

Impact of Exponential and Hyperbolic discounting function in effectiveness of sales promotion

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Abstract— The sales promotion tools and technique are very widely used in modern marketing practices. Their impact on consumer buying behavior is a subject of study and a lot of study is also made in this field. This research paper concentrates on studying the impact of hyperbolic and exponential function in sales promotion tools. This paper analyses the economic decision making of any customer. The product preference by customer is having impact of sales promotion tools but the time of receiving the benefit of sales promotion is also an important issue which customer analyses during purchase. This paper reveals the customer attitude during the purchase whether they think rationally or show a impulsive behavior to get benefit of sales promotion. For the study we have taken 168- sample size from the population of Bhopal and the study is done for FMCG products.

Index Terms— hyperbolic and exponential discounting function, sale promotion tools.

I. INTRODUCTION

The American Marketing Association (AMA) defines sales promotions as “The media and nonmedia marketing pressure applied for a predetermined, limited period of time at the level of consumer, retailer, or wholesaler in order to stimulate trial, increase consumer demand, or improve product availability”

It is described in Webster (2005, p. 123) Sales promotions have been described as a “principal marketing tool, often accounting for the lion’s share of the consumer-marketing budget” The American Marketing Association (AMA) explains consumer sales promotion as “Externally directed incentives offered to the ultimate consumer. These usually consist of offers such as coupons, premiums, rebates, etc., designed to gain one or more of the following: product trial; repeat usage of product; more frequent or multiple product purchases; introduce a new/improved product; introduce new packaging or different size packages; neutralize competitive advertising or sales promotions; capitalize on seasonal, geographic, or special events; encourage consumers to trade up to a larger size, more profitable line, or another product in the line.” Sales promotion is very important to push the sale as it carries the high importance it is also important to understand that how customer react to deferent sales promotion tools. Some sales promotion tools provide the benefit immediately like Discount, Price off, gift but some promotion tools provide the promotional benefit later on like

coupon, Contest. How the customer reacts towards the benefit provided today and the benefit provided later on. This research paper mainly focus on to find out the choice of people regarding some selected sales promotion tools representing both the benefiting immediate or benefiting afterword.

Exponential function:- It is a time-consistent model of discounting. This function says that people think rationally that if a question is asked to anybody that what do prefer 100 Rs today or 120 Rs after one month. The rational thought or Exponential model says that Individuals should select the bigger amount. This model says that the decision taken should be always consistent for bigger amount for any time.

Hyperbolic function:- It is not consistent with time. This model says that the decision is changed due to the impulsive behavior of individuals. This model suggests that if the question is asked that what do prefer 100 Rs today or 120 Rs after one month? Individual will select the 100 Rs because the difference of money is Rs 20 only and the difference in time is one month so the individual can’t think rationally and they prefer to 100 Rs today.

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II. Literature Review

According to Coker Kesha K, Pillai Deepa, Balasubramanian Siva K. (2010) there are two views on delay discounting: rational theory’s exponential delay-discounting and hyperbolic discounting. Hastie and Dawes (2001) explain “law of invariance”, people are expected to exhibit fixed preference or a consistent discounting factor such that given the passage of time (i.e. with delays), preference should remain the same. Bickel and Marsch, 2001 explains economic models based on rational choice theory assume exponential delay-discounting. In other words, for each unit of time delay to the reward’s delivery, the reward’s value is discounted (decreased) by a fixed proportion. However, when faced with a choice, people are not always rational calculators (Herrnstein, 1990). Under some conditions, people will exercise self-control and under other conditions, they will be impulsive in their choices. Self-control refers to “a choice of a larger, more delayed reinforcer over a smaller, less delayed reinforcer” while impulsivity or impulsiveness is defined as “a choice of a smaller, less delayed reinforcer over a larger, more delayed reinforcer” (Logue, 1988, p. 665). Consumer seems to be of two minds about inter temporal consumption decision. According to David laibson (1998) when sacrifices are distant patience predominates. I want/plan/intend to start exercising next month actually rolls around, the designated sacrifices is often avoided.

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III. Research Methodology

The objectives of study are-

To find out the customer choice between sales promotion tools (In contest of Hyperbolic and Exponential).

To find out customer attitude regarding sales promotion tools giving benefit earlier.

For this research structured questionnaire is used and form the 200 collected questionnaires 168 is finally selected for measuring consumer attitude towards Exponential and Hyperbolic discounting function. Primary data was collected from respondents of Bhopal city through a questionnaire designed for a sample of 168 respondents by using the survey method. Stratified Random sampling method is used.

Table 1 Demographic description of the sample

Age		Gender		Education	
Age	Numbe of respon	Gende	Number of respon ents	Educati on Level	Numbe r of respon dents
20-30	84	Male	90	Higher ary	36
30-40	53	Fem ale	78	Graduate	72
40-50	24			Post graduate	60
50+	7				
Tot	168		168		168

The data collected from the respondents are coded, tabulated and analyzed into logical statements using Kai Square test. Secondary data was collected from the available literature, journals and web search wherever necessary.

IV. Results

The findings are tabulated after having used Likert scale for measuring the attitude of the Consumers towards discounting function Kai Square goodness of fit test and Kai Square test of independence is used.

Hypothesis 1

H0- There is no significant difference in the consumer's response to give preference for the selected sales promotion tools.

$$\chi^2_{\text{calculated}} - 18.25$$

$$\chi^2_{\text{critical}} (\alpha= 0.05) \text{ DOF-04- } 9.488$$

Therefore the Ho is rejected it show that there are significant difference in giving preference to sales promotion tools.

Hypothesis 2

We asked the respondents to select the one of the below mentioned option all of them selected option

- (a) Sales promotion tools giving benefit at purchase

- (b) Sales promotion tools giving benefit after one month later with 10% increase

For the study we make hypothesis that:-

H0- There is no significant difference in the consumer's response to give preference to the sales promotion tools which give benefit earlier.

$$\chi^2_{\text{calculated}} - 168$$

$$\chi^2_{\text{critical}} (\alpha= 0.05) \text{ DOF-01- } 3.841$$

Result:- So the Ho is rejected and it shows that customer give preference to the sales promotion tools which give benefit at purchase.

Hypothesis 3

H0- There is no significant difference in the consumer's response to give preference to the sales promotion tools which give benefit maximum.

- (a) Sales promotion tools giving benefit after 4 Month

- (b) Sales promotion tools giving benefit after 5 month with 20% increase

$$\chi^2_{\text{calculated}} - 168$$

$$\chi^2_{\text{critical}} (\alpha= 0.05) \text{ DOF-01- } 3.841$$

Result:- So the Ho is rejected and it shows that customer give preference to the sales promotion tools which give benefit more.

Explanation:- In first customer feel that the time difference is much to gain advantage of 10% only so they prefer first option, and in second case the customer feel that it is better to weight on more months to gain advantage 20% more. So in first condition consumer show hyperbolic discounting functions and in second case they show exponential function and selecting the maximum amount.

Hypothesis 4

H0 Sales promotion tools preference is independent from age group of respondents

$$\chi^2_{\text{calculated}} - 3.76111$$

$$\chi^2_{\text{critical}} (\alpha= 0.05) \text{ DOF-12- } 21.06$$

Calculated value is smaller than Critical value hence the Ho is accepted. It shows that the preference for sales promotion is not depends on age group.

Hypothesis 5

H0 Sales promotion tools preference is independent from education of respondents

$$\chi^2_{\text{calculated}} - 13.86712496$$

$$\chi^2_{\text{critical}} (\alpha= 0.05) \text{ DOF } 08 - 15.507$$

Calculated value is smaller than Critical value hence the Ho is accepted. It shows that the preference for sales promotion is not depends on education of respondents.

Hypothesis 6

H0 Sales promotion tools preference is independent from gender of respondents

$$\chi^2_{\text{calculated}} - 2.591906444$$

$$\chi^2_{\text{critical}} (\alpha= 0.05) \text{ DOF } 04 - 9.488$$

Calculated value is smaller than Critical value hence the H_0 is accepted. It shows that the preference for sales promotion is not depends on gender.

Conclusion

This result shows that the consumer's response for sales promotion tool is significantly different and they show preference towards gift, discount and extra in comparison to coupon and contest. It can't be always true because in hypothesis-2 consumer show the impulsive behavior but in hypothesis-3 they show rational behavior and given preference to maximum. So it may be possible that when the advantage of waiting for benefit is more they may wait. In hypothesis- 4,5 and 6 we try to find out the impact of age , education and gender and result shows that hyperbolic and exponential discounting function are not depends on age, education, and gender. It is the subject of individual attitude.

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