

# Research on the Custom Pricing Model of Online Retail Clothing

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## Abstract

This paper takes custom pricing of online retail clothing as research object. At first, we analyze the factors of custom pricing of online retail clothing and determine its key factor through the investigation and analysis. Then, we build the custom pricing model of online retail clothing considering the impact of supply chain businesses and consumers on prices. Finally, we also improve the optimization of the cost-plus pricing method and use the nonlinear pricing model to calculate the customization degree of customers.

**Keywords:** Online retail clothing, Custom pricing model, Cost-plus pricing method, Customization degree of customers

## 1. Introduction

With the rapid development of clothing e-commerce, we can realize the development of the customization marketing model of online retail clothing through making full use of the advantages of e-commerce and the personalized demand trends of meeting the consumer. Furthermore, in the clothing online customization marketing, reasonable pricing is the basis to meet consumers' demand and make the profit for garment enterprises. It is also a basic function and bottlenecks which can improve and develop the online retail clothing business. Now, enterprises face a more complex situation than before in the process of carrying out the online retail clothing. Online clothing customization which based on e-commerce platform is driven by the consumer's demand and it requires companies to consumer's demand for quick response, so the calculation of production costs, management costs, marketing costs is different from the past and it increases the difficulty of the clothing enterprises in implementing the strategy of custom pricing of online retail clothing. In this context, clothing enterprise urgently need to solve the custom pricing problem under the environment of online retail

Therefore, with analyzing the factors of custom pricing of online retail clothing, we have considered fully the consumers, producers and the characteristics of the clothing network marketing in the online retail clothing business activities. By building the custom pricing model of online retail clothing, it will have strong commercial application value and broad market prospects for the online custom retail clothing enterprise that has been implemented and ready to enter clothing online business

## 2. The Feature and Factor of the Custom Pricing of Online Retail Clothing

### 2.1 The Feature of the Custom Pricing of Online Retail Clothing

Because the clothing online customization has the feature that the consumer demand driving the market, Clothing retail enterprises get customer orders through the network platform, thus, they rearrange and calculate production tasks on the basis of customer orders and make the second design according to the clothing custom products that consumers needed. Its degree of "complex" can cause changes in the cost, finally, it lead to changes in commodity prices. Furthermore, in clothing online customization, the degree of "difficulty" in the structure of the clothing technology can cause the changes of the cost and price, and the fabrics and accessories which also have made influence on costs because the "personalized" order. These factors in clothing online customization will increase the

difficulty and accuracy in the process of cost estimation.

### *2.2 The Factors of Custom Pricing of Online Retail Clothing*

Custom pricing of online retail clothing is affected by multiple factors of cost (price) based on analyzing the feature of online retail clothing and the process of online customization. It is mainly affected by the process feature which include the production and design with the degree of personalization customization of the consumer and the factor of cost which include psychological needs of consumers and personalized service level. Therefore, the custom price of online retail clothing has the feature of being affected by producers, consumers and the retail market. Such factors on the price include suppliers, design, production and service. Furthermore, the factors from the other end of the supply chain of consumer must be considered, including consumer degree of customization, consumers' personal background factors and customer perceived value.

### **3. The Analyzing of the Factors that Affect the Custom Pricing of Online Retail Clothing**

We make the following hypothesis that based on the apparel commodity supply chain, including suppliers, producers and consumers to determine the factors that affect the custom pricing of online retail clothing.

#### *3.1 The hypothesis of factors that affect the customization pricing*

##### **3.1.1 The Influence of Clothing Online Customization Level on Product Prices**

The influence of customer's customization degree on prices, the higher of the customer's customization degree can make the price increasing, which means that the increasing of the material cost, design cost and labor costs will both affect the final product price.

Research hypothesis (H1): the customer degree of customization and clothing online customization prices was positively correlated relationship;

Research hypothesis (H2): the degree of the customer customization and the cost of raw materials, labor and manufacturing were positively correlated.

##### **3.1.2 The Influence of the Production Cost on Custom Clothing Prices in Clothing Online Customization**

Cost is the basis of the garment price. From the perspective of clothing commodity prices, Commodity prices must be based on the cost of product customization process. Therefore, custom commodity prices must faithfully reflect the product cost. On this basis, we put forward the following hypothesis:

Research hypothesis (H4): online retail clothing price and production cost were positively correlated, and cost factors are not independent, there is a causal relationship between factors, and one factor will affect other factors.

Research hypothesis (H5): Clothing online customization services and custom clothing prices were positively correlated.

##### **3.1.3 The Influence of Consumer Psychological Factors On the Custom Clothing Prices in Clothing Online Customization**

The influence of the consumer psychological factors, namely, consumer psychology and customer satisfaction on clothing online customization costs. From this study, we think that the characteristics of different consumer groups, namely, age, level of education, career will affect the price of clothing online customization.

Research hypothesis (H3): different demographic variables (age, level of education, occupation) have a significant impact on clothing online customization prices. In this study, we take consumers and businesses in Shanghai as samples. We design the questionnaire based on the theoretical model in this paper and take samples from target groups, then we measure the samples. Finally, we analyze and validate the measurement results.

#### *3.2 Research and Determination on the Factors which Influencing the Custom Pricing*

According to the needs of the research factors and determining factors, we use the SPSS 20.0 and AMOS20.0 to carry out the reliability analysis, validity analysis, factor analysis and structural equation model analysis.

##### **3.2.1 Research Time**

The research on January 3 to January 17, 2013, take the Marketing Department and production department of the leading group of Shanghai which include 3 guns, Conch and MinGuang three companies and Shanghai universities, staffers, freelancers, retirees as the research object.

Table 3-1 Information of distribution

	The enterprise questionnaire	The Consumer questionnaire
Number of distributed questionnaires	100	500
Number of recovered questionnaires	87	384
number of valid questionnaires	74	378
Efficiency	74%	75.6%

### 3.2.2 Reliability Analysis of the Questionnaire

We use Cronbach's  $\alpha$  reliability estimation method to estimate the reliability of questionnaire.

$$\text{Cronbach's } \alpha \quad \alpha = \frac{k}{k-1} \left(1 - \frac{\sum s_i^2}{s^2}\right) \quad (1)$$

Here,  $k$  is the number of topics,  $s_i^2$  is the variance of each question questionnaire

Generally believed,  $\alpha$  values in the range of 0.65 to 0.70 is acceptable values, as well in the range of 0.70 ~ 0.80 and  $\alpha$  value between 0.80 and 0.90 is very good.

Table 3-2 ANOVA

		Sum of squares	df	mean square	F	Sig
Between factors		2795.115	377	7.414		
Internal factors	Between items	1842.698	10	184.270	75.431	.000
	residual	9209.665	3770	2.443		
	sum	11052.364	3780	2.924		
sum		13847.479	4157	3.331		
The total mean = 3.40						

Table 3-3 Reliable statistics

Cronbach's $\alpha$	Based on the standard Cronbachs Alpha	item
.771	.754	11

### 3.2.3 Exploratory Factor Analysis

We take the sample for the KMO and Bartlett tests to determine whether the observed variables are suitable for factor analysis and structural equation analysis.

Table 3-4 KMO and Bartlett test

Kaiser-Meyer-Olkin measure	.753	
Bartlett sphericity test	Approximate chi-square	549.632
	df	28
	Sig.	.000

From the table we can see that the KMO and Bartlett test measurement value is 0.753, close to 1, and the approximate chi-square test of Bartlett's sphericity is 549.632, which means that observing the variety is more suitable for factor analysis.

### 3.2.4 Structural Equation Model Analysis

By using the structural equation model, we take a further study on the relationship between the factors and factors of influence prices that based on the custom pricing model of online retail clothing and the results of factor analysis.

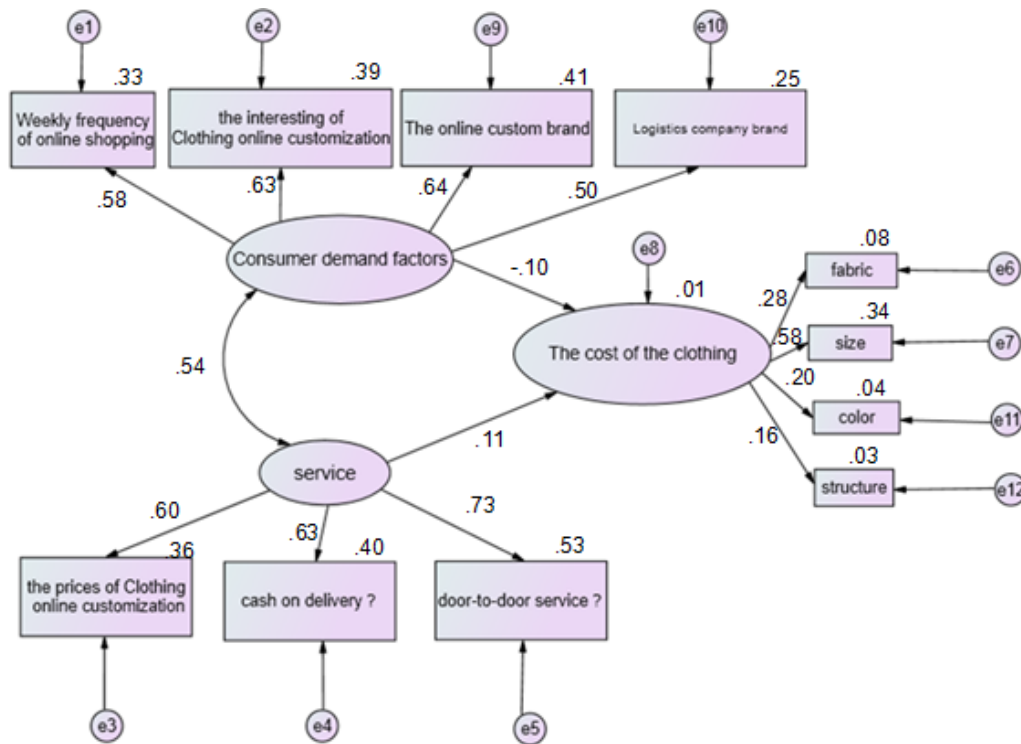


Figure 3-1 Path analysis

### 3.2.5 The Results of the Research Hypothesis Test and Influence Factors to Determine

By analyzing the theoretical model in this paper and the quantitative analysis of this chapter, we summarize the research results of the research hypothesis and confirm the influencing factors of the online customization pricing.

Table 3-5 Research Hypothesis result

Assumption number	Assuming content	Test results
H1	The customer degree of customization and clothing online customization prices were positively correlated relationship	Support
H2	The degree of the customer customization and the cost of raw materials, labor and manufacturing were positively correlated.	Support
H3	Different demographic variables (age, level of education, occupation) have a significant impact on clothing online customization prices.	Support
H4	Online retail clothing price and production cost were positively correlated, and cost factors are not independent, there is a causal relationship between factors, and one factor will affect other factors.	Support
H5	Clothing online customization services and custom clothing prices were positively correlated	Support

## 4. Building the Custom Pricing Model of Online Retail Clothing

Commodity pricing method is varied, common pricing strategies include: Cost-plus pricing method, nonlinear pricing method, etc. Online custom clothing prices is a complex issue to confirm and we need to consider the factors that affect the price of clothing online customization. But at this stage, there is not a clear calculation model of clothing online customization prices to reflect the real value of the online custom clothing. Therefore, we build the custom pricing model of online retail clothing considering the impact of supply chain businesses and consumers on prices. And we also improve the optimization of the cost-plus pricing method and calculate the customers' perceived value. Finally, we use the nonlinear pricing model to calculate customers' customization degree.

Table 4-1 Symbol definition

P	Price	F	Factors
H	unit full cost of the clothing customization	$\alpha$	Influence coefficient
$\beta$	Bonus rate	$\Delta x$	Correction parameters
L	Perceived value	$n_i$	Custom project

#### 4.1 Calculate the Cost-plus rate

In this study, since the custom clothing needs of consumers is more complex, the problem that custom clothing enterprises faced is the uncertain costs that can not cost to the concrete products in customization costs. The method of general enterprise computing is based on full costs and plus the profit margin of the desired to form the final clothing price:  $P=H(1+\beta)$

Calculating the full cost of clothing custom products: H. In microeconomics, cost is the total of various expenses that occur when a business makes items, provides services. Factors of production are engaged in production and business activities of the economic resources. Western economists generally summed up the factors of production labor, capital, natural resources and the operator to four categories, and think that the cost including normal profit, because it is the management talent reward that the proprietor (entrepreneurs) who was one of the factors of production gets. "Excess profits" are not included in the cost which was acquired in the market competition. Mathematical model for describing the dependency relation between some combination of various essential factors of production inputs and the maximum yield that it can produce is known as the "production function".

In the cost function, complete cost (TC) was constituted by fixed cost (FC) and variable cost (VC), namely the  $TC = FC + VC$ .

For specific clothing enterprise, the fixed cost is relatively stable, which means that the total cost changes with the variable cost.

In the relevant range, the change state that the total cost depends on the total variable cost (production) can be described as a kind of approximate linear relationship. Because this study aims at clothing online customization, so the total cost can use n linear polynomial to establish the cost calculation equation.

$$H=k_1x_1+k_2x_2+\dots+k_nx_n+e \quad (2)$$

Here is the fixed cost and variable cost and its coefficient, e is the error coefficient.

Theoretically speaking, when we put the manufacturer's profit maximization as the objective function and take the buyers' consumptive expectations and similar clothing market competition conditions as a constraint condition, we can also calculate the shadow price of the clothes. But as a result of the uncertainty of consumers' psychological factors and the variability of market "game" that many production enterprises have made, it is difficult to make the theory solution into a practical application. So, there is a certain quantitative relationship between the perceived value of the customer and the apparel production costs based on the research of this paper, the analysis and the calculation. And this relationship is represented by  $\mu$ , It is the expected values (or mean) of the market price of similar products which approved by buyers and producers. It reflects the manufacturers' product positioning and the recognition and acceptance in the same cloths, which are the embodying forms of the perceived value.

Assuming L for the customer perceived value, there are n factors affecting the customer perceived value, and each factor represented by F, then, the consumers' perceived value has the following said:

$$L = \sum_{i=1}^n \alpha_i F_i \quad (3)$$

Therefore, we use  $\alpha$  to represent the weight coefficient that was calculated in this article to adjust the numerical value of cognitive value. There are six factors (frequency of online shopping, purchase amount, interest of customization degree, quality of service, customized brand and clothing production costs) make a higher affection to the customers' perceived value from the factor analysis in this paper, So we establish an effective matrix with this six factors which have effect on price.

First, establishing the fitting relationship between factors and clothing prices, then we can get the following equation:

$$f(x)=a*\exp(b*x)+c*\exp(d*x) \quad (4)$$

Here,

$$a = 1.148(0.8307, 1.464); \quad b = -0.02993(-0.1568, 0.09695);$$

$$c = 4.787e-16(-5.749e-12, 5.75e-12); \quad d = 6.629(-2395, 2408)$$

Cost-plus pricing model will now be rewritten as follows:

$$P = H + \alpha H + \Delta x \tag{5}$$

Let's plug the profit margin equation into the equation.

$$P = H + [a \cdot \exp(b \cdot x) + c \cdot \exp(d \cdot x)]H + \Delta x \tag{6}$$

In the equation, we calculate the business costs and the customer perceptive value on price, it quantitatively reflects the perceived value of the enterprise supply chain that include suppliers, production and service factors and client factors that include consumers' personal background factors on prices.

#### 4.2 Price Calculation of the Customizing Degree

We calculated the influence of the enterprise and customer perception factors on the price and on this basis, we calculated the influence of customization degree on the price. In this study, the degree of customization for different segments of consumers are charged different prices, the more project customers customized, the higher the price is. On the other hand, the higher the degree of customization is, such as taking nonlinear pricing, the slower pace the price rise, and the slope decreases. The curve of the price is a rise and convex curvature curve. Therefore, this problem can be abstracted as: using a nonlinear equation, describing a real function with n variables (customized project). Because the modular characteristics of the online custom clothing, we can deduce the price by making different custom project abstracted into  $n_1, n_2, n_3 \dots n_i$  custom project. We build the nonlinear model with the price P and the customized project  $n_i$  and intend to determine the relationship between them. Accordingly, the equation is as follow:

$$p' = \begin{cases} p_1x, & x < x_1 \\ p_1x + p_2(x - x_1), & x_1 < x < x_2 \\ p_1x + p_2(x - x_1) + p_3(x - x_2), & x_2 < x < x_3 \\ \dots\dots\dots \\ p_1x + \dots + p_n(x - x_{n-1}), & x \geq x_{n-1} \end{cases}$$

Here, P is various prices because of the various degree of customization,  $P_x$  is the price of each custom project, and x is the specific customization project in the similar custom project, such as the customization of the collar shape and the custom fabric in Custom collar. n is the segment number of the price. As the number of segments approaches infinity, the cost of customers for different clothing customization degree and the degree of customization become a convex upward curve. As is shown in the figure.

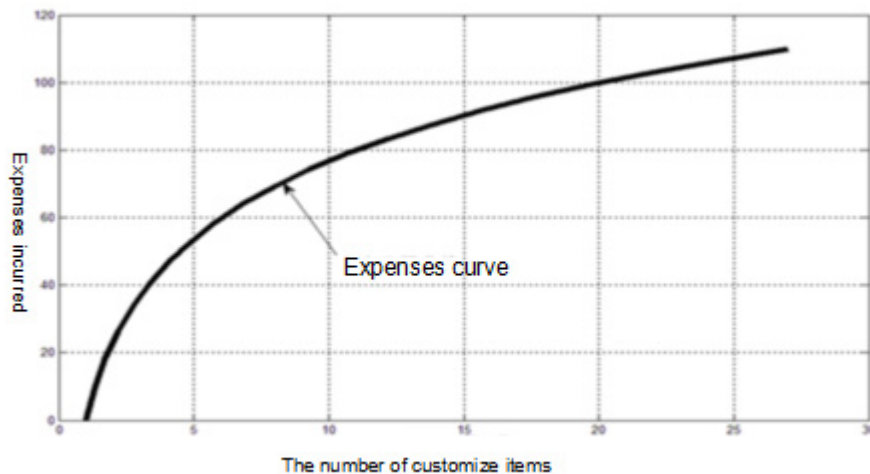


Figure 4-1 Custom cost and custom degree

Therefore, based on the above analysis of the enterprise cost and customer perceived value, uniting this and we can get:

$$P=H + [a*\exp(b*x) + c*\exp(d*x)]H + \left\{ \begin{array}{l} p_1x, x < x_1 \\ p_1x + p_2(x - x_1), x_1 < x < x_2 \\ p_1x + p_2(x - x_1) + p_3(x - x_2), x_2 < x < x_3 \\ \dots \\ p_1x + \dots + p_n(x - x_{n-1}), x \geq x_{n-1} \end{array} \right\} + \Delta x$$

Enterprises calculated H with reference to the historical data in the actual operation, the similar function and the fabric of products are classified on the basis of product series. Then fit the actual price and the influence factors. Finally, we can adjust and determine the parameter of the bonus rate in  $[a*\exp(b*x) + c*\exp(d*x)]$ . In nonlinear price determination, the enterprise custom project is not unlimited. Therefore, the nonlinear pricing equation is not infinite. In the process of using, we only need to determine some of the equation.  $\Delta x$  is the prevention price, due to the extent of deviation from the calculated results and the actual needs of the price equation is too large, hence it needs manual correction. for example, if the equation calculated price and the demand price is consistent,  $\Delta x$  is zero.

Based on the above discussion, the model has the following characteristics:

- Factors in the model of supply chain enterprise are fully discussed, we fully considering the influence of the enterprise on the price, including suppliers, supplying periods, quality factors, design cost, the cost of production and service effects on clothing customization pricing.
- Customer factors in the end of the supply chain are discussed and the traditional clothing cost-plus pricing method is improved in the model, the cost and the bonus rate were stripped, while retaining the garment production costs. We establish the model by making the customer perceived value as a bonus rate. And the customer perceived value was placed into the model to optimize it.
- The degree of custom clothing was placed into the model. According to the modular characteristics of the clothing online customization pricing, we build the model on the level of customization by nonlinear pricing and add the custom model, then determine the prices by the customer's customization project and customization degree.

In the process of model application, the date of production cost in the enterprise can be directly used by placing the database into this equation.

## 5. Summary and Outlook

In this paper we take custom pricing of online retail clothing as research object and analyze, quantify and determine the factors of custom pricing of online retail clothing. First, from the angle of cost accounting, we determine the costs of online clothing customization production in the process and determine the influence factors of the producer on price. By analyzing the customer value, we can determine its impact on the price of online clothing products and quantification from the perspective of customer value. Secondly, we get data from the questionnaire by using market research methods and carry out the reliability analysis, validity analysis, data coding, analyzing and processing by using SPSS 20.0 and AMOS 20.0, MATLAB R2012a software, etc. we determine the key factors that affect the custom price of online clothing and the relationship between them by factor analysis and structural equation model analysis (SEM). Finally, in combination with the practical demand of enterprises, we embedded the results of the study into clothing business system by writing B/S structure software. We improve the current clothing online customization pricing method of the enterprise that used the simple cost-plus pricing method. And we placed the perceived value in online custom clothing pricing and custom projects into the pricing model to achieve the reasonable pricing of the online custom clothing.

Because of manpower, resources, and time constraints, this paper focused all factors that affecting the price of custom clothing online on the enterprises itself, and of all enterprises in the supply chain factors is not comprehensive. In this study, we use nonlinear pricing model to discuss the degree of customization, and whether there were other pricing models which can better reflect the degree of customization that different customers required need further study.

With the rapid development of e-commerce, China's online clothing shopping market scale shows the increasing tendency year by year. In the clothing inventory pressure, enterprises have realized that due to the nature of the clothing itself, each person's personality characteristic and a variety of functional requirements can be reflected on

the clothing under the background of lack of original ability in clothing design and this situation make the consumer required all kinds of personality service, which means that the clothing e-commerce sites must provide a wide range of personalized services. Aiming at this trend, we studied the problems of the formulation of price in the process of online custom clothing. It will have strong application value for clothing enterprises to start online customization business.

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