=.045					

Ref 1)SRW: Standardized Regression WeightsRef 2)SE: Standard Error

Ref 3)CR: Construct Reliability Ref 4) AVE: Average Variance

Extracted

than 0.4, which signifies that our predictors explain most variance in response variables. Measurement model is proved to be appropriate with according to CMIN/DF 1.670, GFI .945, AGFI .923, CFI.990, NFI .976, IFI .990, TLI .988, RMR.043, RMSEA .045.

After confirming convergent validity of the measurement model, we performed distinction validity analysis. Table 5 shows the results of distinction validity analysis based on the assumption that AVE value being greater than the square of correlation coefficient confirms distinction validity.

Distinction validity was confirmed as the AVE values of each latent variable were greater than the coefficient of determination of the relationship between brand image and customer buying behavior, which has the highest correlation.

#### 2.4.4 Research Model Analysis

To evaluate our research model, we tested its goodness of fit as a structural equation model. Table 6 shows how all the Goodness of Fit measures for the research model satisfy their corresponding reference values.

**Table 5.** Distinction validity analysis

	PI	SI	BI	CBB
PI	<b>.877</b>			
SI	.478	<b>.756</b>		
BI	.509	.617	<b>.723</b>	
CBB	.562	.587	.668	<b>.795</b>

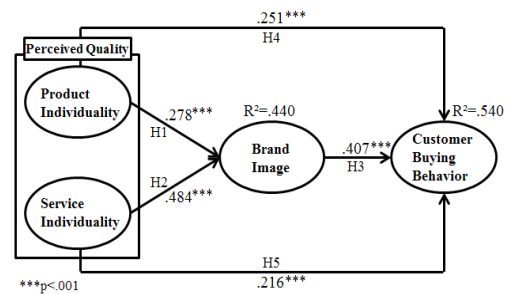
Ref ) Bolded values: AVE values

**Table 6.** Goodness of fit of research model

	Reference Value	Measured Value
Chi-Square	–	163.704
df	–	98
P	>.05	.000
CMIN/DF	< 3.0	1.670
GFI	>.90	.945
AGFI	>.90	.923
CFI	>.90	.990
NFI	>.90	.976
IFI	>.90	.990
TLI	>.90	.988
RMR	<.05	.043
RMSEA	<.05	.045

#### 2.4.5 The Results of Hypothesis Testing

As the research model is found to be appropriate, we analyzed path coefficients for detailed hypothesis testing and results are shown in Figure 2. For multifunction office product, which is an example of industrial product, it was found that higher product individuality leads to higher brand image (standardized coefficient  $\beta = .278$ ,  $P = .001$ ), higher service individuality leads to higher brand image (standardized coefficient  $\beta = .484$ ,  $P = .001$ ), higher brand image leads to higher customer buying behavior (standardized coefficient  $\beta = .407$ ,  $P = .001$ ). Also, it was found that higher product individuality leads to higher customer buying behavior (standardized coefficient  $\beta = .251$ ,  $P = .001$ ) and higher service individuality leads to higher customer buying behavior (standardized coefficient  $\beta = .216$ ,  $P = .001$ ).



**Figure 2.** Path coefficient analysis.

**Table 7.** The mediation effect path coefficients of research model

Structure Path	Mediation Effect	p
PI $\rightarrow$ BI $\rightarrow$ CBB	.113	**
SI $\rightarrow$ BI $\rightarrow$ CBB	.197	**

**Table 8.** The Results of Hypothesis Testing

Hypothesis	Hypothesis to be Testing	Result
H1	Quality individuality will have positive effect on brand image	Accept
H2	Service individuality will have positive effect on brand image	Accept
H3	Brand image will have positive effect on consumer buying behavior	Accept
H4	Quality individuality will have positive effect on customer buying behavior	Accept
H5	Service individuality will have positive effect on customer buying behavior	Accept
H6	Brand image will have significant mediating effect on the relationship between perceived quality individuality and customer buying behavior	Accept



Also, as Table 7 shows, brand image's mediation effect was found to be statistically significant using the Bootstrapping method.

Finally, Table 8 shows the results of hypothesis testing on the effects of perceived quality individuality on brand image and customer buying behavior.

### 3. Conclusion

#### 3.1 Results and Implications

This research was conducted to identify the effects of perceived quality individuality (product individuality, service individuality) on brand image and customer buying behavior for domestic companies that do production, sales or service for industrial product.

After fully understanding the concept and dimension of each variable from past studies, we utilized the results of validity and reliability testing of all measurements in our final analysis. According to structural equation modeling analysis, we came up with following conclusion on our hypotheses. Firstly, product individuality was found to have positive effect on brand image. Secondly, service individuality was found to have positive effect on brand image. Thirdly, brand image was found to have positive effect on customer buying behavior. Fourthly, product individuality was found to have positive effect on customer buying behavior. Fifthly, service individuality was found to have positive effect on customer buying behavior. Finally, brand image was found to have mediation effect on the relationship between perceived quality individuality and customer buying behavior.

These results suggest that it is necessary to reinforce policies on product's quality individuality, service individuality and brand image for servitization of industrial product manufacturing industry.

#### 3.2 Limitations and Future Research Directions

This study has the following limitations and attempts to suggest directions for future research: Firstly, within the selected population, the companies that have used domestic multifunction office products, it is advisable to develop deeper analysis especially those companies with less than 20 employees (59.1% of population). Secondly, it is advisable to consider more diverse factors that influence brand image other than product individuality and service individuality.

### 4. Acknowledgments

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