PROTOTYPE TESTING FOR NEW WEDDING INVITATION CARD COLLECTION

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Abstract

Problem: How does e-mail survey with choice-based conjoint questionnaires help Sea Dragon Company make decision in developing the right prototypes of handmade wedding invitation cards?

Purpose: This study applies a market study technique (e-mail survey) and choice-based conjoint analysis to evaluate the potential of nine product prototypes of handmade wedding invitation cards for Sea Dragon Company, a Vietnamese concerns of small size. The result will provide the company with an understanding of customer preferences and help them decide in consideration of the preferred set of attributes on the potential combination of the prototypes and price to become new products.

Method: This research will be focused on the information gathered from the firsthand data by quantitative e-mail survey with choice-based conjoint questionnaire.

Conclusion and Recommendation: Eight out of nine prototypes can be selected as new products while the remained one is recommended to be omitted according to respondents' preference. Customer preference in terms of design, brand and price are recommended to be the guideline for further prototype development. Mall intercept interview is recommended to be implemented after a full collection of wedding card is developed based on the result of this survey. Choice-based conjoint analysis is recommended as a strong tool for market researchers' prototype testing of new products.

1. Introduction

"The nature of competition is changing toward new product development" Prahalad (1990).

New product development (NPD) is a concept of a complete process from idea generation to launching a new product or service to market. NPD has become more and more critical as companies are facing increasingly keen competition. Customers nowadays pose stringent requirements regarding uniqueness, customization, delivery time, quality, after-sale service, corporate environmental responsibility and so on. In order to stand firm in the turbulent competition, grow and even survive, as proposed by Jan Cobbenhagen (2000), companies must be able to meet those demand by providing continuous lines of new and improved products, processes and services.

In a number of cases, new products fail because they don't fit the customer demand. In order to fix that problem, marketing research plays a significant role in NPD - helping managers make decision before launching the product - in order to avoid substantial loss due to failure.

Therefore, this research suggests prototype testing to help the management make decision in NPD, especially developing the right new products from prototype, with a case study of Sea Dragon Company in Vietnam. In particular, this company is planning to launch a new collection of handmade wedding invitation cards in HCMC market (Vietnam) where only printed wedding cards are existed. They have already developed nine prototypes which are designed with a high diversity of color, shape, image, material, typeface and price. Quantitative research by e-mail survey with choice-based conjoint analysis is suggested as the main method to implement prototype testing for wedding invitation cards. The main characteristic distinguishing choice-based conjoint analysis from other types is that the respondent expresses preferences by choosing concepts from sets of concepts, rather than by rating or ranking them. The task of choosing a preferred concept is similar to what buyers actually do in the marketplace. Choosing a preferred product from a group of products is a simple and natural task that everyone can understand. According to Ely Dahan and V. Srinivasan, attribute-based conjoint analysis is used to refer to the understanding of customer tradeoffs on multiple product attributes and price for testing prototypes.

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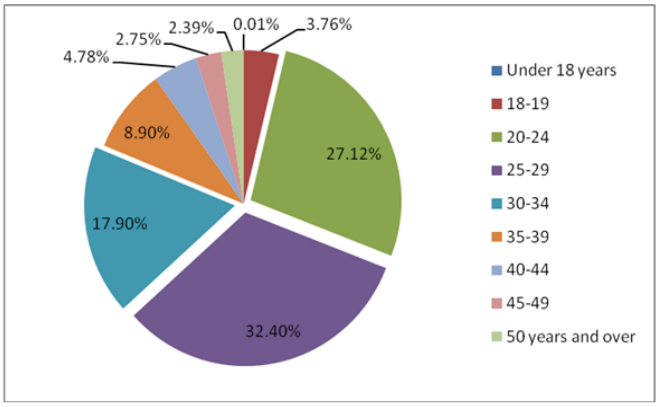
This paper might argue that its results will provide Sea Dragon Company with an understanding of customer preferences and help them decide in consideration of the preferred set of attributes on the potential combination of the prototypes and price to develop new products. In fact, the more the company understands the way consumers accept a product through its set of attributes, the more successful its opportunity for market entry becomes. In particular, this research will look at (1) the utility and importance of attributes, (2) the market simulation to predict share of preference.

a. Wedding invitation cards market in HCMC:

HCMC is a fast growing city with a young population. According to the report of the local statistics office, the population in 2007 in HCMC is 6,650,942 people and the proportion of people in marriageable age (in 2004) is 13.09%, 11.01% and 10.33% for people at the age of 20-24, 25-29 and 30-34 respectively. These are the top three groups of age that have highest number of people getting married every year.

Figure 1: The proportion of people getting married in 2006 (HCMC Statistics Office)



In 2007, there were 49,116 couples got married in HCMC and the number of couple getting married increases by approximately 2-3% per year. The market value of wedding invitation cards is estimated at US$6,907,000 in 2007 (Sea Dragon internal data).

b. Sea Dragon Company and wedding invitation cards:

Established in October 2007, Sea Dragon Fine Arts Co., Ltd designs, produces and trades fine handicrafts articles. It is categorized as small and medium-sized company by the government's regulation with charter capital of VND500 million (about US$31,250) and 40 employees. Its main product lines include handmade greeting cards and clay flowers under Seragon brand. It tries to become one of the top three handmade greeting card suppliers in domestic market by 2011.

In other to boost the growth of this infant enterprise, the top management aims not only to enhance the availability of their products through exploitation of distribution channel but also to develop new products so that they can expand the business to a new market. The company realizes that the wedding invitation cards market is also potential and they can develop a new and differentiated product as handmade wedding invitation card to launch first in HCMC. This market is promising because there are no strong competitors with significant brands; products are printed cards with normal designs; prices are ranged from VND1,000 (~ US$0.06) to 18,000 (~ US$1.02) per card plus envelop; and the young population in HCMC includes high potential customers.

Once Sea Dragon enters this market, it can take advantages of its high production capacity with know-how in producing handmade greeting cards to provide more value of brand new products with differentiated designs and similar price range because it is the first provider of handmade wedding invitation cards in HCMC market. Moreover, selling this kind of product is a way of wholesale trade in which the customer orders a certain number of cards (from 100 to 900 cards/wedding) and pays immediately after receiving the goods. This brings faster capital turnover to the company while part of its capital is withheld temporarily by the chains of bookstore due to the condition of taking goods on consignment.

The design team developed a collection of wedding cards prototypes including 30 designs, after assessment, they narrowed down the potential prototypes to nine designs. At this point, they need assert the potential of this collection by analyzing the customer needs and preferences to decide the guideline of improved designs for new products that have high customer' s acceptance and whether to produce and launch these prototype into the market. Moreover, they have to collect feedback from consumers to complement their knowledge about the market and the competitor to build marketing mix.

2. Research methodology

To investigate the taste of product design, brand and price of wedding invitation cards, especially the attitude toward the nine prototypes, this research studied the responses to the questions of target customers in HCMC. This section of papers describes the data material, and discusses the applied methodology.

Figure 2: Nine prototypes used in the survey

Research method: Quantitative method with the choice-based conjoint analysis questionnaires were presented under mail survey to people at the marriageable age living and working in HCMC.

Research data: Secondary data is from HCMC Statistics Office, newspapers and magazines about wedding, internet, Sea Dragon company internal data and information of relevant researches. Firsthand data include opinions collected from people planning to get married at marriageable age living and working in HCMC.

Research design: Quantitative research

E-mail survey was conducted to collect opinions from 30 people at the marriageable age who are about to marry in one year, living and working in HCMC. This stage aims to assess the preference of customers toward the prototypes' designs, brand and price.

The questionnaires were designed by Sawtooth SSI Web software including 10 random task choices and two fixed task choices. There are four possible answers in a question in which a "none" option is included. The software created approximately 300 versions of questionnaire for the survey. There are three attributes including prototype design, price and brand. Prototype design contains 11 levels (nine prototypes and two commercially available products which are numbered 10 and 11). Price contains five levels and four levels for brand.

Data analysis: After the data had been collected from respondents, it was analyzed with the support of Sawtooth SMRT software.

Sampling method: Sample size is 30 people.

Target population: young people who live and work in HCMC at the time of the survey. They are in marriageable age from 20-34 years old. They plan to get marry in one year and their monthly income is VND3,000,000 (~ US$170) at least.

Sampling frame: A list of 15 email addresses of the target population which is available in Sea Dragon Company.

Sampling technique: Snowball sampling was implemented. Fifteen people who satisfy the criteria of target population were selected to send the questionnaire by mail. The respondents were asked to answer the questionnaires and then send copies of questionnaires to others who belong to the target population of interest. Subsequent respondents were selected based on the referrals.

Research scope: The research only concentrated on wedding invitation card preference in HCMC market. Secondary data was collected mainly from 2000 up to now and focus on relevant information of HCMC. Firsthand data was collected by web survey from 30 people in marriageable age living and working in HCMC.

Result: This research looked at (1) the utility and importance of attributes, (2) the market simulation to predict share of preference. Then this study should help Sea Dragon understand customer preference and make decision in consideration of the preferred set of attributes on the potential combination of the prototypes and price to develop new products.

3. Results

A part-worth utility is a measure of relative desirability or worth. When computing utilities using logit, every attribute level in a conjoint project is assigned a utility (also referred to as a part-worth). The higher the utility is, the more desirable the attribute level is. Levels that have high utilities have a large positive impact respondents' choice.

a. Part-worth utilities of prototype design:

Table 1: Part-worth utilities of prototype design

Effect	Standard Error	t Ratio	Attribute level
0.34768	0.24079	144.388	1. Prototype 1
102.343	0.22933	446.268	2. Prototype 2
-0.27761	0.273	-101.689	3. Prototype 3
-120.964	0.35387	-341.833	4. Prototype 4
0.51224	0.23651	216.583	5. Prototype 5
-0.15277	0.25667	-0.59521	6. Prototype 6
-0.25790	0.26918	-0.95812	7. Prototype 7
0.73419	0.23023	318.895	8. Prototype 8
0.35845	0.24311	147.445	9. Prototype 9
-0.37129	0.27999	-132.606	10. Prototype 10
-0.70678	0.30135	-234.534	11. Prototype 11

Just because six prototypes which are numbered 4, 11, 10, 3, 7, and 6 received a negative utility value does not mean that these levels were unattractive. In fact, these ones may have been very acceptable to all respondents. But other five prototypes which are numbered 1, 9, 5, 8, and 2 are better. The utilities are scaled to sum to 0 within each attribute, so those six prototypes must receive negative utility values.

According to the calculated effect, eight prototypes of Sea Dragon are preferred to the two commercial available products (designs numbered 10 and 11) while prototype 4 is considered less attractive than these two. Prototype 2 is the most preferred design; the next ones are in turns prototype 8, 5, 9, and 1. Prototypes numbered 7, 6 and 3 are less preferred with negative utility values. We see that the least preferred design is the prototype 4 with the lowest utility value of -1.20964.

b. Part-worth utilities of brand:

There are just slightly differences among utilities of brands which are very low as compared with utility values of design. Therefore brand may not be a major element that impacts on a respondent's selection of a wedding card. Seragon is the most preferred brand and the remained ones are in turns "Y tuong Design", Tuong Nguyen and Vinh Phu.

Seragon which is not yet available in wedding card market in HCMC is the brand of Sea Dragon Company. On the other hand, Tuong Nguyen, "Y tuong Design", and Vinh Phu are wedding card stores that have long been participated in this market. This shows the opportunity for Sea Dragon Company to penetrate the market in which customers easily accept new brands.

Table 2: Part-worth utilities of brand

Effect	Standard Error	t Ratio	Attribute level
0.05348	0.13059	0.40948	1. Seragon
-0.02585	0.13208	-0.19575	2. Tuong Nguyen
0.02316	0.13122	0.17647	3. Y tuong Design
-0.05078	0.13203	-0.38460	4. Vinh Phu

c. Part-worth utilities of price:

This table shows respondents preferring lower price levels to higher ones. As a rational explanation for customer purchase behavior, the majority of customers desire premium products at low prices.

We see that the price level 1 was preferred to the price level 2, but we could not tell at that point if the result was statistically significant. We note that the utility for price level 1 is 0.06225 utility points higher than price level 2. We also note the standard errors for each of these utilities. The pooled standard error for the difference between these two utilities is equal to the square root of the sum of the squared standard errors. To get the t-value, we divide the difference in the two utilities by the pooled standard error 0.06225/ 0.198127 = 0.314. If we look this up on a standard t-table, we see that there is no significant difference between these two price levels at 95% confidence interval. Therefore, we conclude that prices at level 1 and 2 are acceptable for target customers.

Table 3: Part-worth utilities of price

Effect	Standard Error	t Ratio	Attribute level
0.80119	0.13939	57.477	1. From VND1,000 to less than 5,000
0.73894	0.14080	5.248	2. From VND5,000 to less than 10,000
-0.04307	0.15717	-0.27403	3. From VND10,000 to less than 15,000
-0.66368	0.18734	-35.426	4. From VND15,000 to less than 20,000
-0.83339	0.19755	-421.864	5. More than VND20,000

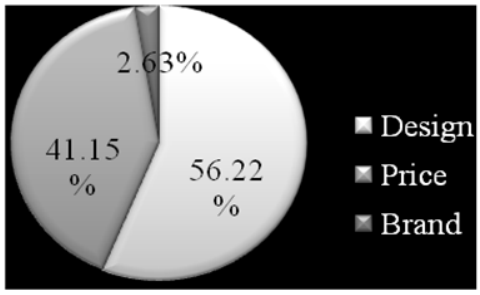
The utility significantly reduces when price increases to level 3; this is the threshold where respondents start to hesitate to accept the products. The t-value calculated when price level 2 is compared to price level 3 is 3.706 which is significant different at roughly the 99.9% confidence interval. The t-value calculated when price level 4 is compared to price level 5 is 0.623 which shows no significant difference at the 95% confidence interval.

Utility values reduce as the prices increase. The most preferred price range is from VND1,000 to less than 5,000 and the next acceptable price range is from VND5,000 to less than 10,000. Products with price ranging from VND10,000 to less than 15,000 should be designed with smaller quantity as compared to products at lower prices. Products with price more than VND15,000 should be offered in limited quantity which is applied only for extremely unique products.

d. Average importances of attributes:

The average importance of attributes is presented under percentage. Wedding invitation card is a product of art, thus design is the most important attribute to have a positive impact on influencing respondents to choose wedding cards. The result shows design makes up 56.22%. Due to the fact that customers buy wedding card in large quantity which is from 100 to 500 sets, price is the second factor in choosing a product because it receives average importance of 41.15%. Brand is considered as the least importance because it contributes a minor proportion of 2.63%.

Figure 3: Average importances of attributes



e. Market simulation:

In a current competitive environment, in order to select right products to maximize interest in offers of Sea Dragon, market simulations are implemented and analyzed. Nine prototype designs under Seragon brand (prototypes numbered from 1 to 9 and brand level 1) compete with two commercial available designs (prototypes numbered 10 and 11 and brand level 2) under Tuong Nguyen brand in market simulations

It is the price policy of Sea Dragon Company to develop products with prices more than VND5,000 due to the higher cost in producing handmade wedding cards as compared to printed ones. They estimate to set prices of prototypes numbered from 1 to 7 at price level 2 which is ranged from VND5,000 to less than 10,000 based on production cost. In scenario 1, prototypes from 1 to 7 are considered to have price level 2 which is the price of the two commercial available products (prototype 10 and 11).

Table 4: Market simulation scenario 1

Product Specifications				Product Shares of Preference	
	Design	Brand	Price	Product1	14.03%
Product1	1	1	2	Product2	27.58%
Product2	2	1	2	Product3	7.51%
Product3	3	1	2	Product4	2.96%
Product4	4	1	2	Product5	16.54%
Product5	5	1	2	Product6	8.51%
Product6	6	1	2	Product7	7.66%
Product7	7	1	2	Product8	6.32%
Product8	10	2	2	Product9	4.52%
Product9	11	2	2	None	4.37%

According to the result, product 2, 5 and 1 receive significant share of preference which are in turns 27.58%, 16.54% and 14.03%. Product 6, 7 and 3 have less shares of preference, however, they are selected with higher percentage than product 8 and 9 which are the two commercial available ones. Only product 4 with prototype 4 has the least share of preference, thus it is not a potential product even at the lowest price range of Sea Dragon. This prototype is recommended to be omitted from the list of prototypes. This result reflects the combination of advantages between Sea Dragon's designs and brand which are evaluated to be outstanding according to utility values.

Prototype 8 and 9 are excluded from the scenario 1 because their unique shape and sophisticated designs require higher price to compensate for the production cost. Sea Dragon estimates that the price for prototype 8 is at level 4 ranged from VND15,000 to less than 20,000 and more than VND20,000 (level 5) for prototype 9. Scenario 2

is conducted to calculate the share of preference among these two prototypes and two commercially available wedding cards which have price ranged from VND5,000 to less than 10,000.

Table 5: Market simulation scenario 2

Product Specifications				Product Shares of Preference	
	Design	Brand	Price	Product 1	21.87%
Product 1	8	1	4	Product 2	12.67%
Product 2	9	1	5	Product 3	27.19%
Product 3	10	2	2	Product 4	19.44%
Product 4	11	2	2	None	18.82%

The result shows the trade-off between design and price in respondents' selection. Even though prototype 8 and 9 are definitely preferred in terms of design, they become less attractive with extremely high prices as compared to less preferred designs with lower price. Product 1 can reach the share of preference just after the highest one which is product 3, a commercially available product. On the other hand, product 2 with the highest price level receives the least share of preference.

Table 6: Market simulation scenario 3

Product Specifications				Product Shares of Preference	
	Design	Brand	Price	Product 1	21.37%
Product 1	8	1	4	Product 2	14.68%
Product 2	9	1	4	Product 3	26.57%
Product 3	10	2	2	Product 4	19.00%
Product 4	11	2	2	None	18.39%

In order to adjust the share of preference in market simulation, scenario 3 is conducted with one changed element which is the price of product 2. This price is set at the same price level with product 1. The result shows that share of preference of product 2 is from 12.67% to 14.68%. However, shares of preference of remained products decrease. There is cannibalism in shares of product 1 by product 2 and shares from other two competitors are taken to product 2. This shows that product 2 only enhances its preference from customers if price is reduced. Therefore, it is recommended that prototype 8 and 9 have price level 4.

4. Conclusion and recommendation

a. Conclusion:

The purpose of this research is to apply a market study technique (mail survey) and choice-based conjoint analysis in prototype testing to provide Sea Dragon Company with an understanding of customer preferences and help them decide in consideration of the preferred set of attributes on the potential combination of the prototypes and price to become new products.

Quantitative research by mail survey with choice-based conjoint analysis is suggested as the main method of implementing the prototype testing for wedding invitation cards. Price, design and brand are the three attributes analyzed in terms of customer preferences. Nine prototypes of Sea Dragon Company compete with two commercial available products of Tuong Nguyen. Five levels of price and four brands are studied.

This research has achieved its objectives which are providing customer preferences and potential combinations of prototype and price. The detail is presented hereunder.

Customer preference of design: Nine prototypes of Sea Dragon are preferred to the two commercially available products (numbered 10 and 11) except the prototype 4. The prototype 2 is the most preferred design; the next ones are in turns prototype 8, 5, 9, 1, 6, 7, 3, 10, 11 and 4.

Customer preference of brand: There are just slightly differences among utilities of brands which are very low. Seragon is the most preferred brand and the remained ones are in turns "Y Tuong Design", Tuong Nguyen and Vinh Phu. This shows the opportunity for Sea Dragon Company to penetrate the market in which customers easily switch among brands.

Customer preference of price: Respondents prefer lower price levels to higher ones. The most preferred price range is from VND1,000 to less than 5,000 and the next acceptable price range is from VND5,000 to less than 10,000. Products with price ranging from VND10,000 to less than 15,000 should be produced in smaller quantity as compared to products at lower prices. Products with price more than VND15,000 should be offered in limited quantity with special marketing activities to promote them to high-income customers.

Importance level of attributes: Design is the most important attribute to have a positive impact on influencing respondents to choose wedding cards. Price is the second factor while brand is

considered as the least importance because it contributes as a minor proportion of 2.63%.

The potential combinations of design and price for new products: Prototypes from 1 to 7 are recommended to be combined with prices at level 2 which is from VND5,000 to less than 10,000. Prototypes 8 and 9 should be priced at level 4. Prototype 4 is the least favored as compared to the two commercially available products at price level 2. Therefore, it is recommended to be omitted from the prototype list.

b. Recommendation:

Sea Dragon Company is recommended to select eight out of nine prototypes as new products while prototype 4 should be omitted. Price level 2 should be applied to prototypes 1, 2, 3, 5, 6, and 7. Price level 4 should be applied to prototypes 8 and 9.

The main limit of this study is its small sample size while conjoint analysis requires 300 responses on average. Due to short time of the research, only 30 responses were collected. The design seed value which is used as a seed for generating random designs was 1 and number of questionnaire versions was 300. The experimental design creation was set with complete enumeration method of random task generation.

There is another limitation in the research due to the small number of prototypes. After this survey, Sea Dragon should be able to develop a full collection of wedding card according to customer preferences. Then test marketing of this new collection should be implemented in a mall intercept to confirm the purchase acceptance.

On the other hand, the limitation of this research is also due to the short time of the customer survey with conjoint analysis. It is necessary to have a further study of competitor performance to compare wedding cards of Sea Dragon with products of other players. The result of that recommended study would help create effective product and pricing strategy for these new products.

Prototype testing with conjoint analysis is a very useful step to enhance the chance of success for new products. It is recommended that marketers pay attention to this step to evaluate the potential of their products. In fact, the more the company understands the way consumers accept a product through its set of attributes, the more successful the opportunity for market introduction becomes■

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