Pricing of Special-Shaped Pearl Pendant Based on GABOR-GRANGER

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Abstract: In order to gain high innovation value profit of special-shaped pearl pendant on the market, the optimum price of such new product was confirmed in the work using GABOR-GRANGER. Firstly, 200 target consumers were selected for the cluster analysis of their attitudes toward baroque pearls. Then, GABOR-GRANGER was applied to calculate the fake income and price threshold of set price point. Last, it was determined the lower limit of 95% confidence bounds of the maximum value of fake income as the conservative optimal price. Results show that the main target consumer groups were not concerned about the price because of the singular and beautiful shape of pearl. Through calculation by Granger Gabor, the optimal price of special-shaped pearl pendant was higher 60.8% than the price obtained by cost plus calculation. Therefore, it is possible to achieve high innovation value profit of new products on the market.

1. Introduction

For its unique personality, special-shaped pearl has become an important element and basic material in recent years. As an innovative variety developed in Chinese waters, it is an important issue to determine a price accepted by consumers while achieving a high value profit [1]. In the work, GABOR-GRANGER [2] was used for the price survey of special-shaped pearl pendant, with the final price of special-shaped pearl pendant determined.

2. Attitude Investigation and Cluster Analysis of Target Consumer Groups to Special-Shaped Pearl

To understand the attitude of target consumer groups to special-shaped pearl pendant, the seven-segment rating scale was used in the work.

A. Expenditure structure analysis of research object and consumers for pendant

Investigation was conducted on old female consumers from 20 to 40 years old in Yangtze River Delta region. While these consumers were selecting dresses in shop, it is possible to ask them questions.

Totally, 235 questionnaires have been sent out. Besides some incomplete questionnaires, there were 200 valid questionnaires.

As special-shaped pearl pendant belongs to non-necessities of life, the expenditure of consumers on pendant was measured in this study. Figure 1 shows the expenditure of consumers on pendant in one year. In

Figure 1, the expenditure of the first consumer group on pendant is below 300 yuan, accounting for about 50%. The expenditure of the second consumer group is between 300 to 1,000 yuan, accounting for about 30%. About 12% of the consumers spend 1,000-2,000 yuan on pendant, and 8% of consumers prefer to spend 2,000-5,000 yuan on pendant. Such expenditure structure of consumers can be used as a reference to draft the price of special-shaped pearl pendant. Therefore, we choose a classic pendant with a low threshold of 300 yuan as research product.

Figure1. Expenditure of consumers on pendant in one year.

B. Investigation and cluster analysis of target consumer groups' attitudes to special-shaped pearl

The investigation of target consumers' attitudes toward special-shaped pearl was conducted using a seven-segment rating scale (See Table I). With above

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questions, cluster analysis was conducted using SPSS17.0 statistics software. Table II shows the

analysis results of 200 valid questionnaires.

Table.1. Investigation of target consumer groups' attitudes to special-shaped pearl

Problem statement	Strongly disagree	Disagree	Partially Disagree	Neutral	Somewhat agree	Agree	Strongly Agree
I like shaped pearl born singular form	-3	-2	-1	0	1	2	3
Wonderful design with a variety of special-shaped pearl inlay craft is interesting.	-3	-2	-1	0	1	2	3
I do not care about the price if the special-shaped pearl is strange and beautiful.	-3	-2	-1	0	1	2	3
I would pay more to special-shaped pearl coupled with attractive packaging.	-3	-2	-1	0	1	2	3
I like special-shaped pearl, and pay no attention to the brands.	-3	-2	-1	0	1	2	3
Although the pearls are shaped by nature, I care about the brand.	-3	-2	-1	0	1	2	3

Obviously, the investigation groups can be divided into two categories according to the concentration degree of rating. The first feature of investigation objects is that they are attracted by the singular form of special-shaped pearl and wonderful design of various inlays. Thus, they care little about the price and brand because of the singular and beautiful shape and exquisite design and packaging. Such consumers account for 52% of the investigation population.

The second feature is that consumers pay no attention to the shape of pearl. Although these consumers believe these special-shaped pearl is natural, they also concerned about the brand. Such consumers account for 48% of the investigation objects.

Above cluster analysis shows that most investigation objects little care about the price and brand because of the singular and beautiful shape and exquisite design and packaging.

For this type of new products, products the valuation of consumers is always uncertainty [4] when pricing need to consider the price strategy, consumer perception, price sensitivity [5], consumer prices quality balance [6], and many other factors, GABOR - GRANGER method is to determine the optimal new product price and the analysis of the influence of price on demand a effectively method, so this paper USES GABOR - GRANGER, formulate the heterosexual beads listed price of the product.

Table.2. Results of cluster analysis of Final Cluster Centers

	Cluster	
	1	2
I like shaped pearl born singular form	2	0
Wonderful design with a variety of special-shaped pearl inlay craft is interesting.	2	0
I do not care about the price if the special-shaped pearl is strange and beautiful.	1	0
I would pay more to special-shaped pearl coupled with attractive packaging.	1	0
I like special-shaped pearl, and pay no attention to the brands.	1	0
Although the pearls are shaped by nature, I care about the brand.	1	1

3. Summary of Simple GABOR-GRANGER

A. Research objective of simple GABOR-GRANGER

Generally, study on the price by Gabor Granger includes two aims: one is to test the influence of price changes of company's existing product on demand; the other is to determine the optimal price of new product and analyze the influence of such price on demand. In the work, Gabor Granger was used to determine the price of special-shaped pearl pendant.

B. Form of questions in questionnaires

While using Gabor Granger, the interviewees are firstly invited to watch the actual product, product samples or product concept. Then, they will be asked with following questions.

For example, "If the price of this product on the market is P1, P2, P3, P4 or P5, will you purchase it?"

This approach requires manufacturers to provide the prices of test. Of all the prices, one will be widely accepted by consumers.

C. Selection of price level

Generally, there should be 6 to 12 price levels in the investigation. If the price levels are too many, much time will be cost, resulting in high expenditure. Furthermore, interviewees may be reluctant to cooperate, resulting in incomplete information. If the

	P1()	P2()	P3()	P4()	P5()
Not to buy	1	1	1	1	1
Might not buy	2	2	2	2	2
Cannot decide	3	3	3	3	3
Likely to buy	4	4	4	4	4
Certainly buy	5	5	5	5	5

Note: $P1 < P2 < P3 < P4 < P5$, there are generally five or six prices.

price levels are too little, it is difficult to reflect the influence of price changes on demand.

A. Data analysis

Firstly, the percentage of interviewees who answer definitely or probably purchase should be tallied for each price level. Besides, the interviewees who answer definitely or probably purchase at high price level should be noted because they would give the same answer at low price levels. Then, fake income can be figured out according to such percentage. The definition is as follows.

Fake income = Price level $\times$ Percentage of interviewees answered definitely or probably purchase in this price level (1)

Based on Equation (1), the fake income of each price is figured out. The price with the largest fake income is regarded as the proposed price of new product.

4. Pricing of Special-Shaped Pearl Pendant Based on Simple GABOR-GRANGER

The investigation of the work is to price the new product — special-shaped pearl pendant. Before investigation, the price level of such new product should be determined. Based on the cost accounting of special-shaped pearl pendant, the price of pearl pendant was calculated as 29 yuan according to cost additive method.

This is also the threshold price of a non-essential fashion product [8]. Consumers of fashion products in this price section have little choice pressure. Then, eight price levels, including 29, 34, 39, 44, 49, 54, 59 and 64, were selected in this work to deeply observe

	29()	39()	44()	49()	56()	64()
Not to buy	1	1	1	1	1	1
Might not buy	2	2	2	2	2	2
Cannot decide	3	3	3	3	3	3
Likely to buy	4	4	4	4	4	4
Certainly buy	5	5	5	5	5	5

the influence of price changes on demand. With these price levels, the investigation questions of special-shaped pearl pendant were designed as follows.

Q: Here is the special-shaped pearl pendant with silver chain (showing the product). If the price of such product on the market was 29, 34, 39, 44, 49, 54, 59 or 64, would you purchase it?

A. Fake income of special-shaped pearl pendant

Through analysis of investigation data of above questions, it is possible to obtain the percentages of consumers who certainly or possibly purchase at different price levels. Then, the fake income is obtained through calculation by Equation (1). Table III shows the fake income of special-shaped pearl pendant.

Table.3. Fake income of special-shaped pearl pendant

Price level (yuan)	Percentage of consumers who certainly or possible purchase (%)	Fake income (yuan)
29	42	12.18
34	45	15.3
39	50	19.5
44	47	20.68
49	52	25.68
54	42	22.68
59	34	20.06
64	27	17.28

B. Determination of the price threshold of special-shaped pearl pendant

Price threshold is a special price point. At this point, there is a significant reduction in the number of demand. Generally, the price threshold is determined through fake demand curve. Such curve is plotted with investigation prices as abscissa and the percentage of

consumers who certainly or possibly purchase it as ordinate. Figure 2 shows the fake demand curve of special-shaped pearl pendant.

Figure 2 shows that the price threshold of special-shaped pearl pendant is 49 yuan. The percentage of consumers, who certainly or possibly purchase, decreases with the increase of price when the price surpasses 49 yuan.

Figure2. Fake demand curve of special-shaped pearl pendant

According to consumers' psychological needs, the price of special-shaped pearl pendant should be determined as 49 yuan, thus achieving the highest fake income.

C. Determination of the final price of special-shaped pearl pendant

In Gabor Granger method, the optimal price is calculated using statistical method, which is difficult to avoid errors. Therefore, the lower limit of 95% confidence bounds of optimal price is generally adopted as the conservative price. However, the optimal price is also temporary due to the various inevitably factors on the market. To be conservative, there is a callback of 5%-10% based on the price threshold. Therefore, the final price of special-shaped pearl pendant is determined as 43 yuan.

5. Conclusions

According to Gabor Granger, the optimal price of special-shaped pearl pendant is higher than the price calculated using cost additive method. Thus, it is possible to obtain high value profit of new product on the market. Pricing the product by Gabor Granger can obtain the optimal price higher than that calculated by cost additive method. Besides, it can also avoid the price threshold which will lead to the reduction of demand. Therefore, it is an effective method to draft the price of new product.

The deficiencies of this study mainly include the following three aspects:

1. Gabor Granger method assumes that other marketing mix factors, such as channels, advertising, sales promotion and other aspects remain unchanged, and the price of competitive brands remains the same. When testing the impact of product price changes on sales, if other factors change, the conclusions obtained cannot be applied. Further studies will use the extended

Gabor Granger method or BPTO (considering competition) for price testing.

2. Gabor Granger method assumes that other factors remain unchanged, but it is difficult to guarantee other aspects remain unchanged for a long time. Therefore, the optimal price obtained is temporary and cannot be guaranteed to remain unchanged for the whole period.

3. This time, the products of the special-shaped beads are the magnet products with low price, and the premium obtained is not too high in the pearl products. Further testing will select a type of high price products for empirical evidence.

References

- Desmet Pierre , “ Effectiveness of measures assessing response to price information” , *Journal of Product & Brand Management* , 2016, Vol. 25(7): 676-686.
- Andre Gabor; Clive Granger, “The Pricing of New Products,” *Management Decision*, 1979, Vol. 17(8):576-589.
- Zhang li, Liu guolian“ Clothing Market Research Analysis — Application of SPSS [M] Beijing: China Textile Press, 2012,7:151-158.
- Stan Lipovetsky, Shon Magnan, Andrea Zanetti Polzi, "Pricing Models in Marketing Research", *Custom Research North America*, Minneapolis, USA, September 2011, 167-174.
- Zheng Zongcheng, Chen Jin, Zhang Wenshuang, "Market Research Practices & Methods," *Guangdong Economic Publishing House Co. Ltd*, 2011, 08, 141-144.
- Peng Du , Qiushuang Chen , “Skimming or penetration: optimal pricing of new fashion products in the presence of strategic consumers”, *Annals of Operations Research* , 2017, Volume 257 (1-2) : 275–295.
- Michel Wedel, Peter S.H. Lee-ang, “A Model for the Effects of Psychological Pricing in Gabor–Granger Price Studies,” *Journal of Economic Psychology*, 1998, Vol. 19(2):237-260.
- Gabor, André; Granger, C. W. J., “Ownership and Acquisition of Consumer Durables: Report on the Nottingham Consumer Durables Project” *European Journal of Marketing*, 1972, Vol. 6(4):234.
- Thomas Kneib, Bernhard Baumgartner, Winfried J. Steiner, “Semiparametric Multinomial Logit Models for Analysing Consumer Choice Behaviour,” *Asta Advances in Statistical Analysis*, 2007, Vol. 17(3):225-244.
- ChungKi Han , “The Effect of Consumer Innovativeness, Perceived Risk and Price Sensitivity on New Product Adoption: The Moderating Effect of Gender.” *Annals of Operations Research*, 2016, Vol. 16(5): 99-114.