



Ranking of Various Apparel Store Formats Using TOPSIS

Praveen Paul J.¹, Jaya Christa S.T.²,

^{1,2}Associate Professor,

¹Management Studies

²Electrical and Electronics Engineering

^{1,2}MEPCO Schlenk Engineering College,
Sivakasi.

¹jpraveen@mepcoeng.ac.in

²stchrista@mepcoeng.ac.in

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Abstract

The objective of this research paper is to rank the three apparel retail outlet formats namely, Exclusive Brand outlets (EBO), Multi Brand Outlets (MBO) and Large format Stores (LFS) based on their service quality attributes. Responses were gathered from customers of LFS, MBO and EBO. SERVQUAL questionnaire was administered to customers within the different formats of retail outlets. The opinion of the respondents were indicated on a five point scale which ranges from strongly disagree to strongly agree. The SERVQUAL instrument has 5 categories such as tangibles, reliability, responsiveness, assurance and empathy. TOPSIS is applied on the responses to rank the retail outlets by assigning a set of weight combinations for the service quality factors. The findings of the research shows that among the different apparel retail outlet formats, LFS is found to be the best among all the three formats for any combination of weights given for the various service quality factors in TOPSIS.

Key Words::Service Quality, SERVQUAL, Ranking, TOPSIS, Apparel store formats.

1 Introduction

The share of Indian apparel market in Indias total retail market is 8%, amounting to a value of USD 40 billion [1]. In the retail industry in India, the apparel industry is the second largest contributor [2]. The Indian fashion and apparel retail market has undergone several fascinating changes and challenges in recent years such as witnessing more sophisticated and demanding customers who have excessive expectations from the retailers related to their apparel purchase experiences [3], [4]. The challenges related to the changing customer expectations in the apparel industry are to be addressed in the most skilled and prudent manner in order to achieve the associated benefits. The apparel retailers could be in formats such as Exclusive Brand Outlets (EBO), Multi Brand Outlets (MBO) and Large Format Stores (LFS) [5]. EBOs stock only one brand of apparel and are usually company owned (Retailers like Van Heusen and Peter England). MBOs have multiple brands offered by big labels (Stores like Lifestyle and Pantaloons). LFS is usually a chain of stores which displays multiple brands of apparel along with smaller brands and brands owned by the LFS itself (like Pothys, Saravana Stores and Textile India) Apparel manufacturers need to be conscious about the quality of service offered by the apparel retailers because they are the interface between the manufacturer and the customer. Thus evaluation of service quality of apparel retailers is vital to increase customer satisfaction and gain profits for both the retailers and the apparel manufacturers. High service quality can be considered as the foundation of a retailers strategy to achieve competitive differentiation through customer satisfaction [6]. Service quality directly impacts customer satisfaction in the retail business [7], [8]. Prior research studies have established that service quality is a good strategic choice for excellence in todays retail business [9], [10]. A customer who enjoys good service quality from a retailer is usually more satisfied in the retail transaction and the perception of service quality rubs on the perception of quality of the product sold too [11]. Service quality ensures consumer satisfaction [12].

Service quality and customer satisfaction lead to customer loyalty [13], [14] and these satisfied customers are most likely to remain loyal [15]. Consumer retention and patronage improve with better service quality [16]. Customer loyalty decreases defection rates and ultimately increases business profits [17], [18]. Service quality is thus considered as a tool for increasing consumers perceived value for the product and as an instrument for better positioning of the product in a competitive environment [19]. Indian consumers recently enjoy increasing disposable income and subsequently have higher living standards. They are also increasingly brand conscious, have exposure to recent fashion trends through media and internet [20]. Indian consumers have a wide choice of apparel retail formats to choose from, for making a purchase [21]. With larger choice of apparel retail formats and growing awareness, Indian consumers are increasingly demanding better service quality from these retailers [22]. Thus retailers can no longer afford to disregard customer service issues [23], [24]. Parasuraman et al. [25] developed the first service quality measurement tool (SERVQUAL). Further, the original SERVQUAL factors were reduced and revised to the present factors namely tangibles, reliability, responsiveness, assurance and empathy [26]. SERVQUAL refers to the customers general assessment of a firms service attributes by comparing their expectations and actual performance. The five dimensions of SERVQUAL that measure the customers opinion to form their judgment on perceived service quality of the organization are: (1) tangibles which is the physical evidence and representations of the service which is signified by the appearance of physical facilities available in the outlet, equipment in the outlet, personnel, and literature materials such as pamphlets etc.; (2) reliability is the ability of the outlet to perform the promised service consistently and accurately time and again. This is indicated by factors such as accuracy in billing, performing the service accurately at the designated time with dependability; (3) responsiveness is the willingness and readiness of the outlet employees to help customers and to provide timely service to the customers; (4) assurance is the employees capability to convey the feeling of trust and confidence to the customers through their knowledge and courtesy; (5) empathy is the employees ability to provide caring and individualized attention to customers [26]. Although researchers agree to the fact that SERVQUAL is a multi-dimensional

construct, no unanimity has been reached on its common validity and also its generic dimensions [27]. Further, no general consensus is agreed upon by the researchers on the nature or the content of these service quality dimensions [28]. Babakus and Boller [29] as well as Parasuraman et al. [30], have suggested additional modifications to the available SERVQUAL model. Because of the fluid nature of SERVQUAL, the instrument can be suitably modified to the changing needs of the research. Service quality in the apparel retail business is considered to be multifaceted and complex because it amalgamates selling of apparel and its associated service quality together to satisfy the customers needs [31]. Measure of Service Quality for Retail Stores using SERVQUAL is already done by many researchers. They have analysed the SERVQUAL outcome with various statistical tools such as confirmatory factor analysis [32], one-way independent sample t-test and ANOVA [33], factor analysis [34], econometric models [35] and multiple linear regression [36]. Research on service quality of apparel retailers is few in number. However, researches on service quality of apparel retailers [37] have not ranked the various formats of apparel retailers such as EBO, MBO, and LFS. Since customers could choose between EBO, MBO, and LFS based on the service quality offered by these outlets for making their apparel purchase decision, finding out which of these three formats of apparel retail store (alternatives) based on the SERVQUAL factors (criteria) offers the best services becomes imperative because apparel manufacturers could choose that apparel outlet format to present their products to the customers. Thus the objective of this empirical study is to rank the best apparel retail formats from the opinion of the customers based on the SERVQUAL factors. In literature, there are a plethora of ranking methods including Technique for Order Preference by Similarity to Ideal Solution (TOPSIS). The technique of TOPSIS is based upon the concept that the best alternative from the existing set is the one whose relative distance from the Ideal solution is the shortest and the same from the Negative ideal solution is the farthest. TOPSIS finds application in several comparisons of factors and factor ranking situations such as prioritizing critical success factors of TQM in pharmaceutical industry [38], evaluation of financial performance of technology firms in stock exchange market [39], evaluation and ranking of relative performance of the banks

across the service quality dimensions [40], evaluation of job satisfaction [41] etc. This research applies TOPSIS method to rank the apparel retail format such as EBOs, MBOs and LFS based on the service quality factors.

2 METHODOLOGY

Responses were gathered from 146 customers from 8 randomly selected EBOs, 143 customers of 8 randomly selected MBOs and 134 customers from 9 randomly selected LFS outlets from various districts of Tamilnadu state in India. SERVQUAL questionnaire was self-administered to customers within the retail outlets. The opinion of the respondents were indicated on a five point scale which ranges from strongly disagree to strongly agree. The SERVQUAL instrument has 5 categories such as tangibles, reliability, responsiveness, assurance and empathy. Table I shows the SERVQUAL dimensions and their corresponding definitions.

TABLE I SERVQUAL DIMENSIONS

S.No	Dimensions	Definitions
1.	Tangibles	The appearance of physical facilities available in the outlet, equipment in the outlet, personnel.
2.	Reliability	The ability of the outlet to perform the promised service consistently and accurately time and again.
3.	Responsiveness	The willingness and readiness of the outlet employees to help customers and to provide timely service to the customers.
4.	Assurance	The employees' capability to convey the feeling of trust and confidence to the customers through their knowledge and courtesy.
5.	Empathy	The employees' ability to provide caring and individualized attention to customers.

After the responses were sought from the consumers, TOPSIS method was applied to rank the various retail formats. Weights for the various service quality factors were assigned in order to apply TOPSIS. Then, based on the results obtained from TOPSIS, the different apparel retail formats were ranked for their best services offered. In order to understand the importance of each and every service quality attribute, the weights assigned to the individual attributes were

varied and the corresponding ranking of the apparel retail formats was obtained. The basic operating principle of TOPSIS technique for ranking the alternatives considered is that the selected solution should have the least distance from the ideal solution and the largest distance from the negative ideal solution [42]. The decision maker has to express the importance of the different criteria to determine the weights of the criteria. A Multi Criteria Decision Making problem is briefly expressed in matrix format as,

$$DM = \begin{matrix} & \begin{matrix} C_1 & C_2 & \dots & C_n \end{matrix} \\ \begin{matrix} A_1 \\ A_2 \\ \vdots \\ A_m \end{matrix} & \begin{bmatrix} x_{11} & x_{12} & \dots & x_{1n} \\ x_{21} & x_{22} & \dots & x_{2n} \\ \vdots & \vdots & \ddots & \vdots \\ x_{m1} & x_{m2} & \dots & x_{mn} \end{bmatrix} \end{matrix}$$

The weight matrix is given as,

$$W = [w_1 \ w_2 \ \dots \ w_n]$$

where,

$A_1, A_2, \dots, A_m$ are the three retail format alternatives out of which the customer has to choose one.

$C_1, C_2, \dots, C_n$ are the five SERVQUAL criteria with which alternatives are measured.

x_{ij} is the respondents' rating of alternative A_i with respect to criterion C_j .

w_j is the weight of criterion C_j .

Let J be the set of benefit attributes or criteria for which greater x_{ij} values are better.

Steps involved in TOPSIS method are presented below:

Step 1: Construction of normalized decision matrix:

This step alterstheslected criteria dimensions into non-dimensional criteria, which permits comparisons across criteria.

Scores are normalized as follows:

$$r_{ij} = \frac{x_{ij}}{\left(\sum_i x_{ij}^2\right)^{1/2}} \text{ for } i = 1, \dots, m; j = 1, \dots, n$$

Step 2: Construction of weighted normalized decision matrix:

A set of weights for each criterion, for $j = 1, \dots, n$ is assumed based on the importance of each criterion. Each column of the normalized decision matrix is multiplied by its associated weight. An element of the new matrix is:

$$v_{ij} = w_j r_{ij}$$

Step 3: Computation of ideal and negative ideal solutions:

Ideal solution is given by,

$$A^* = \{v_1^*, \dots, v_n^*\}$$

where

$$v_j^* = \max_i (v_{ij}) ; \text{ if } j \in J$$

For the problem taken in this research, =maximum value of the empathy factor, maximum value of the tangibles factor, maximum value of the reliability factor, maximum value of the responsiveness factor, maximum value of the assurance factor. The Negative ideal solution is given by,

$$A' = \{v_1', \dots, v_n'\}$$

where,

$$v_j' = \min_i (v_{ij}) ; \text{ if } j \in J$$

Here, = minimum value of the empathy factor, minimum value of the tangibles factor, minimum value of the reliability factor, minimum value of the responsiveness factor, minimum value of the assurance factor.

Step 4: Calculation of the separation measures for each alternative:

The separation from the ideal alternative is,

$$SI_i^* = \left[\sum_j (v_j^* - v_{ij})^2 \right]^{\frac{1}{2}} \text{ for } i = 1, \dots, m$$

Likewise, the separation from the negative ideal alternative is,

$$SI_i' = \left[\sum_j (v_j' - v_{ij})^2 \right]^{\frac{1}{2}} \text{ for } i = 1, \dots, m$$

Step 5: Calculation of the comparative nearness to the ideal solution :

$$C_i^* = \frac{SI_i'}{(SI_i^* + SI_i')} \quad 0 < C_i^* < 1$$

The choice with closest to 1 is selected.

3 ANALYSIS AND RESULTS

A mean value for each format of apparel outlet on the service quality attributes was first computed from the responses collected. Then, TOPSIS was applied to the set of average factor scores of all the three apparel retail outlets across the five factors shown in Table I. The respondents mean rating of alternative Ai with respect to criterion Cj is given as,

$$x = \begin{matrix} \text{Empathy} & \text{Tangibles} & \text{Reliability} & \text{Responsive} & \text{Assurance} \\ \begin{matrix} EBO \\ LFS \\ MBO \end{matrix} & \begin{bmatrix} 3.8698 & 3.4409 & 3.8082 & 3.8310 & 3.8264 \\ 3.8190 & 3.5718 & 3.8258 & 3.8258 & 3.8980 \\ 3.7534 & 3.5638 & 3.7925 & 3.7692 & 3.8344 \end{bmatrix} \end{matrix}$$

Using step 1 of TOPSIS, the normalized decision matrix is obtained as:

$$r = \begin{bmatrix} 0.5857 & 0.5634 & 0.5772 & 0.5807 & 0.5734 \\ 0.5780 & 0.5848 & 0.5799 & 0.5799 & 0.5841 \\ 0.5681 & 0.5835 & 0.5749 & 0.5713 & 0.5746 \end{bmatrix}$$

As the next step in TOPSIS, weights are assigned to each service quality attribute. Different weights are assigned to the attributes to signify varied importance given to those attributes and to determine a best alternative from many. Initially, equal weightage was given for all the service quality factors as specified in Table II.

TABLE II
INITIAL WEIGHTS ASSIGNED FOR THE VARIOUS
SERVICE QUALITY FACTORS

Service Quality Factor	Weight
Empathy	0.2
Tangibles	0.2
Reliability	0.2
Responsiveness	0.2
Assurance	0.2

The weighted normalized decision matrix considering the above weights is obtained as,

$$v = \begin{matrix} \text{Empathy} & \text{Tangibles} & \text{Reliability} & \text{Responsive} & \text{Assurance} \\ \begin{matrix} EBO \\ LFS \\ MBO \end{matrix} & \begin{bmatrix} 0.1171 & 0.1127 & 0.1154 & 0.1161 & 0.1147 \\ 0.1156 & 0.1170 & 0.1160 & 0.1160 & 0.1168 \\ 0.1136 & 0.1167 & 0.1150 & 0.1143 & 0.1149 \end{bmatrix} \end{matrix}$$

From step 3, The ideal solution is found as,

$$A^* = [0.1171 \quad 0.1170 \quad 0.1160 \quad 0.1161 \quad 0.1168]$$

the negative ideal solution

$$A' = [0.1136 \quad 0.1127 \quad 0.1150 \quad 0.1143 \quad 0.1147]$$

Consequent to step 4, the separation from the ideal alternative is

$$SI_i^* = [0.0048 \quad 0.0015 \quad 0.0045]$$

and the separation from the negative ideal alternative is

$$SI_i' = [0.0040 \quad 0.0056 \quad 0.0040]$$

Finally as step 5, the comparative nearness to the ideal solution is

$$C_i^* = [0.4545 \quad 0.7822 \quad 0.4702]$$

An ordering of different formats of retailing outlets is done, where the retailing outlet which is closest to the ideal solution is ranked first. The rankings obtained by the three apparel retail outlet formats after applying TOPSIS technique are shown in Table III.

TABLE III
RANKING OF APPAREL RETAIL OUTLET FORMATS FOR
INITIAL WEIGHTS

Apparel Retail outlet format	Comparative nearness to the ideal solution	Rank
EBO	0.4545	3
LFS	0.7822	1
MBO	0.4702	2

It is evident from the results that the LFS is closest to the ideal solution, followed by the MBO and finally the EBO for the equal weight assigned to the five service quality factors. To understand the influence of the various service quality factors on the preference of a particular format of apparel retail outlet by the customers, the weights were varied and for a set of 20 different weight combinations, the ranks of the retail outlet formats were found. It is interesting to note that, for all the combinations of weights considered, the LFS got the first rank. The set of different weight combinations used in TOPSIS are presented in Table IV.

TABLE IV
VARIOUS WEIGHT COMBINATIONS USED AND
CORRESPONDING RANKING OF APPAREL STORES

SERQUAL Factors					Ranking
Empathy (w ₁)	Tangibles (w ₂)	Reliability (w ₃)	Responsiveness (w ₄)	Assurance (w ₅)	
0.2	0.2	0.2	0.2	0.2	LFS MBO EBO
0.1	0.3	0.2	0.2	0.2	
0.1	0.2	0.3	0.2	0.2	
0.1	0.2	0.2	0.3	0.2	
0.1	0.2	0.2	0.2	0.3	
0.2	0.3	0.1	0.2	0.2	
0.2	0.2	0.1	0.2	0.3	
0.2	0.3	0.2	0.1	0.2	
0.2	0.2	0.3	0.1	0.2	
0.2	0.2	0.2	0.1	0.3	
0.2	0.3	0.2	0.2	0.1	
0.2	0.2	0.3	0.2	0.1	
0.3	0.1	0.2	0.2	0.2	LFS EBO MBO
0.2	0.1	0.3	0.2	0.2	
0.2	0.1	0.2	0.3	0.2	
0.2	0.1	0.2	0.2	0.3	
0.3	0.2	0.1	0.2	0.2	
0.2	0.2	0.1	0.3	0.2	
0.3	0.2	0.2	0.2	0.1	
0.2	0.2	0.2	0.3	0.1	

For the second set of weights namely $w_1 = 0.1$; $w_2 = 0.3$; $w_3 = 0.2$; $w_4 = 0.2$; $w_5 = 0.2$, the computations are shown below. Weighted

normalized decision matrix

$$v = \begin{matrix} & \begin{matrix} \text{Empathy} & \text{Tangibles} & \text{Reliability} & \text{Responsive} & \text{Assurance} \end{matrix} \\ \begin{matrix} EBO \\ LFS \\ MBO \end{matrix} & \begin{bmatrix} 0.0586 & 0.1690 & 0.1154 & 0.1161 & 0.1147 \\ 0.0578 & 0.1755 & 0.1160 & 0.1160 & 0.1168 \\ 0.0568 & 0.1751 & 0.1150 & 0.1143 & 0.1149 \end{bmatrix} \end{matrix}$$

Ideal solution

$$A^* = [0.0586 \quad 0.1755 \quad 0.1160 \quad 0.1161 \quad 0.1168]$$

Negative ideal solution

$$A' = [0.0568 \quad 0.1690 \quad 0.1150 \quad 0.1143 \quad 0.1147]$$

The separation from the ideal alternative is,

$$SI_i^* = [0.0068 \quad 0.0071 \quad 0.0060]$$

The separation from the negative ideal alternative is,

$$SI_i' = [0.0026 \quad 0.0071 \quad 0.0060]$$

Comparative nearness to the ideal solution

$$C_i^* = [0.2778 \quad 0.9008 \quad 0.6413]$$

The set of alternatives can now be ranked according to the descending order of comparative nearness to the ideal solution C_i^* . For this combination of weights also, the same ranking was obtained as before. The above procedure was continued for the other combinations of weights too. The advantages of using TOPSIS for ranking the customer-perceived service quality of retail outlets are that, it is easily understandable and the calculation involved is simple. It allows objective weights for the various factors to be incorporated into the process.

4 FINDINGS

Observing the results compiled in Table IV, it can be seen that, if the factor empathy is given less weightage, then the ranking is LFS,

MBO and EBO. Moreover, if the factor tangibles is given less weightage, then the ranking of the apparel retail formats is LFS, EBO and MBO. If the factor reliability is given less weightage along with higher weightage for empathy or responsiveness, the ranking order of the apparel retail formats is LFS, EBO, and MBO. If Assurance is given less weightage along with higher weightage for empathy and responsiveness, then the ranking of the outlet formats is LFS, EBO and MBO. If the factor responsiveness is given less weightage along with higher weightage for reliability, then the ranking of the store formats is LFS, EBO and MBO. For all other combinations of weights, the ranking of the apparel retail store formats is LFS, MBO and EBO. The reason for the top ranking of LFS is that, these stores usually exhibit impressive tangibility factors such as stocking apparel in multiple floors of the shop, providing facilities for customers to rest, providing pastry shops, having elevator facility etc. Also, these shops employ a large number of workforce which attend to the needs of the customers immediately. LFS also display multiple brands of apparel along with smaller brands thus offering a wide variety of choice for the customers to choose from. LFS attracts a wide variety of customers belonging to different social classes ranging from low income customers to high income customers since LFS provides apparel with a wide price range for all these customers. Similarly, MBOs have multiple brands offered by big labels. This type of outlet is ranked next in popularity because these outlets too offer a wide variety of products to a large number of customers. But these stores are not as big as the LFS, and usually operate from single or double floors of a building. Since EBOs stock only one brand of apparel and are usually company owned, the labels are usually costly and hence it is not very popular with a large number of customers.

5 Conclusion

This paper focuses on the factors which influence the service quality of the three apparel retail outlet formats namely, LFS, MBO and EBO. In this research, TOPSIS has been used to rank the apparel retail outlets by considering the respondents opinion on various service quality factors. TOPSIS provides useful information and

is an effective framework for ranking different formats of apparel retail outlets in terms of their overall performance with respect to multiple service quality factors. The findings of the research show that among the three different apparel retail outlet formats, LFS is found to be the best for any combination of weights given for the various service quality factors in TOPSIS. The ranking of the outlet format is LFS, MBO, EBO for most of the weight combinations. When less weightage is given for tangibles, the ranking is LFS, EBO, MBO. In future, fuzzy TOPSIS can be used to include linguistic terms for decision making.

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Dr. Praveen Paul J. is an Associate Professor in Management Studies with MEPCO Schlenk Engineering College, Sivakasi, India. He has a teaching and research experience of twenty years. In the course of his career, he has authored two books and published many research articles in journals of repute. His research interests are Work life balance, Job Satisfaction and Services Marketing.



Dr. Jaya Christa S. T. is an Associate Professor in Electrical and Electronics Engineering with MEPCO Schlenk Engineering College, Sivakasi, India. She graduated in the field of Electrical and Electronics Engineering from Government College of Engineering, Tirunelveli in 1996. She completed her Post graduation in the field of Power System Engineering from Thiagarajar College of Engineering, Madurai in 1997. She completed her Ph.D. in 2012. She has a teaching and research experience of twenty years. She has published many research papers in international journals and has also authored two books, one on Electrical Engineering and Control Systems, and another on Power System Analysis. Her research areas include application of optimization techniques to power system problems and Multi-Criteria Decision Making.

