Key Factors in the Success of the Customization of Products in Taiwan

Chen-Yi Hsu, Department of International Business, Kainan University, Taiwan
Jyun-Nan Tang, Department of International Business, Kainan University, Taiwan

ABSTRACT

Purpose – The goal of an company is to produce products that can satisfy their consumers. The purpose of this study is to explore the key successful factors of the product customization in Taiwan and how to improve it. Design/methodology/approach – Based on the three constructs and 12 principles concluded from the past research and using DEMATEL in combination with ANP, this study explores the related influence and weights among these key successful factors. Findings – Research results demonstrate that, in the phase of constructs, consumer behavior possesses the highest level of influence. In the phase of principles, consumer environment and product prices are regarded as the key successful factors that have the highest influence and affected level. In addition, product prices are the most critical principle. Originality/value – This study find out the key successful factors of the product customization in Taiwan and propose suggestions for business and academic research to make reference to relevant research topics for future customization.

Keywords: Customization of Product, DEMATEL, ANP, Paper type Research paper

INTRODUCTION

People acknowledge fitness exercise as crucial to maintaining good health, therefore, the level of participation in these activities has grown continuously. Tharrett and Peterson (2006) identified fitness activities, such as running, biking, Pilates, yoga, aerobic dance, biking, aquatics, and weight training. The growing popularity of fitness exercise has driven the development of fitness activity product markets.

In this consumer-oriented society, the goal of many companies is to produce products that can satisfy their consumers and develop a competitive edge. Every aspect of a product such as utility, value and quality should satisfy the needs of consumers. However, whilst achieving customized products and producing them in an efficient and appropriate way, companies should take into account the real thoughts and feelings of consumers. In addition to a survey on the after-sales, an understanding of the market and consumers before production commences should be emphasized by many companies.

Through the exploration of the research background and motivation, the goal of this study is to discuss the related literatures. Moreover, the study further explores the key principles, weights, and related factors of the topic.

Background and motivation

With increasing consumption awareness, consumers are now altering attention to their needs and the uniqueness of products. In order to satisfy the needs of consumers and increase satisfaction, manufacturers tend to adopt a customized strategy for their products.

From the viewpoint of product management, customization is a strategy that is gradually applied to increase product value. A configuration system could meet the consumer needs, ensuring that consumer
needs can be satisfied and that costs are maintained at the same time (Kurt Matzler et al., 2010).

Nikola et al. (2011) pointed out that many companies believe that if customization could be appropriately understood and executed, a commercial and strategic mechanism can be applied to most companies. Through customization, companies could realize the product needs of their consumers and could produce those products that can satisfy the individual needs of those consumers. Developed countries also recognize the importance of customized products' competitive edge. Companies producing customized products have gained a competitive edge to realize consumer needs.

Research Purpose

With fierce competition in the market, traditional standardized products may not be able to satisfy some consumers. In order to increase satisfaction and loyalty of consumers and strengthen their competitive edge in the market, more and more companies provide customized products or services.

Based on the above research background and motivation, this study aims to explore the key successful factors for the customization of products. It will also further explore the related influence and importance of product customization constructs, hoping to offer a reference for the evaluation and improvement of customized strategies in this industry.

Research Method

This study made use of a review of literatures to ascertain three constructs for the customization of products stated by scholars in the past, including consumer behavior, consumer satisfaction, and consumer loyalty. In this study, 12 principles are used for design; DEMATEL is used for the assessment and analysis. Questionnaires were distributed to experts and scholars to complete and the analyzed data were studied based on the returned questionnaires. The influencing weights were calculated through the basic ANP concept and improved planning that is based on the weights and plan performance to find out the influencing successful factors of the customization of products.

Literature Exploration

This section, through a literature review, was conducted mainly to explore the key successful factors for customized products, and was based on the exploration and arrangement of previous researches in all fields. It is used as the theoretical basis in this study.

Customization

Anderson et al. (1999) said that the concept of customization is to manufacture and design individualized products to increase the satisfaction of consumers. Kaplan and Haenlein (2006) pointed out that a customized strategy adopted by companies to satisfy the individual needs increases product value. In the process of manufacturing and assembling products, through the interaction between companies and consumers, the product needs of customization are established to suit the production costs and product price. Baran et al. (2008) believe that the customization of consumer relationship management refers to an organization’s capability to use product, price and marketing channels to suit consumers or companies.

Bharadwaj et al. (2009) pointed out that there are more researches that understand the preferences of consumers, in which consumers prefer to choose customized products. However, Strauss and Frost (2009) held that customization is to satisfy the personal needs of consumers. In other words, a unique technique or method is conducted to satisfy the needs of consumers who need a certain product. Ivica and Natasa (2011) said that different consumers can select individual product components to meet their
different needs. Therefore, consumers could acquire a unique composite product from many product function portfolios with many possibilities. Hira Cho and Susan (2009) held that customization is a type of strategy that can offer consumers extra product value.

Synthesizing all the ideas of the above scholars' researches about the customization of products to explore and define the customization of products as the strategy that can satisfy the behavioral needs of consumers. The correct strategy can also improve the satisfaction of consumers in order to achieve consumer loyalty, and mainly increase value for products, competitive edge in the market, and product uniqueness etc.

**Consumer Behavior**

In 1985, the American Marketing Association (AMA) defined consumer behavior as the dynamic interaction between feelings and cognition, behavior and environment to satisfy personal or organizational objects through the exchange of human behavior.

Leon and Leslie (2000) believed that consumer behavior is the actions conducted through the process of thinking, psychological cognition and previous learning in order to achieve a specific goal. McKenzie (2001) proposed four consumer product appeals of products from companies: (1) appeal through prices: a reduced price or efficient purchase experience can be regarded as bringing value to common consumers; (2) appeal through products: in order to divide consumers into some group to create value, customized products need collaboration and coordination to encourage the design of good products; (3) appeal through demands: based on the personal services required by consumers, these are conducted to bring value; (4) appeal through value: based on commonly stipulated solutions, the service model and the products that are beneficial to both parties are conducted to increase value.

Hoyer and MacInnis (2008) pointed out that consumer behavior consists of all the content related to the decisions made by consumers over a certain period of time and is on the basis of their cultural background, living environment, psychological factors as well as the process of behavior and conception of product prices, features, services, purchase channel, consumption and other functions. Leon and Leslie (2001) proposed that purchase decisions are affected by surrounding people, events, objects as well as consumers’ feelings, mood, and emotions. This process consists of input, processing and output.

This study is based on the idea that consumer behavior is affected by consumption environments, social culture, product information, consumption assessments of prices, utilities, needs, and the convenience of products that eventually affect consumers' purchase behavior.

**Consumer Satisfaction**

Westbrook (1980) believed that the effective management of consumer satisfaction with consumer services will generate significant interest and have a huge impact on the sales and performance of a business.

Consumer satisfaction begins with the design of products and services, in which product design consists of the production capacity planning, manufacturing process selection, system design, and analysis of locations. The decisions made in the product and service designs will affect the comprehensive competitiveness of a business and organization; process selection and capacity planning will also affect the operation of the production system and consumer satisfaction (Stevenson, 2010). Stevenson (2010) proposed Kano Model to conceptualize the satisfaction of consumers and divided consumers into three types: charming, expecting and necessary, which can describe the needs and degrees of the satisfaction of consumers. Necessary basically meets the satisfaction of consumers but does not increase it. Expecting
will steadily increase consumer satisfaction while charming will offer even further satisfaction than expecting with the disproportional growth in satisfaction.

This study defined the satisfaction of consumers as whether or not the results arising after the purchase and usage of products met the expectations that consumers had before the purchase products. Factors affecting consumer satisfaction include product value, brand image, product quality, and company commitment.

**Consumer Loyalty**

Jones and Sasser (1995) believed that consumer loyalty is the willingness to repurchase a particular product or service and can be divided into two kinds: long-term and short-term loyalty. The consumers who have long-term loyalty will not easily change their minds and the consumers who have short-term loyalty will turn to other brands when having a better product.

According to the traditional marketing theories, Oliver (1999) proposed the conceptual model of beliefs, attitudes, and intentions formed by consumer attitudes. Putting behavioral construct into consideration, he divided consumer loyalty into four types: (1) cognitive loyalty: with consideration of price only, consumers think that the products of this brand are relatively better choose; (2) affective loyalty: when consumers identify with information related to the products and further generate their preference towards this brand. Therefore, consumers will commit to this brand. The loyalty behind this behavior comes from the cognitive emotions of consumers; (3) conative loyalty: consumers have positive comments and evaluations of the products of this brand, and further generate a willingness to purchase. The attraction of this brand to consumers will be strengthened; (4) action loyalty: consumers have strong repurchase willingness for this brand and actual purchases will not be affected by other factors.

Kandampully (1998) believed that consumer loyalty is the guarantee of companies toward consumers in quality of products or services. Joel et al. (2008) pointed out that the emphasis on the characteristics and differentiation of products should ensure that products have the color, functions, styles, and senses that consumers prefer. Those factors will strengthen the feelings of consumers to try a product, and thus increase the added value of the products and consumers’ willingness to repurchase.

Synthesizing the ideas of consumer loyalty proposed by the above scholars to explore and define consumer loyalty as the willingness to repurchase a product after purchasing and usage. The satisfaction of product reliability, service, and expectation guarantee affects the willingness to repurchase.

**Research Design**

The first section of this chapter establishes the research constructs and principles for this study. The second section sets up the evaluation mode and the third section elaborates the basic concepts and operating procedures.

**Research Framework**

The principles and constructs of this study are based on the exploration of the literatures in Chapter Two. They confirm the customization of products in all affected companies and further conduct an evaluation of the related important elements in this study, which are shown in the following Figure 1:
Construction of Evaluation Model

Based on the exploration and induction of the literatures in this study, the important factors in the establishment of customization can be concluded as three constructs and 12 principles. The relevant constructs and principles are illustrated in the following table 1.

<table>
<thead>
<tr>
<th>Table 1: Constructs and Principles</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constructs</td>
</tr>
<tr>
<td>CONSUMER BEHAVIOR (A)</td>
</tr>
<tr>
<td>Product Price (a1)</td>
</tr>
<tr>
<td>Product Functions (a2)</td>
</tr>
<tr>
<td>Consumer Demands (a3)</td>
</tr>
<tr>
<td>Product Convenience (a4)</td>
</tr>
<tr>
<td>Consumer Environment (a5)</td>
</tr>
<tr>
<td>CONSUMER SATISFACTION (B)</td>
</tr>
<tr>
<td>Product Value (b1)</td>
</tr>
<tr>
<td>Product Image (b2)</td>
</tr>
<tr>
<td>Product Quality (b3)</td>
</tr>
<tr>
<td>Product Guarantee (b4)</td>
</tr>
<tr>
<td>CONSUMER LOYALTY (C)</td>
</tr>
<tr>
<td>Product Trust (c1)</td>
</tr>
<tr>
<td>Product Services (c2)</td>
</tr>
<tr>
<td>Product Guarantee (c3)</td>
</tr>
</tbody>
</table>
DEMATEL

Origin and basic assumption of the DEMATEL

Decision Making Trial and Evaluation Laboratory (DEMATEL) was developed by the Battelle Institute, based in Geneva, in 1971 to solve the issue of technology and humans. The DEMATEL is used to solve complicated and mutually intricate problems in order to understand the nature of problems, which is conducive to the study of decisions. Tzeng et al. (2008) employed the basic concept of this method to extend the evaluation of many non-independent problems. In DEMATEL, the elements of the analysis shall satisfy the following hypotheses: (1) the need to confirm the nature of the problem: in the generation and planning stage, the nature of the problem shall be clearly understood; the right way to cut into the problem and to define the problem. (2) the need to show the correlation of problems: starting from the factors of each problem and showing the correlation with other factors. The numbers of 0, 1, 2, 3, 4, etc. are used to show the strength of the correlation; (3) the need to understand the features of the nature of the factors of each problem: for each factor of the problem, a related problem analysis is conducted once again to illustrate the arguments based on the results (including agreement and disagreement). Generally speaking, it is hard for a mathematical model to express social or biological systems. Regarding the common method, based on objective things, DEMATEL confirms the mutual dependence and restriction among variables. Therefore, it can reflect the features of the nature of the system and the tendency of evolution.

Framework and Operational Mode of DEMATEL

Tzeng et al. (2008) pointed out that the Battelle Institute developed DEMATEL in order to find a strategy to solve current interrelated problems. This method carries the following features:
(1) Quantitative analysis of the correlation among criteria
(2) The structural confirmation through a questionnaire
(3) The statistical analysis of multi-item structures.
(4) Finding the difference between respondents in the framework

Regarding the DEMATEL questionnaire analysis method, the feature of the questionnaire is a matrix. For the necessary analysis and conclusion in the future, a quantitative analysis will be conducted to measure the relationship and the direct influence among the criteria. The respondents can be integrated into the structural mode as a group.

Structural Model

With data indicating the strength of the correlation among each principle collected and demonstrated in the form of a matrix or network map, a structural model of the respondents is created. This can calculate the strength of the correlation with each problem and the gap in the correlation with other factors can be displayed. The numbers of 0, 1, 2, 3, 4 etc. are used to display the strength of the relationship, and understand the nature of the factors of each problem. In the establishment of the group structural model, the mathematical mean of the subjects is taken to acquire the point of contact for the increase in complexity. After having deleted the relationship under the point of contact, a simplified group structural model is formed.

Structural Analysis

A. There are three steps to conduct a DEMATEL structural analysis
(1) Find out the average matrix
If there are R experts and factors involved in this study, each expert is required to point out the degree of influence of factor i on factor j. A comparison matrix $a_{ij}$ is formed between every two factors, in which the correlation is labeled with 0 (no effect), 1 (low impact), 2 (normal impact), 3 (high impact), and 4 (extremely high impact) in order. These positive values evaluated by experts can be use to form an $n \times n$ matrix $X = \begin{bmatrix} x_{ij} \end{bmatrix}, 1 \leq k \leq R$, i.e. $X^1, X^2, ..., X^R$, indicating that in every matrix without negative values among R experts, every factor $x_{ij}$ in $X^k$ is an integer. If we set the diagonal factor in every answer matrix 1 as 0, we can calculate the average $n \times n$ matrix $A$ among R experts; the formula is as follows (1):

$$a = \frac{1}{R} \sum_{k=1}^{R} x_{ij}^k$$  (1)

The average matrix $A = \begin{bmatrix} a_{ij} \end{bmatrix}$ can be also called a direct relationship matrix. A represents the initial relationship between A and other factors. In addition, through the causal relationship of every pair of factors, we can draw the map of the direct relationship for the factors.

(2) calculate the standardized Direct Relationship Matrix

A standardized Direct Relationship Matrix $D$ is acquired from the average matrix $A$ with the following formulas (2) and (3)

$$S = \max \left( \frac{\max_{1 \leq i \leq n} \sum_{j=1}^{n} a_{ij}, \max_{1 \leq j \leq n} \sum_{i=1}^{n} a_{ij}}{\max_{1 \leq i \leq n} \sum_{j=1}^{n} a_{ij}} \right)$$  (2)

Let

$$D = \frac{A}{S}$$  (3)

In matrix $A$, the sum of every row $j$ refers to the total direct influence of factor $i$ on other factors; the sum of every row $i$ refers to the total direct influence of factor $i$ on other factors. $\max_{1 \leq i \leq n} \sum_{j=1}^{n} a_{ij}$ refers to the strongest direct influence of the affected factors, and $S$ is the upper limit for the relatively large value. Matrix $D$ is acquired from the separation of every single factor in matrix $A$ and every single factor $d_{ij}$ in matrix $D$ varies from 0 to 0.99.

(3) Calculation of the Total Relationship Matrix

Among all factors related to problems, the non-direct influence will be on a constant decrease with the increase in the times of power, such as $D^2, D^3, \ldots, D^I$. The convergent solution of the insurance is an inverse matrix, which is similar to the Markov Chain Matrix,  

$$\lim_{I \to \infty} D = [0]_{nxn},$$

in which 0 is a zero matrix of nxn while 1 is a unit matrix of nxn. The total relationship matrix $T$ is a zero matrix of nxn. The definition is as follows:

$$T = D + D^1 + D^2 + \ldots + D^I = D(I - D)^{-1}$$  (4)

Protracting a Causal Figure

$T = [t_{ij}]$. $t_{ij} = 1, 2, ..., n$ are the factors of the total relationship matrix $T$, and the total sum and the sum of each line are represented, respectively, by $r_i$ and $c_j$ with the definitions as follows (5), (6).
\[ r_j = \left( \sum_{i=1}^{n} r_{ij} \right)_{j \in 1} \quad (5) \]

\[ c_j = \left( \sum_{i=1}^{n} c_{ij} \right)_{1 \in j} \quad (6) \]

\( r_j \) represents the total direct or indirect influence cast by factor i on other factors; \( c_j \) refers to the sum of influence affected by other factors when factor j is regarded as the result. \( (r_j + c_j) \) is called prominence referring to the total degree of affecting and being affected through this factor, which can show prominence in this issue; \( (r_j - c_j) \) is called relation. After the subtraction, if the value is positive, this factor tends to be the cause, with the horizontal axis, \( (r_j + c_j) \), and the vertical axis, \( (r_j - c_j) \).

Therefore, a causal relationship will be reduced to a clear structure and offer solutions in order to deepen the understanding. In addition, based on the interpretation of this causal figure, the decision-maker can make appropriate decisions based on different types of causes or effects.

**Integration DEMATEL and ANP**

Analytical Network Process Management (ANP) was proposed by the scholar Saaty in 1996. It is the extended method of Analytical Hierarchy Process (AHP) and was an improvement on the latter. Saaty used ANP to obtain the weights of multi-principle decisions in order to offer the choices for research schemes or information system plans. Having used DEMATEL to confirm the model framework and the relationship of mutual influence among principles, this study further employed ANP to acquire more precise influencing weights.

This study then adopted the total influence relationship matrix \( T \) of DEMATEL in the application and extension of the super matrix of ANP in order to divide the problems into many different types of clusters. If the usage of DEMATEL can only acquire the mutual relationship of inner dependence and needs ANP to confirm the mutual relationship of the outer dependence among clusters, this study will break the bottleneck of the traditional hypotheses. It employed DEMATEL to acquire the total influence relationship matrix, in which the dynamic influence relationship of important degrees is similar to the importance of the principles and the concept of influence acquired through the questionnaires and ANP.

The decision-making programs of ANP can be divided into the following four stages:

1. Confirm the problems about decision-making and establish the structure of the problems. After having described the problems, it can establish the problem with a network hierarchy structure.
2. Employ the total influence relationship matrix acquired from DEMATEL to standardize the degree of total influence of each layer and construct an un-weighted super-matrix shown in formula (7)

\[
T_c = \begin{bmatrix}
T_{11} & T_{12} & \cdots & T_{1n} \\
T_{21} & T_{22} & \cdots & T_{2n} \\
\vdots & \vdots & \ddots & \vdots \\
T_{n1} & T_{n2} & \cdots & T_{nn}
\end{bmatrix}
\]
After having standardized the total degree of the important influence relationship matrix $T_c$, we acquired matrix $T_c^{\alpha}$, the results are shown in formula (8):

$$T_c^{\alpha} = \begin{bmatrix} D_1 & D_2 & \ldots & D_n \\ e_{11} & e_{12} & \ldots & e_{1n} \\ \vdots & \vdots & \ddots & \vdots \\ e_{n1} & e_{n2} & \ldots & e_{nn} \end{bmatrix}$$

In which, the way to standardize $T_c^{\alpha1}$ is the same as $T_c^{\alpha n}$ before, as shown in the following formulas (9) and (10):

$$d_i = \sum_{j=1}^{n} t_{ij}$$

$$T_c^{\alpha1} = \begin{bmatrix} t_{c11}^{1} & t_{c12}^{1} & \ldots & t_{c1n}^{1} \\ \vdots & \vdots & \ddots & \vdots \\ t_{cn1}^{1} & t_{cn2}^{1} & \ldots & t_{cnn}^{1} \end{bmatrix} \times \begin{bmatrix} t_{c11}^{2} & t_{c12}^{2} & \ldots & t_{c1n}^{2} \\ \vdots & \vdots & \ddots & \vdots \\ t_{cn1}^{2} & t_{cn2}^{2} & \ldots & t_{cnn}^{2} \end{bmatrix} = \begin{bmatrix} t_{c11}^{11} & t_{c12}^{11} & \ldots & t_{c1n}^{11} \\ \vdots & \vdots & \ddots & \vdots \\ t_{cn1}^{11} & t_{cn2}^{11} & \ldots & t_{cnn}^{11} \end{bmatrix}$$

At the same time, the standardized total degree of important influence relationship matrix is filled in the super-matrix based on the mutual dependence relationship among the clusters, which is an un-weighted super-matrix shown in formula (11):

$$W = \begin{bmatrix} D_1 & D_2 & \ldots & D_n \\ e_{11} & e_{12} & \ldots & e_{1n} \\ \vdots & \vdots & \ddots & \vdots \\ e_{n1} & e_{n2} & \ldots & e_{nn} \end{bmatrix}$$

If there are gaps or 0 matrix, there will be independent and not a relied relationship among clusters or principles. The way to acquire other $W^{nn}$ is the same as those of $W^{11}$ and $W^{12}$ shown in formula (12):
In order to acquire a weighted super-matrix, let the total degree of important influence relationship matrix be integrated and standardized based on the degree of influence for each construct of each layer shown in formula (13):

\[
T_D = \begin{bmatrix}
\frac{t_{11}^{11}}{d_1} & \frac{t_{11}^{12}}{d_1} & \cdots & \frac{t_{11}^{1n}}{d_1} \\
\vdots & \vdots & & \vdots \\
\frac{t_{1j}^{11}}{d_j} & \frac{t_{1j}^{12}}{d_j} & \cdots & \frac{t_{1j}^{1n}}{d_j} \\
\vdots & \vdots & & \vdots \\
\frac{t_{nj}^{11}}{d_n} & \frac{t_{nj}^{12}}{d_n} & \cdots & \frac{t_{nj}^{1n}}{d_n}
\end{bmatrix}
\]  

(13)

Standardize the total degree of important influence relationship matrix \(T_D\) and acquire \(T_D^\alpha\), the results are shown as formula (14):

\[
T_D^\alpha = \begin{bmatrix}
\frac{t_{11}^{11}}{d_1}^\alpha & \frac{t_{11}^{12}}{d_1}^\alpha & \cdots & \frac{t_{11}^{1n}}{d_1}^\alpha \\
\vdots & \vdots & & \vdots \\
\frac{t_{1j}^{11}}{d_j}^\alpha & \frac{t_{1j}^{12}}{d_j}^\alpha & \cdots & \frac{t_{1j}^{1n}}{d_j}^\alpha \\
\vdots & \vdots & & \vdots \\
\frac{t_{nj}^{11}}{d_n}^\alpha & \frac{t_{nj}^{12}}{d_n}^\alpha & \cdots & \frac{t_{nj}^{1n}}{d_n}^\alpha
\end{bmatrix}
\]  

(14)

Lead the standardized total degree of important influence relationship matrix \(T_D^\alpha\) into an un-weighted super-matrix and acquire a weighted super-matrix shown in formula (15):

\[
W = \begin{bmatrix}
t_{d_1}^{a_{11}} \times W^1 & t_{d_1}^{a_{12}} \times W^2 & \cdots & t_{d_1}^{a_{1n}} \times W^n \\
t_{d_2}^{a_{21}} \times W^1 & t_{d_2}^{a_{22}} \times W^2 & \cdots & \vdots \\
\vdots & \vdots & & \vdots \\
t_{d_m}^{a_{m1}} \times W^1 & t_{d_m}^{a_{m2}} \times W^2 & \cdots & t_{d_m}^{a_{mn}} \times W^n
\end{bmatrix}
\]  

(15)

(4) In order to acquire a limited super-matrix, make the weighted super-matrix multiply many times and acquire a limit super-matrix. We can then get the weights for each evaluation principle, in which \(W\) is the limit super-matrix and \(h\) stands for any number.
Analysis of Empirical Studies

This chapter offers an analysis of the research background and problem description. After having verified the influence relationship of DEMATEL and calculated the constructs, through DANP, the degree of influence and value of weights, this study explored the valued items of all factors with the help of the degree of importance established by experts and scholars.

Basic Data of the Questionnaires

This study used questionnaires and a one-to-one interview was carried out to acquire the experts and scholars' perspectives. The main objects were experts and scholars equipped with many years of marketing, product management and related backgrounds. In total, there were 30 questionnaires and 26 of them were effective. These questionnaires were sent out from February 2012 to April 2012.

Analysis of Research Background and Problem Description

In an increasingly competitive market and with the promotion of consumer awareness, consumers pay more and more attention to their demands and the unique characteristic of products. In order to satisfy consumers and increase consumer satisfaction, manufacturers are more likely to adopt a customized strategy. The studies of Senanayake and Little (2010) showed that a customized strategy is one of the most important strategies for modern companies. It not only strengthens an company’s competitive edge in the market, but also offers multiple choices for consumers and, most importantly, adds product value in order to increase consumer satisfaction. This study synthesizing those perspectives will explore each influencing factor and value those factors to conduct market planning in the execution of a customized strategy to offer a reference for companies and companies.

The Verification of the Influence Relationship of the DEMATEL

This study employed DEMATEL to confirm the structure of problems and analyzed the mutual influence relationship among three constructs and 12 principles. The relationship tables between Matrix T of the total influence relationship and the degree of influence are shown in table 2 to table 5:

| Table 2: Matrix T of the Relationship with Total Influence among the Constructs |
|-----------------|--------|--------|--------|
| T               | A      | B      | C      |
| A               | 0.705  | 0.778  | 0.756  |
| B               | 0.775  | 0.832  | 0.83   |
| C               | 0.749  | 0.83   | 0.778  |

| Table 3: The Relationship of the Degree of Influence among the Constructs |
|-----------------|--------|--------|---------|----------|
| H               | da(affecting) | ra(being affected) | d+a(r(prominence)) | d-ar(relation) |
| A               | 2.2391  | 2.229   | 4.468   | 0.01     |
| B               | 2.4367  | 2.4042  | 4.877   | -0.004   |
| C               | 2.3575  | 2.364   | 4.721   | -0.007   |
| Max             | 2.4367  | 2.4042  | 4.877   | 0.01     |
| Min             | 2.2391  | 2.229   | 4.468   | -0.007   |
In terms of the relationship of the degree of influence on the constructs in table 4, it can be seen that consumer satisfaction (B) is the most influential factor while consumer behavior (A) is the least influential when compared with other factors. In terms of the relationship of the degree of influence on the principles, as shown in table 5, product quality (b3) is the most important factor for consideration among the 12 principles while consumer environment (a5) is the least influential factor among all the principles. In addition, it is apparent from the degree of being affected among the principles that the most easily affected factor is product price (a1) among all the principles.

From table 3, prominence (di + rj) that represents importance can be calculated. A high value stands for a higher level of importance. From the perspective of the constructs, consumer satisfaction (B) is relatively valued by experts, in which product quality (b3) is the highest in terms of prominence (di + rj). That means experts hold that it is the most important principle, followed by product value(b1), product price(a1), product image(b2) and product guarantee(c3). From table 3, relation (di - rj) can be calculated to represent the influence of principles and the degree of being influenced. A higher level of value stands for a higher level of importance. From the perspective of construct, in terms of relation, the highest one is consumer behavior (A). This indicates that among all three constructs, it is the one that carries the strongest influence. The factor with the minimum influence is consumer loyalty (C) and this construct is
the easiest to be affected by other constructs. From the perspective of principles, the highest one is product quality (b3) in terms of relation (di - rj). This indicates that among all the principles, it carries the most direct influence rather than other factors. The least is product price (b1) and this indicates that it is the easiest one to be affected by other principles.

In protracting the figure for the causal relationship, (di + rj) is the horizontal axis and (di - rj) is the vertical axis. Three constructs and 12 principles were used as indicators in the figure for the causal relationship of each factor for customized products, as shown in Figure 2:

![Figure 2: The Causal Relationship of Each Factor for Customized Products](image)

From Figure 2, it can be realized that, in the strategy of customized products, consumer behavior (A) is the most influential and has a further influence on consumer satisfaction (B) and consumer loyalty (C). Both were affected by the previous two constructs. In the construct of consumer behavior (A), consumer environment (a5) has the strongest influence. Consumer demands (a3), product convenience (a4), and product functions (a2) are all affected by consumer demand. Regarding product price, it is affected by the previous four factors. From the construct of consumer satisfaction, it can be realized that good product quality (b3) will affect product guarantee (b4) and product guarantee will affect product value. Product image is affected by the previous three factors. In the construct of consumer loyalty (C), product service (c2) affects product trust (c1) and product guarantee (c3) is affected by the previous two factors.

**Calculation of DANP Weights**

Based on the matrix of the dynamic degree of importance calculated from DEMATEL, this study acquired an un-weighted super matrix. It also achieved a weighted super matrix based on the matrix of dynamic degree of importance for each construct and a construct maximizing super matrix finally led to the comprehensive weight of each factor which is shown in Table 6:
Table 6: Ranking of weights of the factors of the three constructs and 12 principles

<table>
<thead>
<tr>
<th>Construct</th>
<th>Principle</th>
<th>Weight</th>
<th>Ranking</th>
</tr>
</thead>
<tbody>
<tr>
<td>A Consumer Behavior</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>a1 Product Price</td>
<td>0.0899</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>a2 Product Functions</td>
<td>0.0825</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>a3 Consumer Demands</td>
<td>0.0826</td>
<td>9</td>
</tr>
<tr>
<td></td>
<td>a4 Product Convenience</td>
<td>0.0740</td>
<td>11</td>
</tr>
<tr>
<td></td>
<td>a5 Consumer Environment</td>
<td>0.0690</td>
<td>12</td>
</tr>
<tr>
<td>B Consumer Satisfaction</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>b1 Product Value</td>
<td>0.0888</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>b2 Product Image</td>
<td>0.0874</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>b3 Product Quality</td>
<td>0.0883</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>b4 Product Guarantee</td>
<td>0.0842</td>
<td>7</td>
</tr>
<tr>
<td>C Consumer Loyalty</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>c1 Product Trust</td>
<td>0.0834</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>c2 Product Services</td>
<td>0.0829</td>
<td>8</td>
</tr>
<tr>
<td></td>
<td>c3 Product Guarantee</td>
<td>0.0869</td>
<td>5</td>
</tr>
</tbody>
</table>

According to the viewpoints of the various experts and scholars, the rankings for each factor are as follows: a1 product price (Rank 1), b1 product value (Rank 2) and b3 product quality (Rank 3). However, although they have lower ranking and no direct relationship, a5 consumer environment (Rank 12), a4 product convenience (Rank 11), and a2 product function (Rank 10) do not mean that these factors are not important. Therefore, the results show that product price, product value, and product quality have relatively significant influence and consumer environment, product convenience, and product functions are relatively less important.

CONCLUSIONS AND SUGGESTIONS

Research Conclusions

With the increasingly fierce competition in the market, companies should pay attention to the issue of how to possess a competitive edge in their market. Therefore, different market strategies are conducted mainly to increase consumer satisfaction and loyalty. Hira Cho and Fiorito (2009) pointed out that an understanding of improved customized products by "consumers themselves" is valuable and reliable.

After analyzing the empirical results, this study found that consumer behavior was the most important factor when designing a strategy for customized products, followed by consumer satisfaction and consumer loyalty. Among the 12 principles, product quality is the most influential one, and product price is the one that is being influenced most. In the order of importance, product price is the most important, followed by product value and product quality.

Research Contribution and Improvement

From the analytical results of this study, companies in Taiwan should pay more attention to consumer environment in the first place when they design their customization strategy. The company should first evaluate whether this market has an appropriate consumption environment before designing and planning a customized strategy. Finally, in a different consumption environment, an appropriate customized way is designed, together with product price, sales channels, and the like. Among all the factors, product price, value, quality, image, and guarantee are valued by experts. Therefore, product price
and cost are the factors that should be valued by companies in the execution of a customized strategy. For example, customized products that maximize the benefits of the price and cost are more attractive to consumers. If product value and quality meet or exceed the expectation and needs of consumers, the purchase intention and consumer loyalty will be increased accordingly. These could strengthen product value and quality, and promote the company product image to attract potential consumers.

Research suggestions

Based on the results of the analysis and discussions, this study proposes a few suggestions for companies or academic researches. All of which could offer a reference to future related research of customization.

Suggestions for Companies

In today’s fiercely competitive market environment, companies should be equipped with a certain amount of competitive edge that comes directly from the support of consumers. Customization of products is one of the strategies that could increase consumer satisfaction and loyalty. The analytical results of this study show that consumer environment, customized product price, value, and quality are the top factors concerned by experts and scholars. First of all, companies could conduct a survey among consumers in a consumption market to understand whether consumers need customization products or not. In product management, companies should make detailed plans of the cost of customized products, and strengthen products’ value and quality to satisfy consumers and increase consumer loyalty. All these can strengthen the image and competitive edge of companies in the market.

Suggestions for Future Research

This study only studied the factors of customization of products. Future research can further explore different types of products or focus on the analysis of customization factors in different consumption environment, such as consumer culture, consumer environment, product functions, product quality, and product services etc. In order to find out the most appropriate customized strategies for different products, VIKOR is a better choice to rank the performance and indicators of each principle and propose a plan that could offer a great help to the planning and execution of product customization.

REFERENCES


