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Modeling Brand Switching in Consumers' Products

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Abstract
In this study, we examined the relevance of product attributes to switching rates with reference to three brands of soft drinks. Markov chains were employed to determine the brand loyalty of the consumers of the soft drinks and the future market shares in the long run.
Sequel to the balance vector generated, it was discovered that the consumers exhibited the most brand loyalty towards Fanta.
Keywords: Brand Switching, Brand Loyalty, Markov Chains, Market Shares, Transition Matrix.

1.0 Introduction

Brand switching otherwise known as brand jumping is the process of choosing to switch from routine use of one product or brand to steady use of a different but similar product. When consumers switch from one brand to another, building a picture of likely brand switching behavior occurs.

If a consumer's propensity to switch is known, the market can be modeled to indicate future market share and the relative positioning of the competing brands (Chaarlas & Rajkumar, 2012).

That customers evaluate brands, develop images of brands with varying degrees of loyalty is well established (Keller, 1993; Park, Jun & Shocker, 1996,;Arvind Nivedita, 2010). Product attributes are the image building features of a product which may include packaging, branding, labeling, design, colouring, quality, price, warranty and servicing (Biodun, 2002).

Every consumer of a product is expected to have utility function for each of these attributes. Utility function enables a consumer of a product to study how product satisfaction varies with alternative levels in each of the attributes.

For example, what a consumer wants from a brand of soft drink may be the colour, flavour, taste or gas content. The highest level of utilities emanating from the attributes forms the consumer's ideal brand of soft drink. Several reasons may be responsible for consumers of products switching from one brand to another. According to Umeshanand (2008), the following reasons are said to be underlined factors responsible for brand switching:

- Inconsistent brand positioning of the product and brand.
- Low research and development which do not provide improvisation in product quality and standards.
- Customers finding it uncomfortable if quality of products starts falling.
- Unavailability of product brand and variant which customers demand for.
- Uniqueness and variety in other brands.
- Price escalation or availability of other brands at competitive price.
- kleptomanic customers who are not advocates of brand loyalty, but after consumption and taste of every kind of products and utility possession.

1.2 Definitions of Terms

Brand: This is a name, sign, symbol or design used to identity a product and distinguish it from another product, service or business.
Brand Loyalty: This refers to consumer's behaviour of repeatedly purchasing a specific brand over a certain period of time.
Brand Image: This is a symbolic construct created within the minds of people and consists of all the information and expectations associated with a product or service.
Global Brand: This is the brand that reflects the same set of values around the world. It transcends its origin and creates strong and enduring relationship with customers across countries and cultures.
Selective Perception: This is the process by which individuals perceive what they want to in media messages and disregard the rest.
Selective Exposure: This is the perception by a customer of certain more relevant factors or advertisements but not of others. In this case, a customer may seek or avoid various stimuli.

Selective Retention: This is the perceptual process in which consumers subconsciously are most apt to remember information that confirms their previously held attitudes and prejudices.

The objectives of this study are to:

i. determine the relevance of product attributes to switching rate with references to soft drinks brands (Fanta, Mirinda and Mountain-Dew).
ii. examine the brand loyalty of the consumers' for soft drink brands considered.
iii. employ Markov chains to determine the steady-state probabilities for the soft drink brands.
iv. forecast the future market share that the product would achieve in the long run in terms of the consumers' demand and changes in their demand.

2.1 Material and Method

We administered 180 questionnaires randomly to consumers of the soft drinks considered. The study area used for the distribution of the questionnaires was university of Abuja, Mini Campus, Gwagwalada, Abuja. Descriptive technique using Markov brand switching model was used for the analysis of the data generated.

2.2 Markov Chains

Markov model is a stochastic process used in terms of a random variable indexed with respect to time. Its analysis also takes cognizance of a sequence of events. The state probabilities at a future instant given the present state of the process do not depend on the states occupied in the past. The behavior of the system in each state memorizes i.e the future state of the system at t_{n+1}depends on its present state at t_n (Dilip, Rupam & Anupawa, 2009). Markov chains have been used in many applications; see Jarrow, David and Stuart (1997), Zipkin (1993), White (1993), Sandman (2005), Guedon (1993), Glennon, Dennis and Peter (2005) among others.

2.3 Notations of Markovian Model

Suppose X_n with n $n \in N_0$ denotes random variable on discrete space S. The sequence X = (X_n : n$\in N_0$) is called a stochastic process. If P is a probability measure of X such that $P(X_{n+1} = j/X_0 = i_0 \ldots, X_n = i_n) = P(X_{n+1} = j/ X_n = i_n)$ for all $i_0, \ldots i_n$, $J \in S$ and $n \in N_0$, then the sequence X is a Markov chain on S. The probability measure P is the distribution of X, and S is the state space of X. If the conditional probability $P(X_{n+1} = j/X_n = i_n)$ are independent of time index n$\in N_0$, then the Markov chain X is homogeneous and denoted by $P(X_{n+1} = j/X_n = i) = P_{ij}$ for all i,j$\in$ S.

P_{ij} describes the probability of movement from state i to state j during a specified or discrete time interval.

$$
Pij = \begin{array}{c|cccc}
 & S_1 & S_2 & \ldots & Sn \\
S_1 & P_{11} & P_{12} & \ldots & P_{1n} \\
S_2 & P_{21} & P_{22} & \ldots & P_{2n} \\
. & . & & & \\
. & . & & & \\
. & . & & & \\
S_n & P_{n1} & P_{n2} & \ldots P_{nn} &
\end{array}
$$

where $\sum P_{i\,j} = 1$, $P_{ij} \geq 0$ for all i,j and S_1 S_2, . . . S_n are discrete states. However, if a Markov chain has initial probability vector $X_0 = (i_1, i_2, \ldots i_n)$ and transition matrix P_{ij}, the probability vector after n repetition is $X_0 . p^n_{i,j}$ which defines the future state probabilities.

3.0 Data Analysis and Results

Table 1: Brand Preference.

Brands	Number of Consumers	Percentage
Fanta only	114	32
Mirinda only	18	5
Mountain Dew only	48	13
Fanta to Mountain Dew	50	14
Fanta to Mirinda	65	18
Mirinda to Fanta	12	3
Mirinda to Mountain Dew	5	2
Mountain Dew to Fanta	32	9
Mountain Dew to Mirinda	16	4
Total	**360**	

***Source*: From Field Survey (2012)**

Table 2: Brand Insistence and Switching Rates

Fanta (F)	Number of Consumers	Percentage	Probability
Brand insistence	114	50	0.50
Switching to Mountain Dew	50	22	0.22
Switching to Mirinda	65	28	0.28
Sub Total	**229**		
Mirinda (M)			
Brand Insistence	18	51	0.51
Switching to Fanta	12	35	0.35
Switching to Mountain Dew	5	14	0.14
Sub Total	**35**		
Mountain Dew (MD)			
Brand Insistence	48	50	0.50
Switching to Fanta	32	33	0.33
Switching to Mirinda	16	17	0.17
Sub Total	**96**		

***Source*: From Field Survey (2012)**

The transition matrix is shown below:

$$P_{ij} = \begin{array}{l} \\ \text{Fanta} \\ \text{Mirinda} \\ \text{Mountain Dew} \end{array} \begin{array}{c} \begin{array}{ccc} \text{Fanta} & \text{Mirinda} & \text{Mountain Dew} \end{array} \\ \begin{pmatrix} 0.50 & 0.28 & 0.22 \\ 0.35 & 0.51 & 0.14 \\ 0.33 & 0.17 & 0.59 \end{pmatrix} \end{array}$$

This matrix shows only the existing and the next brand preference of the consumers. The transition diagram showing the three states and the probabilities of moving from one state to another is shown:

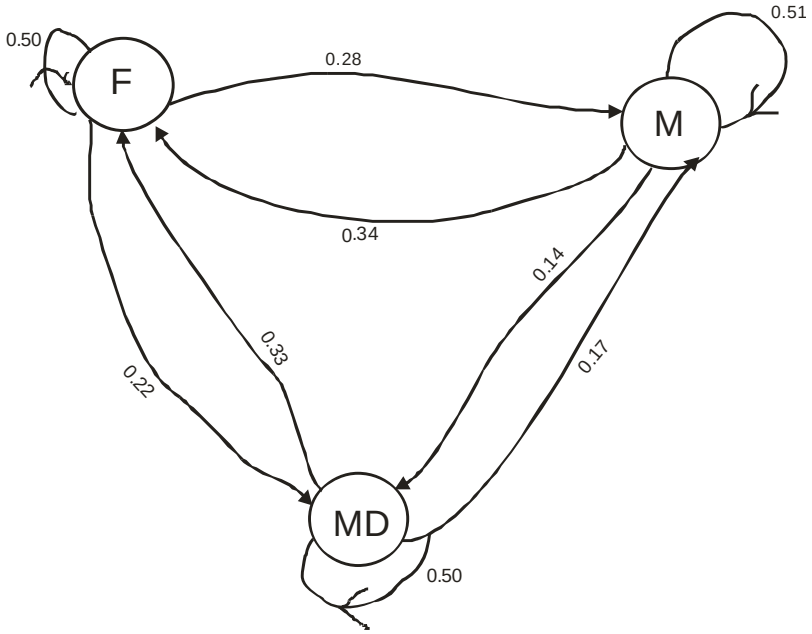

Figure 1.

Table 3: Computation of Steady State Probabilities of the Product Brands (10 STEPS AHEAD FORECAST)

	Fanta	Mirinda	Mountain – Dew
0	0.63	0.10	0.27
1	0.44	0.27	0.28
2	0.40	0.31	0.28
3	0.40	0.32	0.27
4	0.40	0.32	0.27
5	0.40	0.32	0.27
6	0.40	0.32	0.27
7	0.40	0.32	0.27
8	0.40	0.32	0.27
9	0.40	0.32	0.27
10	0.40	0.32	0.27

4.0 Discussion of Results

From Table 1, 32% of the respondents were of the opinion that they would not drink any other soft drink apart from Fanta, 5% of the consumers believed that they would only drink Mirinda and those that insisted that they would drink Mountain Dew were 13% of the consumers.

From table 2, the total demands for Fanta, Mirinda and Mountain Dew are 229, 34 and 96 respectively. Out of these, only 114, 18 and 48 insisted on drinking Fanta, Mirinda and Mountain dew respectively.

Those that would switch from Fanta to Mirinda and Mountain Dew are 22% and 28% respectively. Those that would switch from Mirinda to Fanta and Mountain Dew are 34% and 14% respectively. The number of consumers switching from Mountain-Dew to Fanta and Mirinda are 33% and 17% respectively. However, if

consumers of the soft drinks keep to their switch brand decisions, then the future demand for Fanta would be 158 as against 114; 99 as against 18 for Fanta and 103 as against 48 for Mountain-Dew. This shows that the number of consumers for each of the brands would increase.

From the transition matrix, about 115 (50%) consumers switched from Fanta to other brands; 17 (49%) consumers from Mirinda to other brands and 48 (50%) switched from Mountain-Dew to other brands From the three states, there is an indication that the switch rate is not favourable.

From Table 3, the balanced vector was analyzed using matrix Algebra Tool V 2.1 and sequel to the examination of the Tables 3, and interpretation of the brand preferences, we discovered that with the value of 0.40, Fanta seemed to be the preferred brand compared to others in the long run. The implication of this is that consumers showed the most brand loyalty towards Fanta followed by Mirinda and Mountain-Dew.

5.0 Conclusion and Recommendation

We have used transition matrix as a forecasting tool that could be used to determine market environment in the future. This would in no small way assist marketing managers to compare the intensiveness gained in a particular period of time with product life cycle and also allow them to measure the effect of structural changes such as promotions and price cuts.

When consumers cannot derive satisfaction from a product, they switch to other brands. This makes a product to lose market to others which eventually reduces the profit level of the product that loses market to others. For the level of switching and market share to be minimized, producers of products must be consumer oriented and maintain quality of their products. Marketing managers should not also allow their products to be out of market to avoid irreversible substitute.

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