JETIR.ORG ISSN: 2349-5162 | ESTD Year : 2014 | Monthly Issue
JOURNAL OF EMERGING TECHNOLOGIES AND INNOVATIVE RESEARCH (JETIR)
An International Scholarly Open Access, Peer-reviewed, Refereed Journal

Construction of Sales Stability Index: A Measure to Assess the Stability of a Particular Brand in the Market

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Abstract

In the global market number of consumer goods of different brands are available. The choice of a particular brand depends upon the attributes of the product. Selection of a particular brand is not easy task for the consumers. Depending on the choice of the brand of the particular product sales of the retailers will differ from brand to brand. In this context, sales stability is the ability of any business to maintain consistent sales overtime. Sales stability can be achieved through developing a loyal customer base, offering a unique product or having a strong brand identity.

Therefore, in the present paper the sales stability index is being constructed to know the stability of a particular brand of any product in the market. The proposed index is based on quantity consumed by the customers during particular time interval. The applicability of the proposed index is based on the primary data collected in eighteen general stores of Mathura Township area, Mathura for Amul Milk.

Key words – Stability Index, Sales Stability, Consumer Behaviour

1. Introduction

Sales stability is the ability of any business to maintain consistent sales over time. This can be achieved through developing a consistent relationship with customers, offering a unique product or having a strong product identity.

Sales stability index is essential for business because it allows them to know whether to improve the quality or attributes of the brand of the product for the sale. Sales stability depends on two factors (i) Market Size (ii) Demand of a market.

Market size is the total number of potential clients or buyers in a particular market segment. It is helpful for an organization or small business to determine its potential buyers before launching a new service or product to ensure it reaches expected customers.

In market, large numbers of brands of a product are available. The customer selects a brand on the basis of certain attributes possessed by the particular brand. The level of quality of attributes also differs from brand to brand. All attributes are also equally preferred by the customers. The customer purchases a brand and may switch to another if not satisfied or may continuously purchase it for a long period of time.

A customer is said to be stable customer if he/she purchases a certain brand continuously for a long time. The stability is an important criterion for business men to assess the success which is highly related to the level of satisfaction of a customer. Thus stability plays an important role in stablising a brand in the market. Stability is the characteristic which makes the brand the inherent "fabric" of the market. Thus the computation of the stability index has also policy implication for the market forecast.

If a company wants to launch a new product in the market it can perform a small market survey of the market to forecast and find the stability of a particular brand in the market thus a measure or a mathematical index is required which could assess the stability of the brand in the market. Such types of indicies have been developed by many researchers in various fields like inventory management, marketing management etc. (See: Gupta and Srivastava (2018), Priyender et.al (2009), Priyender and Khare (2008), Srivastava and Khare (2004). In this context no statistical or mathematical index is developed for determining the stability of the product in the market, taking sales per unit time for different retailers. Sales per unit time in the most determinantal factor in evaluating the stability of the particular brand in the market.

The proposed index is based on the quantity sold by the retailers for particular time interval. For mathematical simplicity and easy understanding the numerical value of the index is taken to lie between 0 and 1. The numerical value of the index indicates the degree of utilization depending upon the satisfaction of the customers for a particular brand.

The main objective of the present research paper is to construct the sales stability index to assess the stability of a particular brand in the market. Section 2 focuses on the development of the index, while section 3 deals with the data and application of the suggested index.

2. Development of Index

The present sales stability index is based on the quantity consumed by the retailers for particular time interval.

Suppose we consider 'n' numbers of retailers who are selling a particular brand of any product. Let us assume quantity sold by retailers with respect to particular time intervals are as follows-

q : $q_1, q_2, q_3, \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots q_i \ldots\ldots\ldots\ldots\ldots q_n$

t : $t_1, t_2, t_3 \ldots\ldots\ldots\ldots\ldots\ldots\ldots t_i \ldots\ldots\ldots\ldots\ldots\ldots t_n$

R : $\frac{q_1}{t_1}, \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\frac{q_i}{t_i}, \ldots\ldots\ldots\ldots\ldots\ldots\ldots\frac{q_n}{t_n}$

$\boldsymbol{R_i} = \frac{\boldsymbol{q_i}}{\boldsymbol{t_i}}$ be the sale of the **i**th retailers per unit time **i**=1,2,3…….n

q_i: Quantity sold by the i^{th} retailer

t_i : time duration in which i^{th} retailer sold q_i unit of the brand of a particular product.

Sales of the retailer is said to be stable if atleast q^* quantity (units) of the brand of a particular product for atleast t^* time duration is sold by retailer. Here both q^* and t^* are fixed values (pre-assumed) for quantity and time.

Due to the stability and unstability of sales, number of retailers may be classified into the following categories:

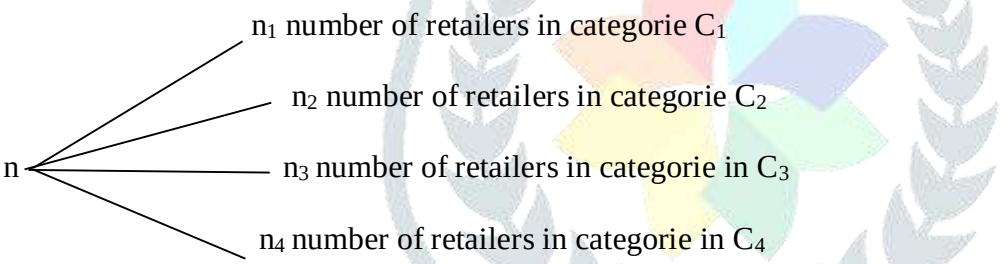
Category I (C_1), $t_i \leq t^*$, $q_i \leq q^*$ stable in term of t_i and unstable in term of q_i.

Category II (C_2), $t_i \leq t^*$, $q_i \geq q^*$ stable in term of t_i and q_i both.

Category III (C_3), $t_i \geq t^*$, $q_i \leq q^*$ unstable in term of t_i and q_i both.

Category IV (C_4), $t_i \geq t^*$, $q_i^* \geq q^*$ and t_i unstable in term of t_i and stable in term of q_i.

Distribution of retailers among the different categories are classified as follows-



Let the general form of index is,

$$I = \emptyset\left[\sum_{i=1}^{n_1} R_i W_{C_1} + \sum_{i=1}^{n_2} R_i W_{C_2} + \sum_{i=1}^{n_3} R_i W_{C_3} + \sum_{i=1}^{n_4} R_i W_{C_4}\right] \ldots\ldots\ldots\ldots\ldots\ldots (1)$$

where $\emptyset$ be the normalizing parameter.

Now, Let the weight can be considered as

$$W_i \ \alpha \ \frac{qi}{ti}$$

Therefore

$$W_i = k \ \frac{qi}{ti} \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (2)$$

Where k is the constant of proportionality, which is determined by the condition that the sum of the weight is equal to 1.

Taking summation on both the side of equation (2)

$$\sum_{i=1}^{n} W_i = k \sum_{i=1}^{n} \frac{qi}{ti}$$

$$W_i = \frac{\frac{qi}{ti}}{\sum_{i=1}^{n} \frac{qi}{ti}}$$

The weight of i^{th} customer lying in different categories are as follows-

$$W_{c_1} = \frac{\frac{q_i}{t^*}}{\sum_{i=1}^{n} \frac{qi}{ti}}$$

$$W_{c_2} = \frac{\frac{q^*}{t^*}}{\sum_{i=1}^{n} \frac{qi}{ti}}$$

$$W_{c_3} = \frac{\frac{q_i}{t_i}}{\sum_{i=1}^{n} \frac{qi}{ti}}$$

$$W_{c_4} = \frac{\frac{q^*}{t_i}}{\sum_{i=1}^{n} \frac{qi}{ti}}$$

Thus, the index can be proceed-

$$I = \emptyset \left[\sum_{i=1}^{n_1} \frac{q_i}{t_i} \times \frac{\frac{q_i}{t^*}}{\sum \frac{q_i}{t_i}} + \sum_{i=1}^{n_2} \frac{q_i}{t_i} \times \frac{\frac{q^*}{t^*}}{\sum \frac{q_i}{t_i}} + \sum_{i=1}^{n_3} \frac{q_i}{t_i} \times \frac{\frac{q_i}{t_i}}{\sum \frac{q_i}{t_i}} + \sum_{i=1}^{n_4} \frac{q_i}{t_i} \times \frac{\frac{q^*}{t_i}}{\sum \frac{q_i}{t_i}} \right]$$

$$I = \frac{\emptyset}{\sum q_i/t_i} \left[\sum_{i=1}^{n_1} \frac{q_i^2}{t^* t_i} + \sum_{i=1}^{n_2} \frac{q_i}{t_i} \times \frac{q^*}{t^*} + \sum_{i=1}^{n_3} \frac{q_i^2}{t_i^2} + \sum_{i=1}^{n_4} \frac{q_i}{t_i^2} \times q^* \right]$$

Now, Max $\left(\sum_{i=1}^{n} q_i / t_i \right) = n q^*/t^*$ & $q_i = q^*, t_i = t^*$

$$1 = \frac{\emptyset}{n \frac{q^*}{t^*}} \left[n_1 \times \frac{q^{*2}}{t^{*2}} + n_2 \times \frac{q^{*2}}{t^{*2}} + n_3 \times \frac{q^{*2}}{t^{*2}} + n_4 \times \frac{q^{*2}}{t^{*2}} \right]$$

$$1 = \frac{\emptyset}{n \frac{q^*}{t^*}} \times \left[n \frac{q^{*2}}{t^{*2}} \right]$$

$$1 = \frac{\emptyset \times q^*}{t^*}$$

$$\emptyset = \frac{t^*}{q^*}$$

Hence the index comes to be

$$I = \frac{t^*}{q^* \sum_{i=1}^{n} q_i/t_i} \left[\sum_{i=1}^{n_1} \frac{q_i}{t_i} \times \frac{\frac{q_i}{t^*}}{\sum \frac{q_i}{t_i}} + \sum_{i=1}^{n_2} \frac{q_i}{t_i} \times \frac{\frac{q^*}{t^*}}{\sum \frac{q_i}{t_i}} + \sum_{i=1}^{n_3} \frac{q_i}{t_i} \times \frac{\frac{q_i}{t_i}}{\sum \frac{q_i}{t_i}} + \sum_{i=1}^{n_4} \frac{q_i}{t_i} \times \frac{\frac{q^*}{t_i}}{\sum \frac{q_i}{t_i}} \right] \ldots\ldots\ldots\ldots (3)$$

3. Data and Application

Data Description

The proposed index is computed on the data collected on Amul Milk from eighteen retailers of Mathura Township, Mathura during the month of June 2022. The number of units of Amul Milk sold during June 2022 along with the names of retailers were noted by the researcher. The data is represented in the appendix 1.

Table showing Amul milk Sale in the month of June 2022 in eighteen retailer stores of Mathura Township, Mathura.

Quntity (q) in litre	759	842	409	847	281	219	255	412	439	275	383	85	203	139	460	252	413	118
Time (t) in days	10	7	9	8	7	7	8	9	6	9	12	11	6	8	7	6	7	5
Sales per unit time (q/t)	75.9	120.08	45.4	105.87	40.1	31.2	31.8	45.7	73.1	30.5	31.9	7.7	33.8	17.37	65.71	42	59	23.6

Following given the numerical illustration of the computation of Stability Index.

For the above data set, let us assume that $q^* = 300$ units and $t^* = 7$ days these are the fixed values.

Thus, we have classified number of retailers different categories – as follows

Category I (C_1), $t_i \leq t^*$, $q_i \leq q^* = 5 = n_1$

Category II (C_2), $t_i \leq t^*$, $q_i \geq q^* = 3 = n_2$

Category III (C_3), $t_i \geq t^*$, $q_i \leq q^* = 4 = n_3$

Category IV (C_4), $t_i \geq t^*$, $q_i \geq q^* = 7 = n_4$

From equation no.3, the numerical value of the index value I= (0.47) is computed for Mathura Township, Mathura. Near Township area, many dairy farms supply milk directly to the customers. So, the supply of Amul milk is comparatively less than the regularly milk directly supplied from dairy farms. The index value (I= 0.47) indicates that the Amul milk is not highly stable product depending upon the satisfaction of the customers.

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Appendix -1

Data showing the number of units of Amul milk sold during June 2022 by eighteen retailers of Mathura Township, Mathura.

Name of the retailers	Time in days	Sale in Litre
Baniya	10	87,84, 75, 61, 61, 71, 90, 95,60
Dinesh	7	126, 156, 156, 113, 101, 90.102
Colo	9	51, 46, 41, 35, 35,51, 58, 60. 32
UAS	8	97, 103, 99, 112, 101, 85,80,90
Ankit	7	35,41,45,45,30.35, 50
Digamber	7	16, 19, 37, 29, 33, 40,45
Amit	8	91, 46, 35, 51, 19,18, 25,38
Sachin	9	58, 37, 49, 35, 69, 29, 75, 23, 37
Paras	6	84,84,83, 88,87, 13
Rajkumar	9	14, 5, 17, 87, 9, 1,7, 75, 60
Uday	12	25, 17, 28, 43, 32, 31, 45, 50, 17, 28, 12, 45
Shyam sankar	11	5, 13, 2,1,8, 15, 17, 2, 4, 6,12
Ram	6	25, 41, 28, 37, 50, 22
Balaji	8	13, 15, 6, 21, 28, 33, 8,15
Avtar	7	95, 97, 25, 30, 110, 45, 58
Kanhiya	6	30, 80,47, 20, 48,27
CISF	7	45,53, 55, 32, 83, 66,79
Satish	5	20,10,26,27,35