Contemporary Challenges of Digital Marketing: Ranking Analysis by Fuzzy Cognitive Maps

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Abstract

In this digital generation, the field of marketing is adhered to technology and is getting customized to the growing interest of the customers. Internet has become the frontline of digital marketing. The marketers are creating an index in the online platform to accomplish the herculean task of acquiring and retaining the customers for product promotion. The merits of digital marketing has received warm welcome amidst the customers, but on the other hand the digital marketers and the decision makers are huddled with several contemporary challenges related to the domains of dynamic trends of technology, target group focus, resource management, capital investment, advertising, innovation to hold the customers and sustainment of uniquity. This paper aims in ranking the major contemporary challenges of digital marketing after analyzing the interrelation between the challenges with the application of Fuzzy Cognitive maps (FCM).

Keywords: Contemporary challenges, Digital Marketing, Ranking,Fuzzy Cognitive Maps.

Introduction

Long run functioning of any business sector is proportional to the selection and implementation of marketing strategies. Marketing is the process of making the products and service reach the customers. In traditional marketing, the distribution channels, pricing and features of products are retailer centered and the customer relationship ended with the product sales. But in digital marketing it is customer centric. As the present world is in line with onlinetools, the digital marketers communicate to their digital customers through the gates of digital communication networks. Digital marketing is blended with social networking and it is highly cost effective.Santanu Kumar and GouriSankar[3] has briefed out the comparative analysis on traditional and digital marketing in the dimensions of product, price, place and promotion. The various digital marketing channels facilitate the propagation of the products to greater extent.

Digital marketing has several added values and attributes but there are many operational hurdles. The major challenges are fluctuating technology, upkeep of reliability, pricing competition, demand of high security on private aspects, capital management, high degree of transparency and
high chance of losing unserved customers. This paper predominantly aims in ranking these contemporary challenges of digital marketing and examines the inter impact of one challenge over another. In this research work the FCM mathematical tool is used to rank these contemporary challenges. The concept of FCM was introduced by Kosko [1], which presents the relationship between the factors pertaining to a problem graphically. The concept of FCM is easily comprehensible. The positive impact between the factors of the decision making situation is represented by 1, the negative impact by -1 and no impact by 0. To be more realistic, the impacts are represented as linguistic variables and later quantified by fuzzy numbers.

Several academicians have presented theoretical description, quantitative and comparative analysis of digital marketing, but on after profound review of the literature of digital marketing, no researcher has ranked or discussed the contemporary challenges of digital marketing using FCM to the best of our knowledge. This has motivated us to apply FCM technique to rank the contemporary challenges of digital marketing. The paper is organized as follows: section 2 presents the methodology; section 3 contains the application of the methodology to the problem considered for study, section 4 discusses the results and concludes the paper.

2. Methodology

This section presents the steps to be followed in ranking analysis [2]

1. The contemporary challenges are taken as the factors of the study and the inter relationship is expressed as linguistic variable based on the linguistic questionnaire given to the respondents associated with digital marketing.

2. The relationship between the factors is represented as linguistic matrix and then it is quantified into matrix A.

3. One of the factors is kept in ON position and others in OFF position and it is passed into A, the resultant B is threshold and again it is passed into A to obtain B1. The same step is repeated until two threshold resultants are alike.

3. Ranking analysis of contemporary challenges of digital marketing by FCM

The contemporary challenges of digital marketing are taken as the factors of FCM [4,5,6].

G1 Fluctuating technology
G2 Upkeep of reliability
G3 Pricing competition,
G4 Demand of high security on private aspects,
G5 Capital management
G6 High degree of transparency
G7 High chance of losing unserved customers
The above linguistic matrix represents the inter impactness of the factors. The linguistic variables are quantified with average of decagonal fuzzy number representation [2] and the modified matrix A is presented below.

\[
\begin{array}{ccccccc}
G1 & G2 & G3 & G4 & G5 & G6 & G7 \\
G1 & 0 & H & L & H & H & L & M \\
G2 & M & 0 & L & M & M & M & M \\
G3 & L & L & 0 & L & L & L & M \\
G4 & H & H & L & 0 & M & H & M \\
G5 & M & M & L & M & 0 & L & M \\
G6 & H & H & H & H & M & 0 & H \\
G7 & L & M & L & L & L & M & 0 \\
\end{array}
\]

Let us keep G1 in ON position and the remaining in OFF position.

I. Let \( X = (1000000) \)
\[
X^*A = (0.8 0.2 0.8 0.8 0.2 0.4)
\]
The resultant \((0.8 0.2 0.8 0.8 0.2 0.4)\) is threshold by assigning 1 to the maximum value and 0 to others.
\[
B = (0101100)
\]
\[
B^*A = (1.6 1.2 0.6 0.8 0.8 1.4 1.2) \rightarrow (1000000) = B1
\]
\[
B1^*A = (0.8 0.2 0.8 0.8 0.2 0.4) \rightarrow (0101100) = B2
\]
\[
B = B2
\]

II. Let \( X = (0100000) \)
\[
X^*A = (0.4 0 0.2 0.4 0.4 0.4)
\]
\[
B = (1001111)
\]
\[
B^*A = (2.2 3.2 1.6 2.2 1.8 1.6 2) \rightarrow (0100000) = B1
\]
\[
B1^*A = (0.4 0 0.2 0.4 0.4 0.4) \rightarrow (1001111) = B2
\]
\[
B = B2
\]
III. Let \( X = (0010000) \)

\[ X*A = (0.2 \ 0.2 \ 0.2 \ 0.2 \ 0.2 \ 0.2 \ 0.4) \rightarrow (0000001) = B \]

\[ B*A = (0.2 \ 0.4 \ 0.2 \ 0.2 \ 0.2 \ 0.4 \ 0) \rightarrow (0100010) = B1 \]

\[ B1^*A = (1.2 \ 0.8 \ 1.2 \ 0.8 \ 0.4 \ 1.2) \rightarrow (1001010) = B2 \]

\[ B2^*A = (1 \ 2 \ 1.6 \ 1.4 \ 1.4 \ 0.8) \rightarrow (0100000) = B3 \]

The same result as II.

IV. Let \( X = (0001000) \)

\[ X*A = (0.8 \ 0.8 \ 0.2 \ 0 \ 0.4 \ 0.8 \ 0.4) \rightarrow (1100101) = B \]

\[ B*A = (1.2 \ 1.6 \ 1.2 \ 2.2 \ 1.6 \ 0.6 \ 1.6) \rightarrow (0001000) = B1 \]

\[ B1^*A = (0.8 \ 0.8 \ 0.2 \ 0.4 \ 0.8 \ 0.4 \ 0.4) \rightarrow (1100010) = B2 \]

V. Let \( X = (0000100) \)

\[ X*A = (0.4 \ 0.4 \ 0.2 \ 0.4 \ 0.2 \ 0.4) \rightarrow (1101001) = B \]

\[ B*A = (1.4 \ 2.0 \ 0.8 \ 1.4 \ 0.8 \ 1.8 \ 1.2) \rightarrow (0100000) = B1 \]

The same result as II.

VI. Let \( X = (0000010) \)

\[ X*A = (0.8 \ 0.8 \ 0.8 \ 0.8 \ 0.8 \ 0.8 \ 0.8) \rightarrow (1111001) = B \]

\[ B*A = (1.6 \ 2.2 \ 0.8 \ 1.6 \ 2.2 \ 1.6) \rightarrow (0100000) = B1 \]

The same result as II.

VII. Let \( X = (0000001) \)

The same result as II.

Table 3.1 Ranking of the Contemporary Challenges

<table>
<thead>
<tr>
<th>ON State</th>
<th>G1</th>
<th>G2</th>
<th>G3</th>
<th>G4</th>
<th>G5</th>
<th>G6</th>
<th>G7</th>
</tr>
</thead>
<tbody>
<tr>
<td>G1</td>
<td>0.4</td>
<td>0.4</td>
<td>0.4</td>
<td>0.4</td>
<td>0.4</td>
<td>0.4</td>
<td>0.4</td>
</tr>
<tr>
<td>G2</td>
<td>0.8</td>
<td>0.2</td>
<td>0.2</td>
<td>0.2</td>
<td>0.2</td>
<td>0.2</td>
<td>0.2</td>
</tr>
<tr>
<td>G3</td>
<td>0.4</td>
<td>0.4</td>
<td>0.4</td>
<td>0.4</td>
<td>0.4</td>
<td>0.4</td>
<td>0.4</td>
</tr>
<tr>
<td>G4</td>
<td>0.4</td>
<td>0.4</td>
<td>0.4</td>
<td>0.4</td>
<td>0.4</td>
<td>0.4</td>
<td>0.4</td>
</tr>
<tr>
<td>G5</td>
<td>0.4</td>
<td>0.4</td>
<td>0.4</td>
<td>0.4</td>
<td>0.4</td>
<td>0.4</td>
<td>0.4</td>
</tr>
<tr>
<td>G6</td>
<td>0.4</td>
<td>0.4</td>
<td>0.4</td>
<td>0.4</td>
<td>0.4</td>
<td>0.4</td>
<td>0.4</td>
</tr>
<tr>
<td>G7</td>
<td>0.4</td>
<td>0.4</td>
<td>0.4</td>
<td>0.4</td>
<td>0.4</td>
<td>0.4</td>
<td>0.4</td>
</tr>
<tr>
<td>Weight</td>
<td>2.8</td>
<td>1.6</td>
<td>1.4</td>
<td>2.8</td>
<td>3.2</td>
<td>3</td>
<td>2.8</td>
</tr>
<tr>
<td>Average</td>
<td>0.4</td>
<td>0.23</td>
<td>0.2</td>
<td>0.4</td>
<td>0.46</td>
<td>0.43</td>
<td>0.4</td>
</tr>
<tr>
<td>Rank</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>3</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
</tbody>
</table>
4. Conclusion

The table 3.1 clearly ranks the contemporary challenges of digital marketing. The factor capital management, followed by high degree of transparency is the major challenges. G1, G4 & G7 occupies the rank 3 and they are closely related. The changing technology causes risks in security aspects and it paves way for losing the unserved customers. The challenge of reliability sustenance and facing global competition in the context of price is yet another problem and it is ranked subsequently.

This research work addresses the major contemporary challenges of digital marketing in the perspective of digital marketers and the ranking analysis will certainly assist the decision makers to formulate suitable strategies for overcoming these hurdles.

References