ORIGINAL ARTICLE

AN EMPIRICAL STUDY ON PRODUCT PLANNING OF LUNCH JARS

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Abstract: In order to develop new lunch jars, in this study, 'Seven Tools for New Product Planning' was used to clarify the direction for lunch jars and optimized concepts by using the group interview to raise hypotheses of lunch jars. To verify those hypotheses obtained from interview survey, questionnaire survey was carried out. Moreover, in order to clarify the condition of lunch jars, positioning analysis was conducted using the data obtained from the questionnaire survey, and the planning directions for new lunch jars were clarified. Depending on this planning direction, 702 original ideas were generated, and then in order to select more promising ones, weighting evaluation was used. Finally, it was optimized to make sure product concept by conjoint analysis. And the concepts of new lunch jars that had strong possibility of great success were proposed by this research.

Keywords: *product planning, seven tools for new product planning, lunch jars.*

1. INTRODUCTION

1.1 Background of the study

According to an interview survey conducted by Kanda [1] on companies handling conventional consumer products, the process of their new product planning is often characterized by being not systematized. Their new product planning is too dependent on subjective experience, intuition and risks. Many products have ended in failure even though they have been developed based on an appropriate idea and backed with huge amount of money for planning.

In order to succeed and manage product planning, we need to systematize these processes. In this research, we apply "Seven Tools for New Product Planning" which is proposed by Kanda and Nagasawa et al, on the lunch jars.

"Seven Tools for New Product Planning" is a method, which combines quality control, marketing, and idea generation methods. This is a method to decide the direction of the project that develop hit products and for an epoch-making idea to conceive, and is a systematic technique to do product planning, a technique collection that unites both sides of qualitative (sense and language) techniques and quantitative (logical and numerical value) techniques, and balances.

Some products developed according to this flow have been spectacular successes [3]. However, as this method has not been applied to lunch jar yet, it is necessary to carry out a demonstrative study in order to verify the applicability of the 'Seven Tools for New Product Planning' to lunch jars, which are lunch box made by vacuum bottle to keep foods warm.

1.2 Objectives of the study

This joint study had been carried out with the full cooperation of and agreement between Tiger Corporation and the Research Center for Management Strategy of the BKC Research Organization of Social Sciences at Ritsumeikan University. The objective of this study can be defined as follows.

Present lunch jars have problems in three points (weight, the price, and the design). A lunch jar weighs about 3-5 times more than a normal lunch box because it needs metal to make lunch jar vacuum bottle. Also, it costs ¥2000-¥5000 each. This is 2-5 times as much as a usual lunch box. In addition, there is a stereotype that "lunch jars are mainly carried by construction workers" Also because the container is lined with vacuum only cylindrical shapes can be made and these might not be appealing to young people or women.

Moreover, the market configuration of the lunch jars consists of three market leaders, Tiger Corporation, Zojirushi Corporation and Thermos Corporation. These major companies occupy a share of about 30 percent each, and it is in a rivalry the market. Therefore, these three major companies need to produce new products for the expansion and activation of the market share in the near future.

P. Drucker says that the objective of companies must be to create customers first, and profits will flow through accordingly. Thus, companies have entered into keen competition in the area of CRM (Customer Relationship Management), such as one-to-one marketing; call centers, and data warehouses. This study both demonstrates and

analyzes the customer enclosure solution using a *Kansei* engineering approach. A prototype of *Kansei* Engineering Approach 'Seven Tools for New Product Planning' that has been instrumental in the creation of many successful products was applied to the development of "lunch jars", thus verifying that a *Kansei* engineering approach can be applied to lunch jars. Moreover, this study set out to quantitatively analyze 'customer enclosure' that has not hitherto been logically explained, thereby providing a clear method to companies is meaningful.

The aim of this study was to create lunch jars that would be popular among young people. This paper identifies the characteristics of lunch jars by employing a cluster of methods defined in 'Seven Tools for New Product Planning,' and summarizes specific concepts [4][5].

2. IDENTIFICATION OF THE HYPOTHETICAL CUSTOMER NEEDS IN LUNCH JARS

2.1 Objective

Through an interview survey which is the first method described in 'Seven Tools for New Product Planning', potential customer needs in lunch jars will be identified. There are various methods used in interview surveys, such as the group interview method and a grid evaluation method [3]. In order to identify the favorable and unfavorable characteristics associated with lunch jars, this study adopts a form of the group interview method. Thus, the overall structure of consumers' awareness can be clarified, which is also useful for sampling the evaluation terms in the next step, a questionnaire survey.

A group interview aims to be attentive to the opinions of a small number of customers through a deep and direct interchange. In general, a chairman is in charge of interviewing five to seven customers selected (or requested) in accordance with the objective.

Thus, when opinions are actively exchanged, as in a group discussion, a successful interview will be achieved without the conversation being dominated by the chairman. Moreover, on those occasions when interviewees energize each other to create a synergy, it is often the case that further important facts will come to light, exceeding original expectations.

2.2 Group interview

A group interview was conducted for seven times. (Total of 35 people)

2.3 Analyzing the group interview results

(1) Preparation of affinity and schematic diagram:

In order to easily identify potential customer needs for lunch jars from the opinions of interviewees in order to formulate hypotheses, an affinity diagram and a schematic diagram were prepared. Figure 1 shows an affinity diagram.

(2) Postulates derived from affinity and schematic diagram

It is clear that the entire group of interviewees thought that the volume of "LWP-0170" made by the Tiger Corporation was too large for both men and women and needed to improve from a design aspect. On the other hand, the volume of "JLU-801" made by Thermos Corporation and "SL-WL07" made by Zojirushi Corporation was appropriate. Moreover, the student restaurant users made a lot of remarks that "It is troublesome to make lunch" although lunchbox users had "Made lunch by themselves" or "Parents made lunch". Pictures of SL-WL07, LWP-0170, JLU-801 and SCLJ7 are shown in Figure 1.

Figure 1: Pictures of the four lunch jars.

Assuming that the interviewees are representative of all users, what users want can be summarized under the following seven headings: (i) well-designed, (ii) portability, (iii) better heat insulation, (iv) reasonable price, (v) appropriate volume, (vi) easy use and (vii) famous brand. The consumer needs for lunch jars abstracted by interview survey were as follows.

- (1) Users prefer well designed (color and size) lunch jars.
- (2) Users prefer usable (light and portable) lunch jars..
- (3) Users prefer lunch jars that have appropriate volume.
- (4) Users prefer lunch jars that have better heat insulation.
- (5) Users prefer reasonable lunch jars.
- (6) Users prefer lunch jars made by famous brand.

2.4 Summary

In order to establish the prevailing attitudes to lunch jars among young people, a group interview was carried out to specifically identify shortcomings and compile a list of desirable lunch jars features, as perceived by the interviewees. The group interview results show that a new lunch jars should be well-designed, usable, have appropriate volume, better heat insulation, reasonable price and famous brand. Accordingly, postulates, such as 'users strongly prefer a well-designed lunch jars,' and 'users prefer a appropriate volume,' were arrived at. These postulates were used as evaluation items for the second method, a questionnaire survey.

3. VERIFICATION OF THE POSTULATES ON LUNCH JARS

3.1 Objective

Through the interview survey, potential customer needs for lunch jars were identified. However the results were based on the views of only 35 interviewees so it was not clear whether the results represented the general views of the young people or not. Therefore, to quantitatively verify the interview survey results, a questionnaire survey targeted at a large number of respondents, the second method of Seven Tools for New Product Planning, was carried out [3].

3.2 Questionnaire survey

Eleven existing lunch jars were selected as evaluation targets, including those obtained from the interview survey. Evaluation targets and evaluation items were selected based on the postulates derived from the interview survey results. In addition, this survey was conducted for 122 people. The details of this questionnaire survey are shown in Table 1.

Table 1: Details of questionnaire survey

Date	May 15 th -22 nd , 2002
Place	Ritsumeikan University
Subjects	Male:33 female:100 (120 valid answers)
Details	The questionnaire sheets were prepared for the subjects and the lunch jars used in this survey were put on the desk for reference. It took about 20 minutes to answer all the questions.
Reward	500yen book coupons were handed.

3.3 Analysis of the questionnaire survey results

A comparative analysis on the large amount of quantitative data provided was conducted using PLANPARTNER, which is the software of the Seven Tools for New Product Planning. Evaluated values in 122 answers were replaced by figures based on the rating on a scale of 1 to 5 (SD method) and these values were inputted.

3.4 Analysis of the questionnaire survey results

(1) Basic statistical figures

The basic statistics obtained from the questionnaire survey show that the rating for the evaluation item, 'rice capacity,' was high with a mean value of 3.83 and the evaluation item 'heat insulation' was high with mean values of 3.73. Also, the rating for the Lunch Jar 'SL-WL07' and 'LWO-W700' were high with mean values of 3.40 and 3.41.

(2) Snake plot

A snake plot shown in Figure 2 helps to clarify the basic statistics. It is obvious from Figure 2 that 'LWO-W700' and 'SCLJ7' had the highest rating for the comprehensive evaluation item 'want to use (free of charge),' while 'LWL-A220' shows the lowest rating.

Figure 2: Snake plot. (Products – evaluation item)

Figure 3: Snake plot. (Evaluation item - products)

(3) Correlation coefficient

In order to identify the factors affecting the evaluation, correlation coefficients were obtained for 10 evaluation items and eleven lunch jars and were shown in Table 2 and Table 3. As respective matrices for correlation coefficients show, the correlation coefficient between 'Side dishes capacity' and 'Lots of rice' was 0.672, which shows that these two items were clearly correlated. Items related to the comprehensive evaluation item 'want to use (free of charge)' were 'Good design' (0.549), 'Easy to use' (0.469), 'Easy to carry' (0.437), 'Light (0.423). Thus, it is clear that design and usability were correlated with the desire to buy the lunch jars. However, the eleven lunch jars included in this survey were independent of each other, as their correlation coefficients among existing lunch jars were not very high.

3.5 Summary

Judging from the correlation coefficient between the evaluation items 'want to use (free of charge)' and other evaluation items, it was clear that 'design' and 'usable' for the subjects was strongly related to the conditions of lunch jars.

Also according to the snake plot, some lunch jars were too big because those are recognized as lots of capacity.

This concept has been included in the postulates derived from the interview survey and has been verified by the questionnaire survey.

4. POSITIONING AND ORIENTATION OF LUNCH JARS

4.1 Objective

A positioning analysis was performed in order to identify the competing relations among lunch jars. Another important objective of a positioning analysis is to identify any advantageous niche that might exist for a new product and its appropriate orientation [3]. In a positioning analysis, a multi-dimensional space like a map was used for the positioning of lunch jars. This space, which is made based on the consumers' perception of how they regard each lunch jars, are called a 'Perception Map.' Multiple axes on a perception map define the market, while dot represents the position of lunch jars. In this study, the data obtained from the questionnaire survey were used for the positional analysis.

Table 2: Correlation coefficients between evaluation items

	Good design	Easy to carry	Easy to use	Light	Lots of rice	Lots of side dishes	heat insulation	Reasonable price	Famous brand	Want to use
Good design	1.000	0.443	0.409	0.366	-0.109	-0.132	-0.076	0.126	0.050	0.549
Portable	0.443	1.000	0.505	0.539	-0.246	-0.220	-0.126	0.160	-0.033	0.437
Usable	0.409	0.505	1.000	0.350	-0.035	-0.041	-0.011	0.125	0.061	0.469
Light	0.366	0.539	0.350	1.000	-0.369	-0.307	-0.361	0.207	-0.062	0.423
Rice capacity	-0.109	-0.246	-0.035	-0.369	1.000	0.672	0.417	0.033	0.188	-0.038
Side dishes capacity	-0.132	-0.220	-0.041	-0.307	0.672	1.000	0.391	0.085	0.048	-0.036
heat insulation	-0.076	-0.126	-0.011	-0.361	0.417	0.391	1.000	-0.072	0.208	-0.048
Reasonable price	0.126	0.160	0.125	0.207	0.033	0.085	-0.072	1.000	-0.082	0.244
Famous brand	0.050	-0.033	0.061	-0.062	0.188	0.048	0.208	-0.082	1.000	0.068
Want to use	0.549	0.437	0.469	0.423	-0.038	-0.036	-0.048	0.244	0.068	1.000

Table 3: Correlation coefficients between evaluation items and products

	LWL-A220	SL-WL07	JLX-1800	LWD-F090	JLU-801	LWQ-0170	SL-EB16	SCLJ7	LWP-0170	JLN-1602	LWO-W700
Good design	1.000	0.265	0.554	0.398	-0.034	0.622	0.638	-0.202	0.619	0.465	-0.016
Portable	0.265	1.000	0.141	0.464	0.404	0.206	0.288	0.109	0.170	0.145	0.321
Usable	0.554	0.141	1.000	0.263	0.099	0.562	0.535	-0.019	0.547	0.643	-0.097
Light	0.398	0.464	0.263	1.000	0.258	0.446	0.480	-0.014	0.395	0.292	0.202
Rice capacity	-0.034	0.404	0.099	0.258	1.000	-0.023	0.054	0.403	-0.059	0.130	0.296
Side dishes capacity	0.622	0.206	0.562	0.446	-0.023	1.000	0.723	-0.147	0.683	0.522	-0.010
heat insulation	0.638	0.288	0.535	0.480	0.054	0.723	1.000	-0.196	0.625	0.463	0.031
Reasonable price	-0.202	0.109	-0.019	-0.014	0.403	-0.147	-0.196	1.000	-0.118	0.079	0.336
Famous brand	0.619	0.170	0.547	0.395	-0.059	0.683	0.625	-0.118	1.000	0.587	0.021
JLN-1602	0.465	0.145	0.643	0.292	0.130	0.522	0.463	0.079	0.587	1.000	-0.054
LWO-W700	-0.016	0.321	-0.097	0.202	0.296	-0.010	0.031	0.336	0.021	-0.054	1.000

4.2 Analysis of the positioning analysis results

(1) Deciding the number of space dimensions

Through factorization, the axes of a perception map could be defined. Except for a general evaluation item, namely 'want to use (free of charge)', the remaining nine evaluation items were arranged into a small group of factors. Table 4 shows the eigenvalues and the contribution rate for each factor. In this study, three factors were adopted. This means that the subjects regarded the lunch jars as a product that can be explained three-dimensionally.

Table 4: Eigenvalues and contribution rate for each factor

factor	Eigenvalues	contribution rate	accumulated contribution rate
factor 1	2.843	31.6%	31.6%
factor 2	1.743	19.4%	51.0%
factor 3	1.119	12.4%	63.4%

(2) Determining the factor characteristics

The characteristics of the above three condensed factors were identified based on the factor loading shown in Table 5. The factor loading is a correlation coefficient between each factor and each evaluation item. An evaluation item with a larger factor loading shows a strong correlation with the factor. As Table 5 shows, the following two evaluation items, 'Rice capacity' and 'Side dishes capacity', had strong correlations with Factor 1. Thus, Factor 1 was named 'Volume,' while Factor 2 and Factor 3 were named 'User-friendliness' and 'Heat insulation' respectively.

Table 5: Factor loading of evaluation items

Evaluation item	Factor 1	Factor 2	Factor 3
Well-designed	-0.070	0.593	0.016
Portability	-0.168	0.751	-0.086
Usable	0.035	0.674	0.064
Light	-0.303	0.597	-0.355
Rice capacity	0.873	-0.110	0.198
Side dishes capacity	0.844	-0.111	-0.024
heat insulation	0.445	-0.066	0.444
Reasonable price	0.134	0.220	-0.294
Famous brand	0.109	0.068	0.345
Meaning of factor	Volume	User-friendliness	Heat insulation

(3) Preparation of a perception map

After determining the number and characteristics of factors, the factor score for each evaluation target was obtained. A perception map can be prepared by positioning an evaluation target according to a factor score within a space where each factor serves as an axis. A dot representing an evaluation target indicates the mean value of a respondent's evaluation.

Using the factor scores, factor scores were positioned within a space where each factor serves as an axis, thus obtaining the perception map shown in Figure 4 and Figure 5.

As shown in Figure 4 to Figure 5, 'JLN-1602', 'JLX-1800' and 'LWQ-0170' were regarded as 'lots of capacity'. On the other hand, 'JLU-801' and 'SCLJ7' were regarded as 'less capacity'. 'LWO-W700' and 'SCLJ7' were regarded as 'user-friendliness'. On the other hand, 'LWL-A220' and 'LWQ-0170' were regarded as 'less user-friendliness' lunch jars.

As Figure 4 and Figure 5 shows, 'LWL-A220' was regarded as a 'good heat insulation' and 'lots of volume' lunch jar while 'SCLJ7' was regarded as a 'bad heat insulation' and 'less volume' lunch jar.

Figure 4: Perception map and ideal vector.
(Volume — User-friendliness)

Figure 5: Perception map and ideal vector.
(volume — Heat insulation)

(4) Ideal vector

A perception map specifies the perception axes, positioning of existing products, and market opportunities (niche market), but does not refer to the appropriate positioning of new products. In order to obtain the appropriate orientation for new products, a preference regression analysis was carried out using the evaluation item

called 'want to use (free of charge)' as an objective variable, and calculated an ideal vector. A preference regression analysis is a way of estimating the significance of an axis obtained from a perception map. And diagonal lines in Figure 4 and Figure 5 represented the ideal vector.

As a result of examining the perception map shown in Figure 4 and Figure 5, it turned out that the subjects preferred lunch jars that simultaneously satisfied the three factors, 'volume,' 'user-friendliness,' and 'heat insulation.' In other words, lunch jars that had less volume with user-friendliness characteristics compared to existing lunch jars were likely to prove popular among young people. For example, if the 'volume' factor were a bit added to the 'SCLJ7,' this lunch jar would approach more closely the ideal orientation.

4.3 Summary

A positioning analysis was carried out in order to elucidate the market structure and to determine the appropriate orientation when developing a new lunch jar. The results of positioning analysis show that the subjects placed considerable importance on the following features: 'volume,' 'user-friendliness,' and 'heat insulation.' And, according to ideal vectors, 'user-friendliness' and 'heat insulation' were recognized important factors when developing new lunch jars. Using a face sheet, respondents were stratified, and each stratum was examined. However, except for the stratum 'do not make lunch everyday,' there were no striking differences.

5. IDEA GERERATION FOR A NEW LUNCH JAR

5.1 Objective

When developing a new lunch jar, an idea generation method, which is the fourth method contained in 'Seven Tools for new Product Planning,' was applied with a view to finding as many creative and innovative ideas as possible within a short period. More specifically, an analogical thinking method was adopted. As analogical thinking is based on a reversal of ordinary common-sense concepts, it should be noted that analogical thinking ideas are only one method among many others [3].

5.2 Ideas based on analogical thinking

(1) Analogical thinking

Analogical thinking aims to draw out totally unique groundbreaking ideas that cannot be obtained through the application of a common sense approach to existing products. The sequence of analogical thinking is shown below:

(i) Decide on a theme: The theme here was 'to create ideas for a new lunch jar that will attract young people.' In particular, it is important to create ideas that are in accordance with the product planning orientation identified by the positioning analysis referred to above. (ii) Enumerate the functions and characteristics of a product based on common sense: Many functions and characteristics of lunch jars can be identified based on common sense, such as 'good design,' and easy to use.' (iii) Formulate a reversed concept apparently contradicting common sense: By formulating a reversed concept, the usual process of thinking limited by a fixation on common sense can be transcended. (iv) Specify the problems to be solved: Problems identified through the reversed concept process are specified. (v) Provide keywords: Keywords linked to the solution of specified problems are provided. (vi) Think of an analogy: For each keyword, it is necessary to think of something that takes advantage of the matter characterized by the keyword in a completely different field. This is an analogy. (vii) Think of creative ideas: Based on analogies, creative ideas can be generated by combining the theme and keywords.

The thinking process mentioned above is made into a list, which will act as a guide to the analogical thinking method. This method is effective in contriving creative ideas and solutions when existing products get into a rut, when customers make irrational demands, or an impasse is reached when devising improvements or solutions to problems.

(2) The results of analogical thinking

Four members of the study group were engaged in generating creative ideas for a new lunch jar. Through analogical thinking, 702 ideas were obtained.

5.3 Summary

Through analogical thinking, which is the fourth tool contained in 'Seven Tools for new Product Planning,' 702 ideas for a new lunch jar were created, including those that could be regarded as potentially highly successful and those that are not feasible. In the next chapter, a method is described that allows concepts that can be transformed into promising products to be sifted out from a mass of raw ideas.

6. SELECTION OF PROMISING IDEAS FOR A NEW LUNCH JARS

6.1 Objective

Among the 702 ideas obtained from the idea generation method, those that could potentially be transformed into

promising products were sifted out. In order to do this, an idea selection method was applied based on the appropriate orientation for the project obtained from the positioning analysis, to sift out important ideas.

6.2 Narrowing ideas by screening

As it was impossible to transform all 702 ideas into commercial reality, promising ideas needed to be selected. In order to pass on to the next method, conjoint analysis, it was necessary to narrow these ideas down. To keep this accurate, the process was divided into two stages in narrowing down the ideas. The ideas that seemed difficult to achieve and unreal were deleted by screening as the first stage. The weight evaluation method was applied to the remaining ideas as the second stage. The ideas judged by three or more of five research members as promising were adopted in the evaluation method. First of all, 702 ideas were narrowed down to around 200 through screening. In screening, overlapping ideas and similar ideas were put together and arranged. Then, based on the criteria obtained from the positioning analysis, such as 'less volume' and 'user-friendliness' as a new lunch jar, each idea was evaluated. In this study, 702 ideas were narrowed down to 20 ideas. For instance, 'A lunch jar with vivid color', 'A lunch jar made from LEGO blocks', 'A lunch jar that consists of small containers' and 'A lunch jar that can keep foods warm at around 60°C'.

6.3 Narrowing ideas by a weighting evaluation method

(1) Weighting evaluation method

Using a weighting evaluation method, ideas were evaluated according to each evaluation item against different criteria, to obtain the overall evaluation of each idea. The sequences of this method are shown below:

- (i) Decide which idea is to be evaluated, (ii) decide which evaluation item is to be evaluated, (iii) decide the criteria for each evaluation items, (iv) obtain an overall evaluation through combining the individual evaluations of each ideas, (v) Adopt the idea showing the highest score in the overall evaluation.

(2) The results of weighting evaluation

In order to visualize the decision-making process used in selection, a weighting evaluation was conducted. The evaluation was based on such criteria as factors including 'user-friendliness', 'volume', and 'heat insulation', which were determined in the positioning analysis with the weights indicating the importance of each evaluation item.

6.4 Summary

Through screening, 702 ideas obtained from the idea generation method were narrowed down to 218 ideas. Then, using the weighting evaluation method, these ideas were narrowed down to 20 promising ideas and they were passed on for conjoint analysis.

7. PROPOSAL ON THE MOST APPROPRIATE CONCEPT FOR LUNCH JARS

7.1 Objective

In order to formulate the most appropriate concept for lunch jars based on the promising ideas obtained from the idea selection method, a conjoint analysis was carried out. Here, through a trade-off between ideas and cost, lunch jars with truly desirable characteristics was formulated.

7.2 Breakdown of the conjoint analysis results

(1) Conjoint analysis

When designing a new product, it is necessary to consider various factors, such as functions that characterize the product, favorable design, and reasonable price. A conception of the most desirable product for consumers can only be formulated by combining the design values of the most desirable factors. For this purpose, it is helpful to obtain the evaluation directly from consumers, assessing the individual impact and design value of each factor, such as product functions, design, and price. Thus, a conjoint analysis method can be applied to estimate the individual effect of each factor from the overall evaluation of a product [3].

(2) Preparation for a conjoint analysis

1) Setting of attributes and standards

Prior to conducting a conjoint analysis, the attributes and standards of the proposed Lunch Jar should be set. An attribute is a factor that characterizes a product by its size, weight and style. A standard is a term and/or a numerical value that describes the attribute specifically. In this study, in order to survey as many ideas as possible, the conjoint analysis was conducted four times.

2) Preparation of a profile

Based on the attributes and standards, the profile cards to be used in the questionnaire were prepared. There were 128 combinations of attributes and standards, in total ($2^7=128$). As it was too difficult for respondents to rank 128 combinations in accordance with their preference, 8 cards were prepared using an $L_8(2^7)$ orthogonal layout. The comparison of these 8 cards is as effective as if comparison has been conducted

Table 6: Profile cards of conjoint analysis

1 st conjoint analysis		2 nd conjoint analysis		3 rd conjoint analysis		4 th conjoint analysis	
attributes	standards	attributes	standards	attributes	standards	attributes	standards
External Design	Silver metal design	Price	¥1,980	Pattern	Colorful border	Shape	Old flask design
	Dressing substitution		¥2,980		Gradation handle		Wine barrel design
	Specular finish design		¥3,980		Dots pattern		Super-slim design
	Pastel pink design		¥4,980		Plain		Cylinder design
Shape	Low one step type	Shape	Lego block	Shape	Combination of small containers	Usable	Chopsticks
	Cylinder		Cylinder		Cylinder		Fork
Porch	Leather porch	Color	Vivid color	Addition function	Mirror	Heat insulation	60°C or more
	Normal porch		Pastel pink		None		45°C or more
Heat insulation	Rotate pedal	Material	Diamond cut	insulation	Cold insulation	Container	Earthenware
	Stainless steel		Plain		None		Plastic
Price	¥3,980	Arrange	2 way use	Price	¥3,980	Price	¥3,980
	¥2,980		1 way use		¥2,980		¥2,980

using all 128 cards. Prepared profiles are shown in Table 6. Also example of profile card was shown in Figure 6

Figure 6: Example of the conjoint card.

3) Conjoint analysis

The conjoint analysis conducted for 57 people who were selected at random. And this analysis was conducted 4 times. The results of the analysis are shown from Figure 7–14. The details of the conjoint analysis are shown in Table 7.

Table 7: Details of conjoint analysis

Date	June 15 th -19 th , 2002
Place	Ritsumeikan University
Subjects	Female:129 (126 valid answers). The female who carry a lunch jar every day are chosen.
Details	The questionnaire sheets (conjoint profile cards) were prepared for the subjects. And conjoint profile cards are sorted in accordance with their preference. The lunch jars used in this survey were put on the desk for reference. It took about 15 minutes to answer all the questions.
Reward	500yen book coupons were handed.

(3) Conjoint analysis results

1) Effective value of each attribute and standard

From Figure 7 - 14 shows the results of this survey, the

effective values of attributes and standards and the contribution rate of diffusion.

Figure 7: The utilities of 1st conjoint analysis.

Figure 8: The contribution rate of 1st conjoint analysis.

In the 1st conjoint analysis, the highest contribution rate of diffusion was ‘Shape’ (48.7%), second highest one was ‘Design’ (32.0%) and the third highest one was ‘Porch’ (12.6%). This means that the shape of a lunch jar was the most important attribute in this 1st analysis and this attribute affects about half of the subjects when a consumer decides to buy a lunch jar. The accumulate contribution rate of ‘Shape’,

'Design' and 'Porch' was more than 90%. So it can be said that consumers consider these three attributes to be very important factor when they buy some lunch jars.

Similarly, judging from the effective value of standards, 'low, one-step type' (0.5) was the most preferred. And 'Pastel pink' (0.4) was the second the most preferred. This means that if the lunch jars were of a 'low, one-step' shape, consumers could buy this new lunch jar more than existing ones.

Figure 9: The utilities of 2nd conjoint analysis.

Figure 10: The contribution rate of 2nd conjoint analysis.

In the 2nd conjoint analysis, the highest contribution rate of diffusion was 'price' (41.5%), the second highest one was 'Shape' (26.5%) and the third highest one was 'Color' (20.7%).

Also, the highest effective value of standard was '¥1,980' (1.1) which was the most reasonable price. Also, the value of 'Lego Block shape' (0.7) and 'Vivid color' (0.6) was high. This means that consumers prioritize cost more than new ideas in 2nd conjoint analysis.

In the 3rd conjoint analysis, the contribution rate of diffusion 'insulation' (71.1%) was highest. And that of 'Pattern' (14.9%) was the second highest. Thus, it can be said that consumers consider almost only 'Insulation' and 'Pattern' when they buy some lunch jars.

The effective value of standard 'cold insulation' (1.3) was highest. And that of 'Dot pattern' (0.8) was the second highest.

So, it can be said that consumer consider these two to be significant factor of purchasing.

Figure 11: The utilities of 3rd conjoint analysis.

Figure 12: The contribution rate of 3rd conjoint analysis.

In the 4th conjoint analysis, the contribution rate of diffusion 'shape' (88.7%) was highest. And others were less than 5%. So it can be said that consumers consider only 'Insulation' virtually. And effective value of standard 'Cylinder design' (1.8), which is the same shape of current lunch jars, was highest. And that of 'Super-slim design' was the second highest. Thus, consumers consider these two are significant factor of purchasing.

Figure 13: The utilities of 4th conjoint analysis.

Figure 14: The contribution rate of 4th conjoint analysis.

2) A trade-off relation between price and other attributes

Effective standard values show that 'price' of ¥2,980 was preferable to ¥3,980, and it was not surprising for consumers to prefer a reasonable price. However, it is necessary to consider the trade-off relation between price and other attributes. In other words, we must find out other attributes that still make a product desirable even if the price rises from ¥2,980 to ¥3,980. More specifically, in numerical terms, we must find other standards showing an effective value exceeding the effective value of the price of the lunch jars (effective value of ¥3,980). The standards that exceed the effective value of ¥3,980 were 'low one step type', 'Heat insulation' and 'cylinder design'. However, as cylinder designs had already been added to current lunch jars, this idea was not appropriate to adapt as a new idea. Therefore, from the result of conjoint analysis, 'low one step type' and 'cold insulation' were revealed to be promising ideas.

7.3 Summary

In order to propose the most appropriate concept for lunch jars, a conjoint analysis was carried out. The results of this analysis show that promising ideas of lunch jars such as 'low one step type' and 'cold insulation' were still favored by subjects in spite of ¥1,000-rise (from ¥2,980 to ¥3,980) in price.

8. CONCLUSION

6 methods contained in the 'Seven Tools for new Product Planning' have been applied in order to formulate a conceptual model of lunch jars. Through the interview survey, the questionnaire survey, and the positioning analysis, which identified subjects' needs and the market structure of lunch jars, it has become clear that consumers prefer lunch jars that contains the following three factors: 'volume,'

'user-friendliness,' and 'heat insulation.' Next, through the idea generation method, idea selection method and conjoint analysis, 702 ideas were generated in accordance with the preferences expressed by the subjects, and then narrowed down to 19 ideas, and this idea was optimized to two promising ideas, which were 'The lunch jar which consists of low one step' and 'The lunch jar which has cold insulation' through conjoint analysis. This implies that these ideas are likely to be a big hit.

This study has investigated and clarified in a specific manner consumer needs for lunch jars, the market structure of existing products, the best orientation for new product planning, and the most appropriate concept for a new product.

Therefore, it can be said that the 'Seven Tools for new Product Planning' are applicable to general merchandise.

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