

Linkage Between Data Mining and Customer's Behaviour

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Abstract

Customers are the assets of any organization. So identifying their behaviour is very important in achieving the goals and objectives of any organization. Customers act as blood of any organizations. Without customers organizations cannot survive and satisfying their needs and wants are the key preferences of the organizations. Quality, price is the primary concerns of customers and the element which influence them to buy a product are advertisement. Brand image also influence the buying behaviour of customers. So, customer satisfaction is very important. When the customers need and wants are satisfied organizations can earn a reasonable profit. And ultimately the organizations goals are achieved. Operational department has a very vital role in satisfying the consumers demand related to cost or price. Quality has also the key preferences of the customers' needs. Marketing department has also very effective role in the promotional activities like advertisement, personnel selling, public relations etc. and also establishing the brand image of the product. Consumers have different towards the different class of products.

Keywords

Brand Image, Perception, Consumer Behavior, Satisfaction, Advertisement

1. Introduction

What is the common link between an Ad (advertisement) that challenges existing associations to the brand featured in the Ad, the introduction of a surprising brand extension, and a brand endorsement by an unexpected celebrity? The answer is that these situations share a theme of consumers facing a new and perhaps even confusing piece of information about a brand, which does not fit comfortably with the image they have learned to associate with the brand. The successful brand management requires a consistent and cohesive image, upheld by congruent brand communication, is a popular adage. However, it is evident that companies do in fact put out communication that runs counter to the established image of their brand, regardless of any advice from brand experts. Consumer attitudes to services deserve increasing attention from marketers within a largely service economy. A number of service-buying situations extend over time and potential consumers experience aspects of the buying process as a recipient of the supplier's buying process service'. The

buying-process service is identified from the customer satisfaction and relationship marketing.

Firms aim to cultivate repeat transactions [11] with customers. The repetition of these interactions over time leads to the development of relationships between firms and their customers. Ethical consumer behavior and the role of the internet, very little work seems to have been undertaken to bring these two themes together (which are consumer ethics and customer ethics). This is unfortunate because the internet is increasingly pervasive (at least in the developed countries) and is used at some stage in a significant number of consumer activities (be it for research, purchase, post sales support, etc.).

Perceived purchase importance may play a role in the customer satisfaction formation process. Purchase importance is different from purchase involvement in that the former relates to the magnitude of a particular purchase. The relationship between satisfaction and loyalty intentions may also be influenced by the degree of importance attached to the purchase. Although, purchase importance plays a role in pre-purchase processes and attitude formation.

The public's fascination with famous people will continue unabated because of its role in society as entertainment, and its function in personal exploration, so it is likely that there will be an increased use of celebrities in advertising. The return on investment and the success rate in the creation of intangible assets for shareholders will also improve as artists and their agents, and advertisers and their agencies, become more professional in their use of the celebrity technique [23]. Brand image incongruity as a common label for discrepancies between a particular piece of communication about a brand and the brand image already established with consumers, as well as presented a set of consumer responses to brand image incongruity. The potential in taking a broad view of brand image incongruity, looking across individual research domains, lies in the opportunity to deduce implications and predictions.[26]. Customer loyalty is thought to be dependent upon customer perception of value. This will depend in part upon customers' level of satisfaction with current service but also how well the supplier is innovating and anticipating their next need. Customers will evaluate dissatisfaction with particular incidents with their suppliers against their overall impression of the value offered by that supplier, when compared with competitors and the cost to them of switching suppliers.[4]. Technological developments in general create new opportunities for action and new sets of choices that are ultimately of a moral nature. Studying their impact on everyday behavior is important so that resulting 'policy vacuums' can be successfully addressed [20]. The effect of purchase importance on customer satisfaction evaluations in a natural service setting. All the structural estimates were in the expected direction. Consistent with prior beliefs, perceived performance has a stronger influence on customer satisfaction when purchase importance is low. But for a high importance purchase, expectations have a stronger influence on disconfirmation, and both disconfirmation and perceived performance influence customer satisfaction.[28]. To analyze the customer's inter purchase time by considering the regularity of inter purchase time, adding learning and the departure factors and including the heterogeneity of customers. We provided these extensions by replacing some NBD assumptions. Firstly, as regular purchases exist, we adopted Erlang inter purchase times in our model. We found that the customer's inter purchase time can be extended to Erlang-c and still can be easy to estimate. Secondly, consideration of the customer's learning and departure is shown to be necessary when we treat the buying population as having easy exit and entry.[31]. The importance of establishing, developing and maintaining customer relationships in a retail context. Relationship marketing theory and customer equity theory posit that consumers' evaluations of a retailer's offerings and consumers' perceptions of the intrinsic quality of the relationship (i.e. the strength of the relationship) shape consumers' behavior in the relationship [10], [29]. It is suggested that the perception of the consumer about the inputs of the retailer influences the relationship commitment of the consumer to that retailer, which in turn has an impact on the consumer decision to act

(un)ethically or, more specifically, on the consumer's reaction to receiving too much change.[27]. This study provides some important contributions, both in methodology and theory, for the study and practice of brand loyalty: First, the proposed no conscious method to measure consumers' degree of brand loyalty and inertia is new and nonintrusive. Compared to the traditional multi attribute models, this method does not require consumers to express their evaluative judgment toward the brand directly, or to organize their brand knowledge in a brand choice decision mode. It thus provides a non conscious explanation regarding consumers' repeat purchase behavior. This approach is especially important in the study of brand loyalty because consumers can repeatedly purchase the same brand, either actively, due to personal commitment to the brand, or passively, due to consumer inertia. The traditional conscious-level method can only detect brand loyalty, and fails to uncover the inertia mechanism. The concept of making a distinction between two sources of repeat purchase, brand loyalty, and inertia clearly shows that repeat purchase is not only a consumer-specific time-constant variable, but also a promotion-specific time-varying variable. [14]. Findings suggest that private label purchasers are more different than similar in terms of demographics and behaviors according to the selected retail format, with several exceptions between the Wal-Mart, Kohl's and JC Penney formats which appear to share competitive space. The cross-shopping trees indicated that Wal-Mart and JC Penney private label consumers engage in purchasing comparable private labels in both chains. Wal-Mart and Kohl's also share private label consumers for comparable private label brands[1]. The objective was to use information gathered from a data warehouse to develop insights into a customer base and to explore the marketing opportunities that might arise. Based on a large sample of the customers of an international insurance company, the paper illustrates the application of the Survival analysis method to the study of cross-selling. Cox's proportional hazard regression has several advantages over other similar regression techniques, chief among which is the treatment of time as a continuum rather than as discrete episodes, which reflects the reality of a customer relationship.[2]. The findings Suggest that marketers who seek a particular segment of consumers for their product or service (e.g., variety seekers) may be able to find a significant number of these among three countries in Europe and the United States. Country differences were also noted, however, both in terms of the penetration of segments and the nature of the 'average' consumers in the four countries. [19]. Results are derived from the buying behavior of the individual consumer by noting how certain sub groupings or clustering of consumers-i.e. those who buy a particular pair of brands in a particular time period and those who do not-lead to simple relationships. These describe the brand-choice patterns of the individual consumer but do not explain why he behaves that way (in terms of motivation and needs, risk reduction, habit, learning, or any other such intervening variables. [9].

We have identified different problems and issues like

consumer's attitude, customer's perception etc. and different issues related to the customer's retention and CRM. Our main focus in this research proposal is on the consumer behavior. Which factors effects the buying decision of customers and what are the key preferences in customers buying decision? And how the customers become loyal to the brand and whether the customers are inheritably loyal or situational loyal.

Firms can generate a reasonable profit by using the effective promotional tools like advertisement, personal selling, public, relations etc. and assessing the consumer behavior. Price, income and household size etc affect the consumer buying behavior and through repeat purchase consumers become brand loyal .Brand loyalty also effects the consumers buying behavior. Sales person acts a bridge b/w the firms and the customers. A sales person can also affect the buying decision of customers and satisfying the customer's needs and wants and can generate a reasonable profit.

The paper is organized as follows: Section II describes the theoretical framework and hypothesis, section III illustrates data analysis and results and at last the conclusion is drawn in Section VI.

2. Theoretical Framework and Hypothesis

2.1. Theoretical Framework

In our model the dependent variable is consumer behavior and independent variables are price, advertisement, brand image. Individually variable has the positive impact on each other, but all variables depend on the consumer behavior variable All variables helps to satisfy customer and fulfill their needs and wants, at the end these variables become the reason of organization sales growth.

2.1.1. Brand Image

Brand image can be defined as “the meanings consumers’ associate with the product” where meanings are consumers’ perceptions of e.g. advertising and other brand related activities [16] claim that “a well-recognized and accepted brand image is one of the most valuable assets a firm possesses” since brands can “influence patronage decisions and purchase behaviors”. “Product image refers to attributes associated with a given product or service”, and this is interpreted through e.g. price, channel of distribution and advertising [17] so it is hypothesized that data mining has positive effect on brand image.

2.1.2. Price

Price is also considered to be a part of merchandise. For instance [18] and ([19]) have included price as an important attribute of retail stores. [20] Defined prices/value in terms of e.g. fair prices and value for money. According to [21] there are four main dimensions to be reflected upon when considering price and these are; the price position towards

competitors, different geographical market conditions, price differentials between products in the retailer's assortment and strategies related to the time dimension e.g. high-low-pricing strategies or everyday-low pricing strategy. So it is hypothesized that data mining has positive effect on price.

2.1.3. Advertisement

According to [22], advertisements are symbolic extensions of the store. Through words, consumers create abstractions of the stores'. Consumers create a conceptual image of the store via advertising and it is the retailers' responsibility to transfer the desired image. [21] States that advertising and promotion serve as a way for the retailer to attempt to portray a certain image, increase sales, win new consumers' and so on. The message is controlled by the retailer and it is likely to reach a broad group of consumers (Ibid). There are other ways than advertising that can give the retailer publicity, such as public relations and corporate social responsibilities, and the choice of media is dependent on what specific target groups the retailer wants to reach (Ibid). So it is hypothesized that data mining has positive effect on advertisement.

2.2. Theoretical Framework

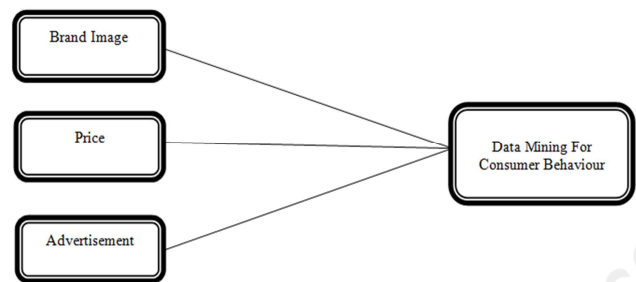


Fig 1. Theoretical Framework

2.3. Hypothesis

H_0 : There is a relationship b/w Data mining and consumer Buying behavior

H_1 : There is no relationship b/w Data mining and Consumer buying behavior

3. Data Analysis and Results

The data for the research paper was collected through questionnaires from the students of Top University of Pakistan. The questionnaire contained total of 22 questions on the 3 independent and 1 dependent variables. The data was collected by randomly distributing the 100 questionnaires among the students and then collecting the filled questionnaires. Different students fill these questioners on the basis of their knowledge and experiences. This data collection process was conducted in 7 days. Sample of 100 students including male and female. The purpose was to take a broad view of the result of the research to the huge population who have provided there data to any kind of record. The sampling method utilized for the reason of sampling was simple random sampling as we have randomly selected the students who

filled the self-administered questionnaires.

3.1. Reliability Analysis

Cronbach's alpha is the most common measure of internal consistency ("reliability"). It is most commonly used when you have multiple Likert questions in a survey/questionnaire that form a scale and you wish to determine if the scale is reliable. In other words reliability is that other things being equal, a person should get the same score on a questionnaire if they complete it at two different points in the time. We can also say reliability to be that two persons, who are the same in terms of construct being measured, should get the same score. The main idea is that set of items should produce results consistent with the overall questionnaire. In a reliable scale the Cronbach's alpha should not be less than .65. Cronbach's alpha values for consumer behavior are .634, for brand image it is .737, for advertisement it is .623 and .631 is for price. Somehow there are different reasons for which reliability is less than its set level. One of the reasons is in appropriate fulfillment of questionnaires by the students. The results of questionnaires which were filled by the students have shown the above mentioned values. For consumer behavior no of items was 4, for brand image it was 6 advertisements it was 3 and finally 4 were for price. These set of items were consistent with the questionnaires filled by the students.

Table 1. Reliability analysis

Variables	α	Items
Brand Image	.737	4
Advertisement	.623	3
Price	.631	4
Consumer Behavior	.634	4

3.2. Descriptive Analysis

For the survey 100 questionnaires were filled in which 74 were males and 26 were females. Males were in majority because of an easy interaction with them. The questionnaires were filled by the personal experiences and interests of the respondent.

Table 2. Descriptive analysis

Gender	Respondents
Male	74
Female	26
Total	100

Table 3. Descriptive statistics of Brand Image

Variables	Range	Mean	Std. Deviation	Variance
Brand Image	3.67	3.1533	.82561	.682
Price	4.00	3.2425	.72514	.526
Advertisement	4.00	3.0833	.76596	.587
Consumer behavior	4.00	3.2200	.87132	.759

The descriptive analysis describes the overall characteristics of the data collected. The descriptive analysis table above described the characteristics of data collected on 15 items. The descriptive analysis reveal the number of respondent for each item, the range of the data collected, the

minimum and the maximum value of the data collected, the mean of the data, the standard deviation of the data, the variance and Skewness of the data collected. The number of respondent for all items is 100, the range is 4 and the minimum value and maximum value for all is 1 and 5 respectively. The lowest mean is for advertisement that is 3.08 and the highest mean is for price that is 3.24. This revealed that on advertisement respondent least positively inclined toward agreeing and on price the respondent were most positively inclined to agreeing. For brand image and consumer behavior respondents were more inclined toward agreeing with the items. The average score for brand image and consumer behavior showing respondent response to be on the right side of the neutral category and inclined toward agreeing with the items.

3.3. Correlation Analysis

A correlation tells how and to what extent two variables are linearly related. The correlation is used when two variables that are quantitative in nature and are measured on a scale that is approximately interval scale. Correlation shows whether there is a relationship between the two variables and whether one variable is caused due to the other. The significance is the p-value that tells us the probability we would expect our result given the null hypothesis is true. If our p-value is less than alpha - .5 – we would reject the null hypothesis and conclude that there is a relationship between the two variables under study. In the above table correlation analysis for consumer behaviour is shown. The correlation between independent and dependent variables is 1.000, which is weak correlation. The p-value is .000, this consistent with the correlation. The p-value is less than alpha therefore it is statistically significant. Thus we reject the null hypothesis and conclude that there is a relationship between dependent and independent variables

Table 4. Correlation

Correlation		CB	BI	Price	AD
Pearson Correlation	CB	1.000	.385	.485	.342
	BI	.385	1.000	.491	.376
	Price	.485	.491	1.000	.450
	AD	.342	.376	.450	1.000

3.4. Regression Analysis

A regression is typically used to predict a dependent variable with an independent variable. Regression analysis is closely related to correlation analysis. In this research study the researcher shows the behavior of consumers and impact of variables that is price, advertisement and brand image.

In this research study the researcher is interested in whether data mining was related to knowledge management-innovation – technology – direct marketing. Whether there is a correlation is answered by correlation analysis. In this research simple regression is applied on two models. The model summary gives the adjusted R^2 . The model summary gives the adjusted R^2 . The R^2 should be above .270. The R^2 should be more than .250 and adjusted r square is .252. it shows

the variation in dependent variable explained by independent variables.

Table 5. Regression Analysis

R	R ²	Adj.R ²	Std. Err. Est.
.525 ^a	.275	.252	.75334

3.5. ANOVA

As in ANOVAs the value of *f* should be high than 12 and value in the ANOVA table is 12.145 and significance value should be less than 2 and value in the table is .000 Since the *p*-value is less than alpha so we can reject the alternative hypothesis and conclude that there is a relationship between independent and dependent variables.

Table 6. ANOVA

	Sum of Squares	df	Mean Square	F	Sig.
Regression	20.678	3	6.893	12.145	.000
Residual	54.482	96	.568		
Total	75.160	96			

3.6. Coefficients of Regression

In the equation $Y = a + b_1X_1 + b_2X_2 + b_3X_3$, *Y* is the dependent variable, *a* is a constant, the *b* are the beta coefficient that indicate the degree of influence the corresponding independent variable has on variations in the dependent variable. The higher the value of *b*, the more influential the independent variable and the sign indicates the nature of relationship whether the variable move together or in opposite direction. The *X*s are the independent variables. The *t* statistic column is not so important to consider but the sig. column is important to see. The significant level should be below 5 percent.

In above table the values of beta are .168, .347 and .123 the relation b/w brand image, advertisement and price with consumer is positive so they will move in same direction.

Table 7. Coefficient of regression

Variables	Std.Coeff.	T	Sig.
CB		2.182	.032
BI	.168	1.654	.101
Price	.347	3.288	.001
AD	.123	1.236	.219

4. Conclusion

In this research paper impact of data mining on consumer behavior was considered as the topic of research and we have done different research in this dimension. Variables which are undertaken are the consumer behavior which is the dependent variable and price advertisement and brand image are considered as the independent variable. Understanding consumer behavior means to know the needs and wants of consumers towards products. Only that product exists in the market that efficiently fulfills the demands of its consumers. Pricing, brand image and advertising play a very vital role in judging consumer buying behavior. Researchers have shown

agreement on this point that if pricing of the product is according to consumers buying power and it also justify the good quality of product and also the influential advertising techniques are used than brand image will increase and it will show positive relation with consumers buying behavior. Correlation in this research study shows the positive relationship among variables. Consumer plays a vital role in achieving the organizations goals and objectives because customers are considered as the blood of the organizations. In the past researches different researches has shown that stability of any product in the market for the long time is possible through suitable pricing, effective promotional tools and the image of the brand in the market. Because compromise on any of these variables can bring the product to its decline stage. Use of the modern technology for these techniques is very important. Competitors are also there to compete with you. So there is need of appropriate innovation. And identifying the consumer behavior. This research is directed towards the consumer attitude and their perception towards the product. Operational department has a very vital role in satisfying the consumers demand related to cost or price. Quality has also the key preferences of the customers' needs. marketing department has also very effective role in the promotional activities like advertisement, personnel selling, public relations etc. and also establishing the brand image of the product. Consumers have different towards the different class of products. In luxuries quality and its functionality are highly focused by the customers. In necessities customers show concern mainly with price. Consumers buying behavior change with the passage of time. so the innovative products bring in the market should be after great research by forecasting the consumers buying behavior in future. customers commitment towards product can only be possible by satisfying them. Customers dealing are very important and any organization should take a great care while dealing and interacting with their customers. Trust is also the key element in the purchase behavior of customers. Organizations should give customers the trust so that the customers are directed towards the repeat purchase of products. Today organizations are giving extreme focus on brand and customer loyalty. Brand loyalty only comes up when the customers need are satisfied. So that our research shows or concluded that all of the variables have influential role effect on consumer buying behavior.

References

- [1] Alexander, N., A. M. Doherty, et al. (2010). "Consumer receptiveness to international retail market entry." *International Journal of Retail & Distribution Management* 38(3): 160-17
- [2] Ansell, J., T. Harrison, et al. (2007). "Identifying cross-selling opportunities, using lifestyle segmentation and survival analysis." *Marketing Intelligence & Planning* 25(4): 394-410.
- [3] Barrett, G., T. Jones, et al. (2002). "The economic embeddedness of immigrant enterprise in Britain." *International Journal of Entrepreneurial Behavior & Research* 8(1/2): 11-31.

- [4] Buttle, F. and J. Burton (2002). "Does service failure influence customer loyalty?" *Journal of Consumer Behaviour* 1(3): 217-227.
- [5] Chatzidakis, A. and D. Mitussis (2007). "Computer ethics and consumer ethics: the impact of the internet on consumers' ethical decision-making process." *Journal of Consumer Behaviour* 6(5): 305-320.
- [6] Chowdhury, J., J. Reardon, et al. (1998). "Alternative modes of measuring store image: an empirical assessment of structured versus unstructured measures." *Journal of Marketing Theory and Practice*: 72-86.
- [7] Clarke, G. (2001). "Confirming satisfaction as an attitude within the service-buying process." *Journal of Consumer Behaviour* 1(2): 111-123.
- [8] De Pelsmacker, P. and W. Janssens (2007). "A model for fair trade buying behaviour: The role of perceived quantity and quality of information and of product-specific attitudes." *Journal of Business Ethics* 75(4): 361-380.
- [9] Ehrenberg, A. S. and G. J. Goodhardt (1970). "Pack-size rates of buying." *Applied Economics* 2(1): 15-26.
- [10] Garbarino, E. and M. S. Johnson (1999). "The different roles of satisfaction, trust, and commitment in customer relationships." *the Journal of Marketing*: 70-87.
- [11] Gummesson, E. (1995). "Relationship marketing: its role in the service economy." *Understanding services management* 244: 68.
- [12] Harris, L. and C. Dennis (2011). "Engaging customers on Facebook: Challenges for retailers." *Journal of Consumer Behaviour* 10(6): 338-346.
- [13] Hoon Song, J., J. A. Kolb, et al. (2010). "Role of transformational leadership in effective organizational knowledge creation practices: Mediating effects of employees' work engagement." *Human Resource Development Quarterly* 23(1): 65-101.
- [14] Huang, M. H. and S. Yu (1999). "Are consumers inherently or situationally brand loyal?" A set intercorrelation account for conscious brand loyalty and nonconscious inertia." *Psychology & Marketing* 16(6): 523-544.
- [15] Laforet, S. (2011). "Brand names on packaging and their impact on purchase preference." *Journal of Consumer Behaviour* 10(1): 18-30.
- [16] Lindquist, J. D. (1974). "Meaning of Image: A Survey of Empirical Hypothetical Evidence." *Journal of Retailing* 50: 29-38.
- [17] Marsden, D. (2001). "Deconstructing consumer behaviour: theory and practice." *Journal of Consumer Behaviour* 1(1): 9-21.
- [18] Martineau, P. (1958). "Social classes and spending behavior." *the Journal of Marketing*: 121-130.
- [19] McCarty, J. A., M. I. Horn, et al. (2007). "An exploratory study of consumer style: Country differences and international segments." *Journal of Consumer Behaviour* 6(1): 48-59.
- [20] Moore, M. and J. M. Carpenter (1985). "A decision tree approach to modeling the private label apparel consumer." *Marketing Intelligence & Planning* 28(1): 59-69.
- [21] Porter, S. S. and C. Claycomb (1997). "The influence of brand recognition on retail store image." *Journal of product & brand management* 6(6): 373-387.
- [22] Praxmarer, S. (2011). "Message strength and persuasion when consumers imagine product usage." *Journal of Consumer Behaviour* 10(4): 225-231.
- [23] Pringle, H. and L. Binet (2005). "How marketers can use celebrities to sell more effectively." *Journal of Consumer Behaviour* 4(3): 201-214.
- [24] Quester, P. G., A. Karunaratna, et al. (2000). "Self-congruity and product evaluation: a cross-cultural study." *Journal of Consumer Marketing* 17(6): 525-535.
- [25] Shanteau, J. (1988). "Consumer impression formation: The integration of visual and verbal information." *Nonverbal communication in advertising*: 43-57.
- [26] Sjödin, H. and F. Ålén (2006). "When communication challenges brand associations: a framework for understanding consumer responses to brand image incongruity." *Journal of Consumer Behaviour* 5(1): 32-42.
- [27] Steenhaut, S. and P. Van Kenhove (2005). "Relationship commitment and ethical consumer behavior in a retail setting: The case of receiving too much change at the checkout." *Journal of Business Ethics* 56(4): 335-353.
- [28] Tam, J. L. M. (2011). "The moderating effects of purchase importance in customer satisfaction process: An empirical investigation." *Journal of Consumer Behaviour* 10(4): 205-215.
- [29] Verhoef, P. C. (2003). "Understanding the effect of customer relationship management efforts on customer retention and customer share development." *Journal of marketing* 67(4): 30-45.
- [30] Wilson, E. J., R. C. McMurrian, et al. (2001). "How buyers frame problems: revisited." *Psychology & Marketing* 18(6): 617-655.
- [31] Wu, C. and H.-L. Chen (2000). "Counting your customers: Compounding customer's in-store decisions, interpurchase time and repurchasing behavior." *European Journal of Operational Research* 127(1): 109-119.