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ADVERTISING PERFORMANCE IN JAPAN

by

Takeshi Shimizu

Research Tasks and the flow of Analysis

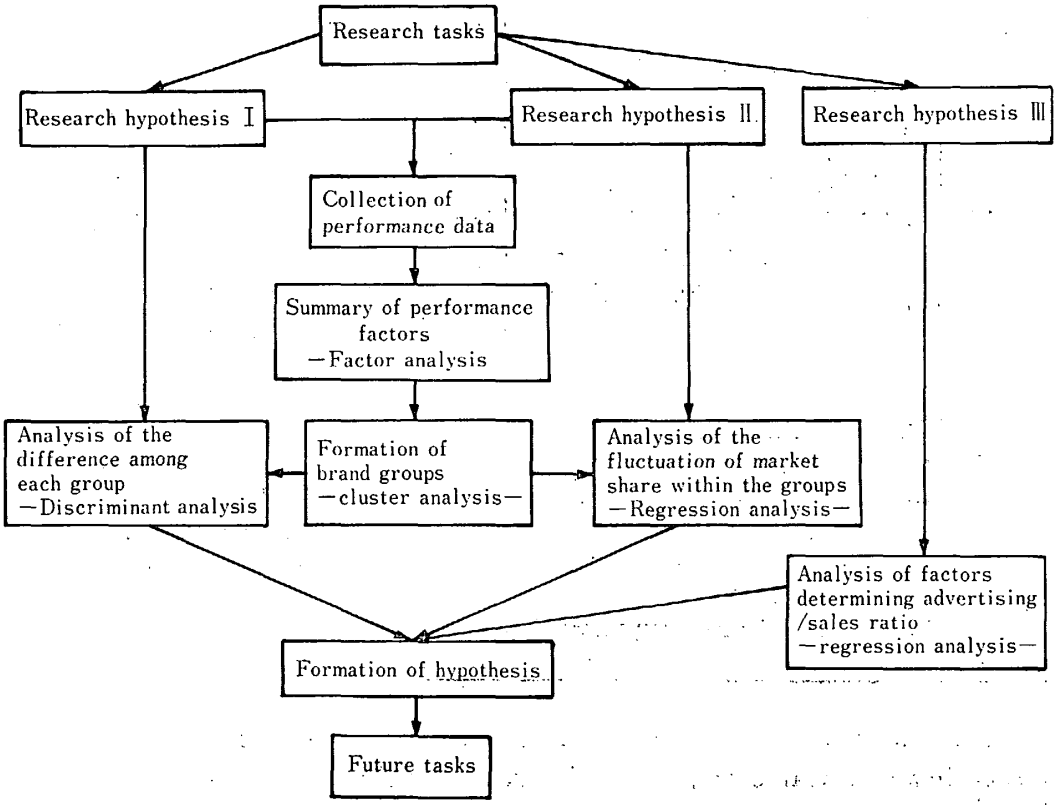
In this study, it is intended that the relations between the business performance and marketing activities, especially advertising activities, are examined.

The analysises in this study are to be categorized into roughly three parts:

Analysis I: The samples on each brand level are to be categorized in accordance with their multi-dimensional business performances, and the variables that generate the difference among performance group are to be extracted on the basis of sample studies.

Analysis II: The variables that determine the variation in market shares within

Chart 1. The Flow of Analysis



each performance group are to be extracted.
Analysis III: Focusing on the advertising/sales ratio which is one of the alternative independent variables in the analysis I and II, the variables that explain the variation of the ratio are to be examined. The flow of analysis is shown in Chart 1.

Preparation for Analysises and the Formation of Performance Cluster

The sample items which are to be dealt in this study are 94 consumers' products that include foodstuffs, miscellaneous goods, phermaciutical products, cosmetics, household utensils, transportation machineries and houses.

A total of 23 alternative independent variables that explain the difference among each group of brands and the variation of market shares among different groups of brands in the analysis I and II are shown in Chart 2. These are categorized mainly into the advertising cost variables and the attribute variables of corporations first of all. Secondly, the advertising cost variables are to be divided into the advertising cost variables of each brand and corporate advertising cost variables.

Chart 2. List for Alternative Independent Variables (analysis I·II)

Advertising cost variables	(A) Brand advertising variables	Corporate attribute variables	(C) Corporate image variables
	A_1 Advertising cost/sales		C_1 Technology image
	A_2 Previous year's advertising cost/sales		C_2 New product development
	A_3 Advertising cost compared to the previous year		C_3 Customer service
	A_4 TV advertising cost/sales		C_4 Good sales network
	A_5 Radio advertising cost/sales		C_5 Skillful in advertising
	A_6 Newspaper advertising cost/sales		C_6 Eager in consumer issues
	A_7 Magazine advertising cost/sales		C_7 Contribution to society
			C_8 Reliability
			C_9 Modernness
			C_{10} Good future prospects
	(B) Corporate advertising cost variables		(D) Corporate structure variables
	B_1 Advertising cost/sales		D_1 Product cost/sales
	B_2 Advertising cost compared to the previous year		D_2 Labor cost/sales
	B_3 Selling and general expences/sales		D_3 Total capital used per capita labor force

The attribute variables of business corporations are to be divided into the corporate image variables and the corporate structure variables.

In preparation for the analysis of the relations between the business performance and variables including advertising costs, we are, first of all, to classify the 94 samples according to plural business performance variables. The analysis on each group will be made in Analysis I, II and III.

Business performance variables are 11 variables as shown in Chart 3. It was necessary to select the variables which are less dependent on others as it is assumed that each variable might be strongly correlated. In order to eliminate the correlation of the 11 variables, their contents are to be summarized by factor analysis.

Chart 3. List for Performance Variables

1.	Outstanding brand evaluation
2.	Knowing of brand name
3.	The ratio of consumers' desire to purchase a particular brand
4.	The percentage of the use of a particular brand
5.	The percentage of exposure to brand advertising
6.	Market share
7.	Profit/sales
8.	Profitability (Percentage of profit against the total amount of capital)
9.	Stability (Ratio of business expenses and income)
10.	Growth (Five-year average percentage of the growth of profit)
11.	Productivity (Sales per capita of employee)

Chart 4. Results of Factor Analysis (after rotation)

Variables number	Factors / Performance related variables	I	II	III	Cummunality
1	Outstanding brand evaluation	.93	.00	.14	.88
2	Knowing the name	.41	.01	.72	.68
3	Desire to purchase	.94	.10	.06	.89
4	Use of particular brand	.84	−.00	.18	.74
5	Exposure to advertising	.54	−.00	.65	.71
6	Market share	.63	−.00	.29	.48
7	Profit/sales	.09	.66	.02	.44
8	Profitability	−.00	.65	.09	.43
9	Stability	−.18	.32	.23	.19
10	Growth	−.00	.12	−.01	.02
11	Productivity	.01	−.15	−.22	.07
	Eigen value	3.88	1.33	.73	
	Percentage of variance	35	12	7	
	Cumulative percentage of variance	35	47	54	

The outcomes of the factor analysis on the 11 variables of the business performance after the varimax rotation are as Chart 4. The eigen value of the first factor is 3.88, second factor 1.33 and third 0.73. In usual practice, it is said that the factor that has the eigen value of more than 1.0 is important in factor analysis, but the third factor will be taken into consideration in this study although it has the eigen value of less than 1.0, for the third factor is strongly related to the advertising factor. Accordingly, 35% of the total 11 variables is summarized by the first factor, about 12% by the second factor and 7% by the third factor, totaling 54%.

Let us analyze each factor in accordance with the factor loading. As for the first factor, the brand level variables including the desire to purchase (No. 3), the best brand image (No. 1) and use of particular brand (No. 4) show higher scores in factor loading. From this finding, the first factor is concerned with the last half of the buying process which is: the exposure to advertising-knowing-image-desire to purchase and an actual use or consumption. In this sense, it can be called the factor of consumers' buying evaluation.

Chart 5. Coordinates of Gravity

Factors / Clusters	I Buying evaluation	II Profitability	III Advertising communication	Group names
First cluster (40 samples)	−0.46	−0.54	−0.30	Low performance group
Second cluster (27 samples)	−0.27	0.75	0.22	High profitability group
Third cluster (27 samples)	1.61	−0.07	0.30	All buying process superior group

For the second factor, variable Profit/sales (No. 7) and Profitability (No. 8) show stronger scores in the factor loading. This factor is the one that is concerned with profitability that exists in between the brand and the level of business corporation. For the third factor, knowing the name (No. 2) and the percentage of exposure to advertising (No. 5) show higher factor loading scores and it is the factor that is connected with the first half of the consumers' buying process. It can also be called advertising communication factor.

The communality of variables No. 9, 10, and 11 are low and these variables are not related factor. This means that the three factors that are to be used in the following analysises are composed of variables No. 1 through No. 8.

Next, a total of 94 samples are analyzed in accordance with the cluster analysis in order to form performance groups. The analysis was made on the ground of the factor scores obtained from the factor analysis. As a result of the cluster analysis, three cluster groups were made as illustrated by Chart 5.

Judging the characteristics of each cluster from the gravity of each cluster

on the coordinates in the factor space of three dimensions, the first cluster shows minus scores in every dimension. In comparison with other two cluster groups, the first cluster shows the lowest scores in consumers' buying evaluation, profitability and advertising communication. Therefore, it can be named the "over-all low performance group."

Consumers' buying evaluation in the second cluster is relatively low, but its advertising communication factor is high and profitability outstanding. Let us name this cluster the "high profitability group."

Profitability of the third cluster is placed between that of the first and second cluster. It's advertising communication factor, however, is the highest among the three and consumers' buying evaluation factor outstandingly high. This cluster, therefore, can be named the "superior group in total buying process. In the following sections, analysis mainly on the three groups are to be discussed.

Analysis of the variables that contribute to the difference in performance:

Following the above-mentioned preparatory works, the analysis I has been made. Hypothesis in connection with the analysis I is as follows:

Research hypothesis I: The difference among each performance group is a function of advertising cost and corporate attributes.

Corollary I: The discriminant power of each variable in explaining the difference among the performance groups is different by each group.

On the premise of these hypothesis, we tried to extract the variables that discriminate the difference among each performance group. That is to say, we tried to find the variable that effectively distinguishes the performance group of each brand of product. To do so, the three performance groups were set as the dependent variables and the 23 alternative independent variables mentioned earlier as the independent variables and five ways of stepwise discriminant analysis was made.

Step 1: The stepwise discriminant analysis by 7 brand advertising cost variables as being the alternative independent variable against the three performance groups.

Step 2: The stepwise discriminant analysis by 7 brand advertising cost variables and 3 corporate advertising variables.

Step 3: The stepwise discriminant analysis by 10 corporate image variables.

Step 4: The stepwise discriminant analysis by the above-mentioned three variable groups as a whole.

Step 5: The stepwise discriminant analysis by all of the 27 variables with the above-mentioned three variable groups plus 3 corporate structures variables.

The analysis is to be made as follows on the basis of the final results of the

stepwise discriminant analysis. At the first step by the brand advertising cost variable A1–A7, two linear discriminant functions were found. However, the results of the F test were 16% for the level of significance of the first discriminant function and 29% of the second discriminant function, failing to gain a significant discriminant function. The hit rate by this discriminant function was 41.4% but it was assumed that an effective discrimination can not be made by the brand advertising cost variable.

The result gained from the stepwise discriminant analysis with the advertising cost variables A1 A7 and B1 B3 showed that 41.8% was effectively discriminated. However, the level of significance for the first discriminant function was 15% and the second function 17%. These results indicate that it is not possible to explain the difference among the performance groups by the advertising cost variables of the brand and corporate level.

As the third step, the crimination was made by the corporate image variables C1–C10. The hit rate was 42.8%, enabling to extract the first discriminant function with the level of significance at 0.01 and the second discriminant function with the level of significance at 0.38 (refer Chart 6).

Chart 6. Indice of Discriminant Function

Discriminant function	Eigen value	Canonical correlation	Level of significance
1	0.24	0.44	0.01
2	0.03	0.18	0.38

Chart 7. Coefficient of Discriminant Function

Names of variables	Function I	Level of significance
C_2	0.85	0.01
C_3	0.61	0.01
C_6	−0.60	0.01
C_8	−0.73	0.01

The canonical correlation coefficient of the first discriminant function is 0.44, accounting for 19.4% of the total variance. Furthermore, Chart 7 shows the discriminant coefficient of the first discriminant function and its level of significance for the partial F ratio. Among the 10 variables introduced, C2, C3, C6 and C8 are in the high level of significance, showing their efficiency as discriminant variables.

If we take a look at the absolute value of the discriminant coefficient in order to determine the characteristics of the dimension that discriminate from one performance group to another, all of the four variables just mentioned are relatively high in their absolute value. But C2, new product development, and C6, the customer service, are also high in the plus value while C8, reliability,

Chart8. Coefficient and Discriminant Indice

Name of variables	Function 1	Level of significance
A_2	0.37	0.01
A_4	−0.23	0.01
C_2	0.72	0.01
C_3	0.65	0.01
C_6	−0.51	0.01
C_8	−0.72	0.01

and C6, earnestness in consumer issues are high in the minus value. Accordingly, the first function shows the new product development, service and low consumer reliability.

As the fourth step of analysis, the discriminant analysis by all the three groups of variables was made. It showed the discriminant hit rate of 55.3%. However, only the first function was found to be the significant discriminant function at 0.01.

The significant first function shows 0.47 in the canonical correlation coefficient, explaining 22% of the total variance. Judging from the significant discriminant variables shown in Chart 8, variable A2, A4, C2, C3, C6 and C8 among the introduced 20 variables are all significant and efficient discriminant variables. However, C2, new product development, and C3, customer service, are high in the plus direction and C6, reliability, and C8, earnestness in consumers' issue, are high in the minus direction, judging from its standardized discriminant coefficient. This shows the same result of the third step. A2, advertising cost for the previous year/sales, and A4, TV advertising cost/sales, are low in coefficient, showing their law importance as the discriminant variables.

As the last step, another discriminant analysis by all the variables with corporate structure variable D1–D3 was made to find the highly significant two discriminant functions. Taking a look at its canonical correlation, 20.2% of the total variance for the first function and 12.2% of the second function were significantly explained, making the total 32.4%.

Among total variables of 23, seven variables, namely A2, A4, C1, C2, C3, C8 and D2 were extracted to the discriminant function in the final step. They are composed of the variables related to brand advertising cost, corporate image and corporate structure. They all show the level of significance at 0.01, indicating that they are significant discriminant variables. According to Chart 9, C3, customer service, and C2, new product development, are high in the plus direction in the first function, followed by A2, advertising cost in the previous year/sales, that shows the same tendency and C8, reliability, also shows prominency in minus direction. These variables extracted had shown their characteristics as expected from the previous analysis. That is to say, the dimensions shown by the first function were reliability, product and service and brand

Chart 9. Coefficient and Discriminant Indice

	Function 1	Function 2	Discriminant indice (%)
A_2	0.43	−0.03	7.0
A_4	−0.24	−0.55	12.8
C_1	0.12	−0.74	13.5
C_2	0.50	−0.09	7.8
C_3	0.64	−0.43	14.5
C_8	−1.08	0.55	34.0
D_2	−0.04	−0.57	10.4

advertising cost is also related to this level.

As for the coefficient of the second discriminant function, it means the dimension of technology, structure and advertising since the function is high in the minus direction in C1, technological image, D2, labor cost per head/sales, and A4, brand TV advertising cost/sales. Then we took a look at the size of the discriminant coefficients of the variables that were considered to be high in their discriminant power for each of the first and second discriminant function. C8, reliability, plays the major role in the first function, followed by C3, customer service, C2, new product development and A2, advertising cost for the previous year/sales. In the second function, C1, technological image, D2, labor cost per head/sales, A4, brand TV advertising cost/sales, and C8, reliability, play major roles in this order.

Next, we need to find out the total effective discriminant capability through these two different discriminant functions. The variables that significantly contribute to these two functions as a whole can be judged from the ratio of the F value.[1] When we judge it from over-all view point on the ground of this relative discriminant criteria, C8, reliability image, is by far high in its discriminant capability, followed by C3, service image, C1, technology image, and A4, brand TV advertising cost/sales. This can be confirmed as follows. On the basis of cordinates composed of the discriminant coefficient, each variable is plotted on 2 dimension of the discriminant function first of all. Then draw a bector on it. The length of the bector corresponds to the scale of the above-mentioned discriminant capability.[2] That is to say, the order is C8, C3, C1 and A4, corresponding to the length of the bector.

Then the gravity of each performance group (Chart 10) in the discriminant space is to be found. When each group is positioned in a cordinate in accordance with its gravity, it can be illustrated as shown in Chart 11. The range of the value of gravity for the first dimension is 1.17 and for the second dimension 0.76.

1) J. F. Gonzàlez-Arce, *Market Segmentation by Consumer Perception*, 1975, pp. 71–72.
2) W. D. Perreault Jr., Alternative Approach for Interpretation of Multiple Discriminant Analysis in Marketing Research, *Journal of Business Research*, Vol. 7, No. 2, 1979, p. 163.

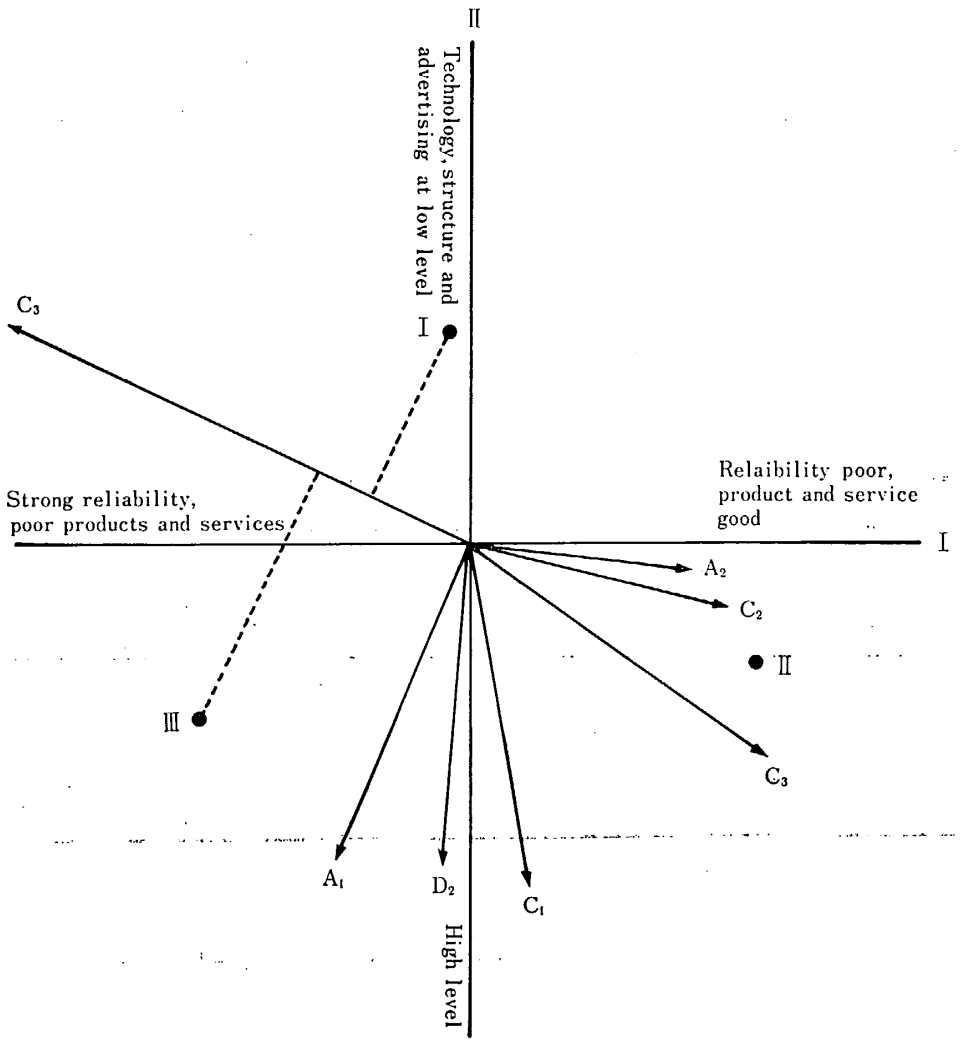
This confirms that the first discriminant function of the first dimension has more capable in discriminating the performance groups than that of the second discriminant function.

The relative position of each performance group in connection with each variable can be judged by drawing a line parpendicular from the gravity of each

Chart 10. Gravity of Performance Groups

	Dimension I	Dimension II
Low performance group (I)	−0.05	0.41
High profit group (II)	0.63	−0.25
All buying process superior group (III)	−0.54	−0.35

Chart 11. Discriminant Dimension and Positioning



performance group to the bectors of each variable.[3] Take C8, reliability image, as an example. In this category, the superior group of all buying processes (III) is the highest, followed by the low performance group (I). The high profit group (II) shows the lowest reliability.

Similarly, the low performance group (I) keeps second or third position in all the 7 variables. As for C1, technology, A4, TV advertising cost/sales, and D2, labor cost/sales, it is placed third, the lowest. As for the high profitability group (II), it was placed to the top position in the C1, technology, C3, customer service, C2, new product development and A2, previous year's advertising cost/sales categories. But it is prominent that the same group is placed at the bottom when it comes to C8, reliability. The superior group of all buying processes (III) is placed to the highest position in the C8, reliability, A4, TV advertising/sales, and D2, labor cost/sales categories. And it occupies the lowest position in the C2, new product development and A2, previous year's advertising cost/sales categories.

Finally, the hit rates by the discriminant functions in this last step, are shown in Chart 12. The over-all hit rate is 56.3%. This over-all hit rate exceeds the maximum random hit rate of the three groups. Furthermore, it is confirmed that the hit rate of each group, 55.0%, 63%, 51.9%, all exceed the random hit rate. On top of that, the F matrics of Chart 13 shows that the discrimination between the high profitability group and superior group of all buying processes is the clearest and that between the low performance group and superior group of all buying processes is worst. This can also be confirmed from the discriminant classification.

Judging from the above-mentioned analysis, the difference among each per-

Chart 12. Discriminant Classification Matrics

	I	II	III	Random hit rate
Low performance group (I)	55.0%	17.5%	27.5%	42.6%
High profit group (II)	29.6	63.0	7.4	28.7
All buying process superior group (III)	18.5	29.6	51.9	28.7

Chart 13. *F* Matrix

	I	II	III
Low performance group (I)			
High profit group (II)	2.33		
All buying process superior group (III)	2.05	3.13	

3) R. M. Johnson, Multiple Discriminant Analysis: Marketing Research Applications, *in Multivariate Methods for Market and Survey Research*, J. N. Sheth, ed., 1977, p. 71.

formance group is explained by the advertising cost variables and corporate attribute as shown by the research hypothesis. The existence of the variables with highly accountable and opposit were confirmed.

The results of the analysis done so far can be summarized as follows. They are summarized as the concrete hypothesisis to be further discussed.

Hypothesis 1: The brand advertising cost and corporate advertising cost variables have no capability to discriminate the performance groups if they are isolated from other variables.

Hypothesis 2: Capability for the corporate image variable to discriminate is significant and high even if it stands alone. The ability of discrimination of new product development, reliability, customer service and earnestness in consumers' issues is high.

Hypothesis 3: When the corporate image variable is jointly taken into consideration with the advertising cost variables, the two advertising variables, namely previous year's brand advertising cost/sales and the brand TV advertising cost/sales have significant discriminant capability.

Hypothesis 4: When all the 27 variables are taken into consideration simultaneously, the previous year's brand advertising cost/sales and brand TV advertising cost/sales have significant discriminant ability. The brand TV advertising cost/sales shows particularly high discriminant capacity.

Hypothesis 5: When all the variables are taken into consideration simultaneously, the corporate image shows significant and high discriminant capability. Reliability image shows high discriminant ability in particular, followed by customer service, technological image and new product development.

Hypothesis 6: Among the corporate structure variables, the labor cost/sales shows particularly significant and high discriminant ability even when all the variables are taken into consideration at the same time.

Analysis of market share variation

On the ground of the analysis (I) discussed so far, we move to the analysis (II). The research hypothesis of the analysis (II) can be summarized as follows:

Research hypotheses II—The variation of market share in each performance group is the function of the advertising cost and the corporate attributes.

Corollary 1—Among the performance clusters, significant variables that explain the variation of market share are different.

On the ground of the research hypothesis, we tried to extract the variables that explain the variation of market share. To do so, we defined market share as a dependent variable and the 23 alternative independent variables mentioned earlier as independent variables. With this in mind, we made a stepwise regression analysis in five different ways for each group. The steps for the analysis are described as follows:

Step 1: The stepwise regression analysis that makes the brand advertising

variables as alternative independent variables in accordance with each performance group.

Step 2: The stepwise regression analysis by the brand advertising variables and corporate advertising cost variables.

Step 3: The stepwise regression analysis by the corporate image variables.

Step 4: The stepwise regression analysis by the brand advertising cost variables, corporate advertising cost variables and corporate image variables.

Step 5: The stepwise regression analysis by the brand advertising cost variables, corporate advertising cost variables, corporate image variables and corporate structure variables.

Chart 14 shows the results of the stepwise regression analysis in 15 different cases. In each case, the best possible repression equation is shown according to the level of significance for the regression equation and multiple correlation coefficient (multiple corretation coefficient revised by degree of freedom), the level of significance for partial correlation coefficient, size of coefficients of determination and the rationality of the sign of partial corretation coefficient. As for the low performance group, for instance, even with the best regression equation, the capability to explain the variation of market share within the low performance group by the brand advertising variables is quite low, judging from the results of the stepwise regression analysis conducted with market share as the dependent variable and brand advertising cost variables as alternative independent variables. That is to say, the coefficients of determination R^2 that was derived from doubling the multiple correlation coefficient is only 3% and with the revision by degrees of freedom, it goes further down to 1%. Furthermore, the level of significance of regression equation and multiple correlation coefficient for F(25), as a result of the F test, is quite low. It becomes significant when risk reaches 25%. The best regression equation chosen in this case is one that newspaper advertising is the only independent variable and its regression coefficient is expressed by the standardized coefficient (β coefficient) that shows relative importance among different variables. Although its minus indication can possibly be interpreted in accordance with actual situation, the regression equation becomes significant when the level of significance at 25% as indicated by the level of significance of the partial F ratio F(25) and its stability is very uncertain. Therefore, the regression equation shown in this case does not necessarily have complete ability to explain the variations of market share among the low performance groups although it is the best among many repressive equations.

Let us now examine some of the variables that determine the variations of market share of each performance group according to the above mentioned. In this study, analysis are to be made with determination coefficients revised by degree of freedom since the number of samples in each group are relatively few. Taking a look at the low performance group, first of all, regression equation

Chart 14. Results of Stepwise Regression Analysis

Variable groups	Low performance group				High profit group				All buying process superior group			
A group	R^2=0.03 (0.01)			F(25%)	R^2=0.18 (0.15)			F(5%)	R^2=0.12 (0.09)			F(10%)
	−0.19	A_6	Newspaper advertising	(25)	0.43	A_7	Magazine advertising	(5)	−0.35	A_5	Radio advertising	(10)
A + B group	R^2=0.33 (0.29)			(1)	R^2=0.18 (0.15)			(5)	R^2=0.15 (0.12)			(5)
	0.38	B_1	Advertising/sales	(1)	0.43	A_7	Magazine advertising	(5)	0.39	B_1	Advertising/sales	(5)
	0.28	B_3	Sales/sales	(5)								
C group	R^2=0.33 (0.29)			(1)	R^2=0.36 (0.31)			(1)	R^2=0.42 (0.31)			(5)
	0.72	C_5	Skillful advertising	(1)	0.79	C_3	Customer service	(1)	0.65	C_3	Customer service	(1)
	−0.40	C_9	Modernness	(1)	−0.69	C_3	Reliability	(1)	−0.50	C_7	Contribution to society	(5)
									−0.75	C_9	Modernness	(1)
									0.69	C_1	Image of technology	(5)
A + B + C group	R^2=0.41 (0.37)			(1)	R^2=0.44 (0.33)			(1)	R^2=0.43 (0.36)			(1)
	0.36	B_1	Advertising/sales	(1)	0.26	A_7	Magazine advertising	(5)	0.37	B_1	Advertising/sales	(1)
	0.38	C_5	Good at advertising	(1)	0.17	B_3	Sales/sales	(5)	0.80	C_3	Customer service	(1)
	−0.30	C_7	Contribution to society	(1)	0.61	C_3	Customer service	(1)	−0.66	C_7	Contribution to society	(1)
					−0.51	C_8	Reliability	(1)				
A + B + C + D group	R^2=0.47 (0.41)			(1)	R^2=0.46 (0.37)			(1)	R^2=0.43 (0.36)			(1)
	0.55	B_1	Advertising/sales	(1)	0.26	A_7	Magazine advertising	(5)	0.37	B_1	Advertising/sales	(1)
	0.39	D_3	Total capital	(1)	−0.23	D_1	Product cost	(5)	0.80	C_3	Customer service	(1)
	0.27	D_2	Labor cost	(1)	0.61	C_3	Customer service	(1)	−0.66	C_7	Contribution to society	(1)
	−0.21	D_1	Product cost	(5)	−0.53	C_8	Reliability	(1)				

Note : A group Brand advertising cost related variables
B group Corporate advertising cost related variables
C group Corporate image related variables
D group Corporate structure related variables

composed from the corporate advertising cost/sales and selling-general expenses/sales of the corporate advertising cost related variables is more significant with its determination coefficient at 0.29 than the regression equation that involves newspaper advertising as its sole independent variable and each coefficient is also enough significant.

On the contrary, 29.0% of the variation of market share can be explained by the image of skillful advertising and the image of modernness according to the regression analysis by the corporate image variables. F ratio and partial F ratio are on 1% level, showing that they are quite significant. The results of the analysis by the brand advertising cost, corporate advertising cost, and corporate image related variables showed that the regression equation with the corporate advertising/sales, the image of skillful advertising and the image of social contribution was selected. Its determination coefficient is 0.37, indicating fitness and the stability of its regression coefficient. Among these three independent variables, the corporate advertising cost/sales and the image of skillful advertising contributes to the increase of market share equally and the image of social contribution contrarily, makes minus contribution to the expansion of market share.

With these three groups of variables, if the corporate structure variable is added, the highest determination coefficient of 0.41 is gained. As its explanatory variable, corporate advertising cost/sales shows the largest positive indication in its relative degree of importance, followed by the corporate structure variable. The total amount of capital used per each employee and labor cost/sales contribute to the increase of market share and the production cost makes minus contribution.

Next, magazine advertising is being selected as independent variable along with brand advertising cost variable and corporate advertising cost variable among the high profit group. Its determination coefficient is 0.15, showing its significance with 5% level. On the other hand, in the regression analysis by the corporate image variable, repression equation by two independent variables indicate the determination coefficient of 0.31, the image of customer service showing positive influence over market share and the image of reliability casting minus influence over the share. According to the results of the regression analysis by the three group of the independent variables as a whole, the image of customer service, magazine advertising and selling-general expenses/sales affect positively to market share in this order and reliability shows negative effects on the share. When the independent variables are limited to the three variables like the low performance group, its determination coefficient becomes 0.33. With the addition of the corporate structure variable, coefficient 0.37 is given, indicating that the product cost makes minus contribution.

As for all buying process superior group, the single regression equation composed from radio advertising will be selected but it does not fit quite well. On the contrary, the corporate advertising cost/sales by the corporate adver-

tising cost variable shows the explanatory capability of 12%. Its F ratio and partial F ratio both are significant, showing 5% level of significance. As for the regression analysis by the corporate image variables, the image of technological advancement and better customer service show positive reaction to market share and the image of modernness and social contribution make minus effect on the share, indicating 0.31 of determination coefficient. Like other groups, when the variables are limited to the two independent variables, its coefficient will become 0.24. According to the results of a regression analysis by the brand advertising cost, corporate advertising cost and corporate image variables as a whole, the customer service show the largest relative weight towards the plus direction, followed by the corporate advertising cost/sales. The image of social contribution also affects negatively to the share. The regression analysises that adds the corporate structure variable and that does not add it show the same result and the corporate structure variable's capability of explaining is low.

As a result of the above-mentioned analysis, most part of the variation of market share in accordance with each performance cluster can be explained by advertising cost and corporate abribute variables as shown by the research hypothesis. We can now say that the explanatory variables significant in each group were extracted.

Followings are summaries of the results of our analysises as new hypothesises..

Hypothesis 1: The variation of market share on the low performance group and the superior groups of total buying process can be explained better by the corporate advertising cost/sales variable than the brand advertising/sales for the one year.

Hypothesis 2: The capacity of explaining the market share of high profit groups is possessed highly by the brand advertising cost variables than the corporate advertising cost variables.

Hypothesis 3: The market share of the corporate image variable and brand variables is significant and has strong ties each other.

Hypothesis 4: The corporate image variable gives plus and minus effects against market share.

Hypothesis 5: The corporate structure variable is strongly connected with the variation of market share of the low performance groups. The relation between the high profit groups and the superior groups of total buying process is not as strong.

Analysis of advertising/sales ratio

The purpose of this section is to discuss on the factors that determine advertising/sales ratio (A1) of the brand that is one of the alternative independent variables used in the above-mentioned analysis. Various kinds of studies

have already been done on advertising/sales ratio or on the determining factors of advertising intensity.[4] In this study, some of the determining factors of the ratio that had been extracted from the previous researches are to be used as the hypothesises and to test them with the samples by this study. The hypothesises taken out from the previous researches that are to be discussed here are as follows:

Hypothesis 1: Price policies taken by each competitive brand has positive relation with advertising/sales ratio.

Hypothesis 2: The market share of each brand has negative relation with advertising/sales ratio.

Hypothesis 3: Profit/sales ratio of each brand has negative relation with advertising/sales ratio.

Hypothesis 4: In the market where each brand belongs to, a general form of competition is connected with advertising/sales ratio of the particular brand.

Hypothesis 5: Early or later entry is related with the ratio.

Hypothesis 6: Advertising/sales ratio has significant relation with the stages of product life cycle and its ratio gradually get lower as the stage advances.

The factors in the above-mentioned hypothesises can be divided largely into the corporate related factors and market related factors. The corporate related factors can be further divided into corporate policies (price policies) and corporate performance (profit and market share) and the market related factors can be divided into the form of competition, marketing initiative and PLC.

In order to examine the relations between these factors and advertising/sales ratio, price policies were divided into three strategies; higher pricing, same-level pricing and lower pricing policies. The main type of competition in the market where the particular brand belongs to was diversified by price, quality, substancial factors besides quality (service conditions, etc.), exterior elements (design, package, etc.), corporate image and channels. The marketing initiative was divided by who hit the market first or later. The PLC was divided into the period of introduction, earlier growth stage, late growth period, maturity, and declining stage. These category variables were dealt as dummy variables (See Chart 15).

In order to examine these hypothesises, the results of the application of regressive equation models were predicted in advance as follows in connection with hypothesis 1 through 3, on the ground of the fruits of the previous studies. As for the price policy (Hypothesis 1), the higher pricing strategies against competitors were expected to increase the ratio of advertising/sales ratio. Because, the higher pricing strategies can increase advertising expenditure with expected higher profit margine on one hand and they restrict the target on quality customers, limiting the expansion of sales on the other hand. In addition to

4) P. K. Else, The Incidence of Advertising in Manufacturing Industries, *Oxford Economic Papers*, March, 1966, P. Doyle, Advertising Expenditure and Consumer Demand, *Oxford Economic Papers*, Nov., 1968.

Chart 15. List for Explanatory Variables

A Corporate related factors			
	Policies		
		Price policies	High level A101
			Same level A102
			Low level
	Performance		
		Market share	A2
		Profit/sales ratio	A3
B Market related factors			
		Type of competition	Prices B101
			Quality B102
			Other substancial elements B103
			External and superficial elements B104
			Corporate image B105
			Channels
		First-come, late-come	first-come brands B201
			Late-come brands
		PLC	Introduction stage B301
			Early stage of growth B302
			Late stage of growth B303
			Stage of maturity B304
			Stage of decline

this, high quality advertising becomes necessary to form high quality image. The reason why companies that take similar pricing strategies with competing firms is that they tend to focus their attention on non-price factors. With additional spending on advertising, they try to be in advantageous position. For the companies with lower pricing strategies, they will be required to spend on advertising for their development of massive market, especially during the introduction period of low priced new products.

As for the market share (Hypothesis 2), advertising/sales ratio is predicted to become lower in accordance with the increase of market share. Because, when the share is quite large, companies tend to take strategies to maintain the share rather than expanding it, first of all. Secondly, when advertising has accumulative effects on the brands with larger market share, their advertising during a particular period of time does not always directly reflect the sales performance of that particular period. If the expansion of market share is achieved, it is not necessarily required to maintain high level of advertising/sales ratio[5].

As for profit/sales ratio (Hypothesis 3), one of the corporate performance factors, it has positive relations with advertising/sales ratio theoritically for the

5) R. D. Buzzel & P. W. Farris, Marketing Costs in Consumer Goods Industries, MSI, 1976, p. 19.

following reasons[6]: 1) High level advertising expenditure prevents the entry of new products in the market, resulting in the maintenance of high-level profitability for the already-existing corporates; 2) The high level of advertising/sales ratio itself means the existence of high-level product differentiation. And advertising help consumers realize the difference in products, therefore the product differentiations become the barrier to the new entry and make high level profit; 3) Since advertising expenditure freely is determined by each firm, it tends to be cut off when profitability is low and to be expanded when profitability is high.

On the ground that the results of the application of rgressive equation model were assumed as the above, a stepwise regression analysis has been done with advertising/sales ratio as an dependent variable, and price strategies, share and profit/profit ratio as independent variables in order to examine the hypothesises 1 through 3. The price strategies were dealt as dummy variables and its basic category is dealt as such that the low price policy has zero value. This regressive equation was applied to all of 94 samples and the low performance group including the largest 40 samples.

The final results of the stepwise regression analysis by corporate related factors on the pricing strategies show that price policy (same) is given 0.17 of standardized coefficient and the price policy (high) is given 0.02. This means that both of high level and same level pricing policies have positive relations with advertising/sales ratio and they contribute to its increase. Moreover, it indicate that the high pricing policy and same pricing policy each had increased advertising/sales ratio relatively by 0.17 and 0.02 accordingly when compared to the low pricing policy.

The same can be said to the low performance group. However, the level of precision and the significance level of partial F ratio for both all of the samples and the low performance group are quite low. Therefore, the best regressive equation was chosen among the regressive equations derived in each step, judging from its precision, the size of determination coefficients and partial F ratio. As a result, the single regressive equation by pricing policy (same) was selected as seen on the upper part of Chart 16. But the precision level and the level of partial F ratio are low in this case also. That is to say, the result of this study does not positively approve the positive relation between the advertising/sales ratio and relative prices as indicated in hypothesis 1.

As for the relations with market share (hypothesis 2), the regression coefficient of market share according to the final results of the stepwise regressive analysis is 0.06 for all the samples and -0.03 for the low performance group, making difference of the sign between the two groups. Their absolute value, however, are close to 0 and their partial regression coefficients are not significant, however. Therefore, it rather shows the lack of relations between the two in-

6) R. D. Buzzel & P. W. Farris, *op. cit.*, p. 25.

Chart 16. Results of Regression Analysis

All samples (94)			Low performance cluster (40)		
R^2=0.03 (0.02)		F(15)	R^2=0.04 (0.02)		F(20)
0.17	Price policy	F(15)	0.20	Price policy (same)	F(20)
Final results			Final results		
0.17	Price policy (same)		0.20	Price policy (same)	
0.09	Profit/sales rate		0.16	Profit/sales rate	
0.06	Market share		−0.03	Market share	
0.02	Price policy (high)		0.01	Price policy (high)	

stead of negative relations between advertising/sales ratio and market share as mentioned in hypothesis 2.

On the hypothesis 3, significant positive relations could not be observed between advertising/sales ratio and profit/sales ratio, not supporting the hypothesis. This also can be said to all of the samples and low performance groups. Like the share in the hypothesis 2, the fact that profit/sales ratio was not derived in the selected best regressive equation supports it too.

Before examining the hypothesis 4 through 6, following the hypothesis 1 through 3, we should mention that the results of the regression analysis were expected to be as follows judging from the results of the previous researches. As for the relations between the type of competition and advertising/sales ratio (hypothesis 4), followings were predicted. In case that the type of competition in the market where the particular brand belongs is the price competition, this brand would have hard time to avoid price competition. Therefore, it was expected that advertising/sales ratio would become low. On the contrary, when the type of competition is related to substantial elements except quality, it was expected as N. H. Borden pointed out that the possibility of substantial product differencial would enhance advertising opportunity, increasing advertising expenditure and making positive relations. On the other hand, when competition take the type of superficial elements and corporate image competition, it was thought to be necessary to throw massive advertising in the market to differentiate the products externally.[8] Finally, as for the so-called channel competition, it was expected that the channel and advertising have negative relation since the channel is the main core of the push strategy and advertising the main part of the pull strategy. Although the channel and advertising replenish each other, they can also replace each other too.

As for the initiation of the products to the market and late introduction, the first-come products need massive amount of advertising expenditure in order

7) N. H. Borden, The Economic Effects of Advertising, 1942, pp. 844–845.
8) W. R. Smith, Product Differentiation and Market Segmentation as Alternative Marketing Strategies, J. M. July, 1956, pp. 3–8.

to establish consumers' awareness and acceptance of the products and late-come products are expected to pour only a small amount of advertising investment. On the contrary, there were opinions that the late-come products must spend even greater amount of advertising money in order to take over the share of the already established first-comers.

Finally, as for the life cycle of brands, advertising/sales ratio is the highest at the time of product introduction and it gets lower and and lower in accordance with the development of product life cycle[9]. That is to say, during the period of product introduction, even if the amount of sales is negligible, advertising/sales ratio become very high as a large sum of advertising expenditure has to be spent in order to; 1. make the consumers known the existence of the new products, 2. promote their trial use and 3. promote stock at retail level. During the early growth period and the later part of the growth stage, the advertising expenditure is usually to be kept on the high level. But with the rapid growth of sale the ratio would decrease. During the maturity stage advertising/sales ratio would rapidly decrease, because of the decrease of profit margin due to the reduction of prices and because of dull response to the advertising. During the declining stage, the ratio would decrease much more.

On the basis of the above-mentioned predicted results of the regression analysis, the hypothesisis 4 through 6 were examined. To do so, advertising/sales ratio was defined as a dependent variable, and the type of competition, market initiation and PLS as independent variables. With these variables, the stepwise regression analysis with dummies were done on all the samples and on the low performance group. These three sets of independent variables are all market related factors, showing the condition of competition, and it's expected that they are interrelated. Therefore, these variables were analyzed with the regression analysis as one set. The results of the analysis were shown on Chart 17.

When we take a look at the last results of the stepwise regression analysis in connection with the type of competition (hypothesis 4), all of the samples and the low performance group show almost identical output. The basic category of the type of competition is the competition over channels. And except the corporate image of low performance group, all of them have plus sign in the standardized coefficient. The difference between substantial elements except quality and external elements, in particular, show relatively high level of plus sign. This means that it is connected with the increase of advertising/sales ratio, matching to the earlier predictions. As for prices, on the contrary, partial regression coefficient is almost zero, showing no relations with the advertising/sales ratio. As for quality and corporate image, the two sample groups

9) R. D. Buzzel, Competitive Behavior and Product Life Cycle, 1966, AMA Proceedings, pp. 52–54.
J. J. Lambin, Advertising, Competition and Market Conduct in Oligopoly Over Time, 1972, pp. 124–127.

Chart 17. Result of Regression Analysis

All samples (94)			Low performance group (40)		
R^2=0.10 (0.07)	F(5)		R^2=0.30 (0.22)	F(5)	
0.21	Other substancial elements F	(1)	0.48	Other substancial elements F	(1)
−0.27	Early stage of growth	(1)	−0.60	Early period of growth	(1)
−0.21	Maturity stage	(5)	−0.36	Maturity period	(5)
			0.26	External elements	(5)
	Final results			Final results	
0.32	Other substancial elements		0.49	Other substancial elements	
−0.36	Early stage of growth		−0.65	Early period of growth	
−0.30	Maturity period		−0.41	Maturity period	
0.02	Prices		0.27	External elements	
0.20	External elements		−0.06	Corporate image	
0.19	Quality		−0.09	Later stage of growth period	
0.11	Corporate image		0.04	Quality	
−0.08	First-come brands		−0.02	First-come brands	
−0.13	Later part of growth period		0.02	Introduction period	
0.05	Introduction stage		0.01	Prices	

show a slightly different indication, and they seem to contribute to the increase of advertising/sales ratio.

However, the level of precision and partial F ratio are low. Accordingly, when the best possible regressive equation is selected among many steps, with the result of F test on the significant level of 5%, competition with substantial elements except quality is derived with highly significant regressive coefficient according to the upper level of Chart 17. This indicates that competition on the basis of substantial elements except quality is strongly tied with the increase of advertising/sales ratio and that it makes plus contribution. When the samples were divided, the determining coefficients revised by degrees of freedom increase from 7% of all the samples to 22% of the low performance groups. For the low performance group, competition based on external elements also make significant contribution towards the plus direction.

As for the market initiative (hypothesis 5), the first-come brands in both samples show minus contribution as the final results of the stepwise regression analysis. This seems to indicate that market initiative slightly lowers advertising/sales ratio. But the judgement should be retained since the precision of the analysis and the significant level of partial regression coefficient are low and it was not introduced in the best regression equation.

As for the hypothesis on the product life cycle, advertising/sales ratio changes itself, tracing the shape of letter W, in accordance with each stage of the PLC, according to the standardized regressive coefficients of the final results

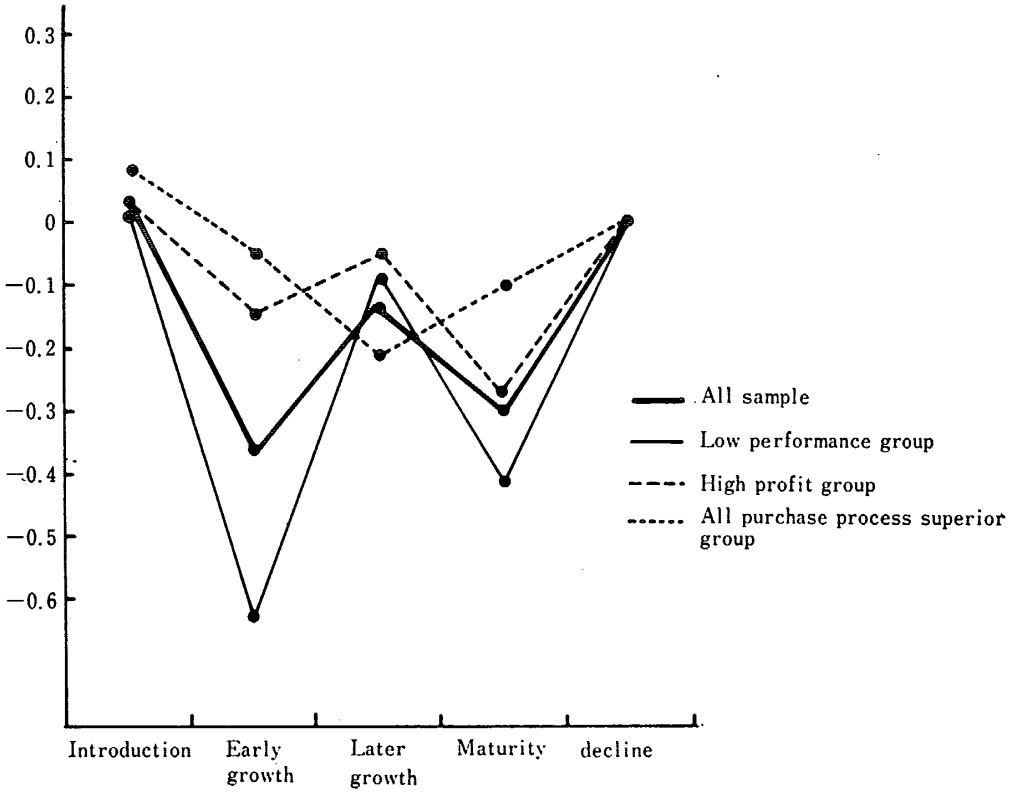
of all the samples. That is to say, on the contrary to the previous hypothesis that advertising/sales ratio declines from the period of introduction to the period of declining, advertising/sales ratio is high during the introduction period, declines abruptly during the earlier part of the growth period and reaches the lowest point, goes up again during the late part of the growth period, declines again sharply during its maturity and again goes up during the declining period.

This pattern also can fit not only to all the samples but also to the low performance group that includes the largest sample among the divided groups, showing the similar shape of letter W as seen at the Chart 18. The angle of the W shape for the low performance groups is sharper than that for all the samples as a result of categorizing all the samples. It can be interpreted that particular characteristics of each group have been shown here.

In order to confirm what has been analyzed, we made a similar analysis on the high profit group and all buying process superior group that had been excluded from being analyzed. They were excluded in the past from the practice of analysis because their samples were relatively scarce. As shown in Chart 18, the change of advertising/sales ratio for the high profit group also shows W shape. Its range of change is much smaller than those of the all sample group and the low performance group.

As for the all buying process superior group, on the other hand, it also

Chart 18. Advertising/Sales Ratio and Product Life Cycle



moves in between the two highest points similarly to the high profit group, but the change in the middle shows the shape of letter V. That is to say, advertising/sales ratio does not get lower relatively during the early stage of growth. It shows an abrupt decline during the late period of growth. The all purchase process superior group requires the largest amount of advertising expenditure. This V-shape change can be interpreted as a reformed shape of the basic W-shape pattern when it is taken into consideration that the all buying superior group enjoys the highest effects in the field of communication such as knowing the name and exposure.

With the best significant regressive equation at the level of 5%, the early stage of growth and maturity period are introduced to the all sample group and the low performance group and obtain significant partial correlation coefficient at 1% or 5%. For all sample group, advertising/sales ratio lowers by 0.27 for the early stage of growth compared to the declining period and 0.21 for the maturity period. For the low performance group, the advertising/sales ratio lowers by 0.6 in the early period of growth and 0.36 during the maturity period. The existence of these significant coefficients seem to support the existence of up-down fluctuation pattern.

According to the cross section data, advertising/sales ratio basically shows W-shape in accordance with the stages of the life cycle rather than the gradual-declining type. Being different from the gradual-declining type, the reason why advertising/sales ratio goes up at the later part of growth stage is assumed that the ratio of sales growth slows down on one hand and the number of competing companies increase that intensifies advertising competition on the other hand. Also, the reason for the increase of advertising/sales ratio during the declining period is attributed to the fact that the declining of sales becomes more than the reduced amount of advertising expenditure.

The above-mentioned discussions on the hypothesises 1 through 6 can be summarized to the new hypothesises as follows:

Hypothesis 1: The pricing policy of each brand has no significant positive relations with advertising/sales ratio.

Hypothesis 2: Market share and advertising/sales ratio has nothing to do with each other, rather than having negative relations.

Hypothesis 3: Profit ratio and advertising/sales ratio has no significant positive relations.

Hypothesis 4: The competition between substantial elements except quality and external elements give positive effects on the expansion of advertising/sales ratio.

Hypothesis 5: Initiative to the market has no significant relations with advertising/sales ratio.

Hypothesis 6: PLC works as a ruling factor for advertising/sales ratio. Advertising/sales ratio shows the fluctuation of W-shape as its basic pattern in accordance with each stage of PLC. For the brands that look heavy on ad-

vertising communication for knowing the name and exposure, it shows the fluctuation of V-shape as a reformed pattern.

Summary aud Future Issues

In this study, discriminant analysis on the performance groups were made in the analysis (I) and the elements that explain the difference among the groups were extracted. In the analysis (II), the factors that explain the variation of market share in each group were tried to be extracted by the regression analysis to each performance group. In the analysis (III), the previous hypothesisis were tried to be tested along with the factors that rule advertising/sales ratio that was used as the alternative independent variable in the analysis of (I) and (II). The results were summarized as the new 6 hypothesises.

This study is depended on only the 94 samples. For the analysis of each separate performance group or the analysis by dummy variables, further examination with more samples are required. Furthermore, the new hypothesises extracted should be further refined with repeated study and modified to general hypothesises.