Effectiveness of Marketing Decision Variables: A Case Study

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ABSTRACT
We carried out this work with the aim of studying the impact of marketing variables on sales and overall customer satisfaction level by taking into consideration both financial and non-financial aspects of the measurement. The return-on-investment (ROI) was calculated for each marketing variable on the basis of sales and adjusted for respective customer satisfaction index (CSI). The results obtained were compared to get an idea of the effectiveness of marketing variables on Sales, CSI, and return-on-investment (ROI). The findings suggest that the marketing variables (advertising, sales force, promotion, distribution and price) have significant positive impact on sales except price as well as on customer satisfaction. Finally, coming to adjusted return-on-investment (ROI), it was found maximum for distribution for the brand.
Key words: Marketing Expenditures, Investment, Marketing Mix, Effectiveness, Return-on- Investment, and Customer Satisfaction Index.

INTRODUCTION:

Many people have related the success of a firm to the firm's ability to develop a well balanced 'marketing mix'. The 'marketing mix' concept can be expressed in a number of ways, but perhaps the most widely accepted is McCarthy's classification known as 'four P's:' Product, Price, Promotion (Advertising, Sales force and Sales promotion) and Place (Distribution).

Initially, the top management viewed marketing as a tool for achieving success in sales, market share and gross margin in a defined marketplace. The mania for growth is commonly expressed in the battle to increase sales due to the belief that higher profits automatically follow from higher sales. The most common cause of trouble is the widely held belief that the only road to success is through growth. Many business people see growth of sales as the solution to all problems. It

seldom is. Growth is not synonymous with capitalistic success. In fact, launching few products or product lines is usually the surest route to better profit and higher return on investment.

In this very competitive world, corporations are engaged as corporate cost cutters to maximize shareholder returns. According to Sheth and Sisodia (2002), manufacturing costs have been reduced from 50% to 30%, general management costs have also declined as a proportion of total corporate costs as 30% to 20%, but in contrast to manufacturing and general management costs, marketing-related costs have increased significantly from only 20% of total corporate costs 50 years ago to 50% today. Marketing costs are direct costs; including expenses such as product development, selling, distribution, advertising, sales promotion, public relations, customer service etc.

In spite of huge marketing expenditures, management frequently does not have concrete measures or knowledge of what is obtained in return for its sizeable investment in marketing. Moreover, many have doubted that definite quantitative measurements of marketing effectiveness could ever be made. It was contended that the interaction of numerous forces in the marketplace precluded the isolation of the influence of marketing efforts. During the last few years, a perceptible change in thinking has occurred as private firms, universities, the U.S. Department of Agriculture, and other public bodies, have made a persistent effort in attacking the problem of measuring the effects of promotion. In today's business world, measurements of results achieved through marketing efforts are considered essential to sound practical operations. Without measurement of return on investment (ROI), weak and ineffectual programs may be continued year after year, dissipating large sums of money.

To assess the effectiveness of marketing decision variables both the subjective and objective measures of the performance are needed. The financial measures of performance are sales, profits, return on investment etc. The non-financial measures are customer satisfaction, awareness level of customers, purchase intentions etc. It is necessary to move beyond sole reliance on financial measures. In the consumer goods industries, where repeat purchase is an important

objective, measuring customer satisfaction, will be helpful. In addition, the management control system clearly requires an amalgam of both the financial and non-financial aspects of effectiveness of marketing decision variables.

PURPOSE:

The purpose of this paper is two folds. First, examining the relationship between marketing variables (advertising, sales force, sales promotion, distribution and price) and sales (revenue). In the same time, identifying the impact of customers' emotional reaction toward each marketing variable on overall customer satisfaction level Second, the average customer satisfaction index (CSI) and the adjusted return-on-investment (ROI) of each marketing variable will be calculated. Firstly, we have discussed the related previous works (in brief), the relevant objectives and the models. These have been followed by hypotheses, methodology, findings, and conclusions.

PREVIOUS WORKS:

We have covered those works that dealt with financial aspects of the measurement at firm level and also customer satisfaction related studies as non-financial aspects of the measurement of effectiveness of marketing decision variables.

***Firm-level Studies*:**

Charles Sevin's Marketing Productivity Analysis (1965) is one of the pioneer books in the area of marketing productivity. The book lay out detailed profitability analysis for the products and marketing programmes. Feder (1965) borrowed from the microeconomic literature to discuss comparing marginal revenues to marginal costs as a way of better allocating marketing resources. Goodman (1970, 1972) followed in Sevin's footsteps by examining profitability and the return on investment of marketing activities and his advocacy of establishing the position of 'marketing controller' within firms. Buzzell and Chussil (1985) and Day and Fahey (1988) advocate the use of discounted cash flows as a way of calculating the net present value (NPV) of marketing strategies. Bonoma and Clark (1988) found that the most frequent measures of output were profits, sales, market share and cash flow. The common inputs were marketing expense,

investment, and number of employees. They also noted a large number of moderating variables, which they grouped by market, product, customer, and task characteristics.

Customer Satisfaction studies:

Churchill and Surprenant, 1982 have undertaken a study to investigate the relationships among the determinants of customer satisfaction. They considered two types of products, a durable and a non-durable good. They found that the effects of expectation, disconfirmation, and performance were different for durable as well as non-durable products. Peterson and Wilson, 1992 review a large number of studies and they found that the distribution of customer satisfaction responses is highly skewed towards the positive. They found that the highly skewed distribution reduces the likelihood that a significant correlation between satisfaction and other performance variables may be observed. Anderson and Sullivan, 1993 have performed a study to investigate the antecedents and behavioral consequences of satisfaction both analytically and empirically. They have analyzed a database of nationally representative survey of 22,300 customers of a variety of major products and services in Sweden in 1989-1990. Hauser *et al.,* 1994 have found that the customer satisfaction as a criterion of incentive of salespeople encounter severe implementation problems. Firstly, they are more subjective to manipulation than accounting rule-based measures, such as sales per salespeople. Jones and Sasser, 1995 have performed a study to identify the reasons of defection of satisfied customer of firms. They suggested that the impact of an advantage in customer satisfaction would vary dramatically with the competitive nature of the industry. Anderson *et al*., 1997 performed a survey in Sweden to identify the difference between customer satisfaction and quality of products and services as the Swedish Customer Satisfaction Barometer (SCSB). They found that the average elasticity of ROI with respect to customer satisfaction for goods was 0.25 and for services it was only 0.14.

In the field of marketing, there is lack of studies considering both the financial and non-financial aspects of the measurement of effectiveness of each marketing decision variable at firm level. In addition, we are not able to reach those studies that combined both the aspects of the

measurement and comedown to a single indicator for better managerial control over the marketing decision variables.

OBJECTIVES:

We have identified following three objectives with respect to the marketing decision variables.

The objectives are not mutually exclusive but they are interrelated to each other.

1. To estimate the impact on sales of different marketing variables such as advertising, sales promotion, sales force, distribution and price of product acting as independent variables.
2. To investigate the relationship between overall customers satisfaction level as categorical dependent variable and customers' emotional reaction toward each marketing variable acting as metric independent variables.
3. To obtain the adjusted return -on- investment (ROI) in each marketing variable giving due adjustment for respective customer satisfaction index.

MODELS:

In this study, we consider three models for different objectives (mentioned earlier). Each of them has been discussed very shortly as below:

Model for objective1:

The mathematical expression (1) we have considered for the objective one (mentioned earlier) is given below. Many empirical studies support this form due to its nature of diminishing return to scale, at least in the relevant range for decision-making (Freeland and Weinberg, 1977) with regard to response to the marketing variables.

(1) Equation: $Y_t = e^{\beta_0 + u_t} X_{1t}^{\beta_1} X_{2t}^{\beta_2} X_{3t}^{\beta_3} X_{4t}^{\beta_4} X_{5t}^{\beta_5}$, For t = 1, 2,……T.

Where: Y_t = Volume of sales in period t, X_{1t} = Advertising expenditure in rupees in period t, X_{2t} = Sales force expenditure in rupees in period t, X_{3t} = Sales promotion expenditure in rupees in period t, X_{4t} = Distributors commission paid in rupees in period t, X_{5t} = Price of products in monetary term in period t, and u_t = A random disturbance term.

Model for objective 2:

In this study, the response variable has only two outcomes. So, we considered binary logistic regression equation (2) as an appropriate method for mapping this dichotomous response variable.

(2) Equation: $\ln(\frac{p}{1-p}) = \lambda_1 Q_1 + \lambda_2 Q_2 + \lambda_3 Q_3 + \lambda_4 Q_4 + \varepsilon$

Where, $\frac{p}{1-p}$ = Odd ratio and $0 \le p \le 1$, Q_1 = Score of customers' emotional reactions on advertisement, Q_2 = Score of customers' emotional reactions on product attributes, Q_3 = Score of customers' emotional reactions on availability of products, Q_4 = Score of customers' emotional reactions on price of products and ε = A random disturbance term.

Model for objective 3:

In the context of the above two models ROI is computed as:

(3) Equation: $ROI_i = \beta_i * (CS)_i$

Where: ROI_i = Return on investment in i^{th} variable, β_i = Partial regression coefficient for ith variable, and $(CS)_i$ = Customer satisfaction index with the attributes of i^{th} variable.

HYPOTHESES:

We have formulated the following hypotheses with respect to model one and model two.

$H_{1.1}$: Advertising expenditure would influence the sales positively.

H_0: $\beta_1 = 0$ against H_a: $\beta_1 > 0$

$H_{1.2}$: Sales force expenditure would influence the sales positively.

H_0: $\beta_2 = 0$ against H_a: $\beta_2 > 0$

$H_{1.3}$: Promotional expenditure would influence the sales positively.

H_0: $\beta_3 = 0$ against H_a: $\beta_3 > 0$

$H_{1.4}$: Distribution expenditure would influence the sales positively.

H_0: $\beta_4 = 0$ against H_a: $\beta_4 > 0$

$H_{1.5}$: Price of products would influence the sales negatively.

H_0: $\beta_5 = 0$ against H_a: $\beta_5 < 0$

$H_{2.1}$: Customers' emotional reactions to advertising would have a perceptible effect on overall customer satisfaction level.

H_0: $\hat{p} = 0.5$ against H_a: $\hat{p} > 0.5$

$H_{2.2}$: Customers' emotional reactions to product attributes would have a perceptible effect on overall customer satisfaction level.

H_0: $\hat{p} = 0.5$ against H_a: $\hat{p} > 0.5$

$H_{2.3}$: Customers' emotional reactions to distribution would have a perceptible effect on overall customer satisfaction level.

H_0: $\hat{p} = 0.5$ against H_a: $\hat{p} > 0.5$

$H_{2.4}$: Customers' emotional reactions to price of products would have a perceptible effect on overall customer satisfaction level.

H_0: $\hat{p} = 0.5$ against H_a: $\hat{p} > 0.5$

METHODOLOGY & DATA:

We have designed the questionnaire for this case study. It has six parts. The first part (advertising) contains 13 statements, second part (product) has 12 statements, third part (distribution) contains eight statements, forth part (price) has 11 statements. Each of the statement is five-point Likert scale ranging from "strongly agree" to "strongly disagree" continuum. The fifth part consists one statement regarding customers overall satisfaction with the brand as a whole is a five-point Likert scale ranging from "completely satisfied" to "not at all satisfied" continuum. Last part of the questionnaire contains demographic profiles of the respondents. In

our study area, there are eleven firms operating with nearly identical products and make the market is very competitive in nature. Out of 11 firms, we have taken one firm for quarterly financial data of the variables for the period of six years (2000-2005). We took a sample of 150 households (power =0.8) for our primary data regarding customer's satisfaction and their perception toward each marketing variable to represent the population in our study area. We have compared all the relevant primary data collection techniques and subsequently chose the personal interview method as a way of collecting data from the respondents (housewives).

FINDING & DISCUSSIONS:

The results for predicting sales volume of Keo-Karpin brand is shown in the EXIBIT:I The estimated regression equation for sales volume has the following form:

lnSales = 4.3 + 0.375 ln (Advertising) + 1.2 ln (Sales force) + 0.95 ln(Promotion)

+ 0.235 ln (Distribution) - 0.5 ln (Price)

The interpretations of this equation are that some of the independent variables have positive effects upon sales volume. In the same time, other variables have the negative effects on sales. The variables, those have positive effect on sales are advertising, sales promotion, sales force and distribution. In contrast, price is the only variable, which has the negative impact on sales. The equation suggests that one unit of increase/decrease in these variables would increase/decrease the sales volume. The amount of increase/decrease in the sales volume would expect differs on the basis of the regression coefficient of each variable. In addition, the partial correlation coefficients are shown in the EXIBIT: I. They are usually used to identify the individual impact on dependent variable of each independent variable. The results clearly show that the sales force effort has the greatest impact on sales, followed by sales promotion, price of products, distribution of products and advertising.

In addition, the elasticities of advertising, sales force, sales promotion, distribution and price are 1.38, 1.40, 0.051, 1.42 and –0.13 respectively. This indicates that sales volume are highly

sensitive with respect to advertising, sales force and distribution. But, sales volume are insensitive in the case of sales promotion and price.

The results in EXIBIT: I support all the hypotheses. The coefficient of advertising is positive and significant (1.38, p< .047). The coefficient of sales force effort is positive and significant (1.40, p< .000). The coefficient of promotion is positive and significant (.051, p< .000). The coefficient

EXIBIT I: Response of Sales to Marketing Variables of Keo-Karpin (Reference Model 1)

The Regression Equation (Keo-Karpin):

$\ln Y = 1.98 + 1.38 \ln X1 + 1.40 \ln X2 + 0.0512 \ln X3 + 1.412 \ln X4 - 0.13 \ln X5$

Predictors	Coefficients	Std. Error	t	p	@Partial r^2
Advertising	1.380	0.770	1.79**	.0470	0.408
Sales Force	1.400	0.181	7.72*	<.0000	0.894
Promotion	0.051	0.008	6.11*	<.0000	0.845
Distribution	1.420	0.811	1.75**	.0500	0.415
Price	-0.130	0.022	-5.80*	<.0000	-0.832

*Significant at .001 percent level (one-tail) or better. **significant at 5 percent level (one-tail) or better
X1- Advertising Expenditure, X2- Sales Force Expenditure, X3-Sales Promotion Expenditure,
X4- Distributors Commission, X5-Price of Products, Y- Sales of Product
@: Each coefficient below represents in a unit free form the partial effect of marketing efforts on sales, in both the cases abstracting from the influence of other variables.

of distribution is positive and significant (1.42, p< .05). The coefficient of price is negative and significant (-0.13, p< .000) in this case. Thus, all the variables except price have a positive significant impact on sales in the case of this firm. In contrast, price has a negative significant impact on sales for this firm. The results of validation statistics appeared in the EXIBIT:II. Each of the criterions has desirable statistical significance level in its respect purpose of use.

EXIBIT II:

Validation Statistics of Regression Equation (Reference Model 1)

Brand	R^2	F	p	J-B	D-W
Keo-Karpin	0.95	77.24*	<.000	2.4	1.81

*Significant at the .001 percent level., J-B= Jarque-Bera Statistics,
D-W= Durbin- Watson Value of autocorrelation

The equation for predicting individual customer satisfaction level of Keo-Karpin Brand appeared in the EXIBIT:III. The estimated equation has the following form:

$$\ln (p/1-p) = -14.7 + 1.58\ Q_1 + 2.4Q_2 + 2.3Q_3 + 3.3Q_4$$

The interpretations of this equation are that all the independent variables have positive effect upon probability of being satisfied of each customer with this firm. All the variables such as customer's emotional reaction toward advertising, customer's emotional reaction toward personal selling, customer's emotional reaction toward distribution, and customer's emotional reaction toward price of products have positive effects upon the variable of interest in this context. The results in the EXIBIT: III, indicate that the sales force variable has the greatest effect on overall customer satisfaction level, followed by price, distribution and advertising in the case of this Keo-Karpin brand.

EXIBIT III:
Regression coefficients for Marketing Variables to overall satisfaction level of Keo-Karpin (Reference Model 2)

The Logistic Regression Equation (Keo-Karpin):
$\ln (p/1-p) = -14.7 + 1.580Q_1 + 2.40Q_2 + 2.30Q_3 + 3.30Q_4$

Predictors	Coefficients	Std. Error	Z	p	Odds Ratio (p/1-p)	Rank
Advertising	1.58	.55	2.87**	.0020	4.44	0.87(4)
Sales Force	2.40	.85	2.82**	.0025	11.00	2.04(1)
Distribution	2.30	.74	3.07**	.0015	21.50	1.70(3)
Price	3.30	.59	5.61*	<.0000	27.10	1.94(2)

*significant at 0.5 percent level (one tail) or better. **significant at 5 percent level (one-tail) or better.

Q1- Customer's Emotional Reaction toward Advertising, Q2- Customer's Emotional Reaction toward Product, Q3- Customer's Emotional Reaction toward Distribution, Q2- Customer's Emotional Reaction toward Price.

EXIBIT IV:

Validation Statistics of Logistic Regression Equation (Reference Model 2)

Brand	-2LL (125)	p	G (4)	p	HL (8)	p
Keo-Karpin	119.7**	0.29	112.8*	.00	13.46**	.09

*significant at .001 percent level. **not significant at 5 percent level
( )- degrees of freedom

The results in EXIBIT: III support all the hypotheses. The coefficient of advertising construct is positive and significant (1.58, p< .002). The coefficient of sales force construct is positive and significant (2.4, p< .0025). The coefficient of distribution construct is positive and significant (2.3, p< .0015). The coefficient of price construct is positive and significant (3.30, p< .000). Thus, customer's attitude toward all the variables has a positive contribution to raise their overall satisfaction level with this firm. The validation statistics of logistic regression equation are shown in the EXIBIT: IV. Each of the criterions has desirable statistical significance level in its respect purpose of use.

The Customer Satisfaction Indices with respect to each of the marketing variable are given in the EXIBIT: V. This indicates that the CSI of advertising, sales force, distribution and price are 0.73, 0.76, 0.74 and 0.47 respectively. This result reveals that all the variables except price have satisfied the customers' above 70 percent level. But, in the case of price variable it is only around 50 percent level.

EXIBIT: V

Customers' Satisfaction Indices (CSI) of Marketing Variables

Variables	Valid cases	Keo-Karpin
Advertising	130	.73
Sales force	130	.76
Promotion	130	.73
Distribution	130	.74
Price	130	.47

EXIBIT: VI

Return-on-investment of Marketing Variables

Efforts	Keo-Karpin
Advertising	100.7
Sales force	106.3

Promotion	003.8
Distribution	106.4
Price	6.11

The results of adjusted return-on-investment (ROI) of different marketing variables are shown in the EXIBIT: VI. The results indicate that the adjusted return-on-investment (ROI) into advertising, sales force, sales promotion, distribution and price are 100.7%, 106.4%, 3.8%, 106.4% and 6.11% respectively. This indicates that the adjusted ROI is maximum in both the sales force as well as distribution and lowest in the case of promotion.

CONCLUSIONS:

It can be concluded that the effectiveness of each marketing variable varies from one another in the same marketing effort. The elasticities are significantly differing from advertising to price variable as well. In addition, the level of customer satisfaction also varies from advertising to price variable. The adjusted return on investment also varies from variable to variable in the same marketing mix. The marketing manager of this firm should use these findings for the decision of resource allocation into these marketing variables. The findings of this study related to different marketing variables may be used as inputs for strategic market planning of any firm. In this contest, it could be said that the optimal mix of marketing variables is unique to each firm and depends on the cost-benefits continuum and the characteristics of the market as well as the brand’s position in its life cycle. Still, this study provides a sense of the relative importance of different marketing variables for most of the firms in consumer goods industries. In addition, this work is applicable to owner-operated firms as well as corporations in which there is likely to be a separation of ownership and control.

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