Evaluating E-Commerce Portals from the Perspective of the End User – A Group Decision Support Approach

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Abstract. The stories of Kirana shops are now becoming folklore as Digital Retail has reared its head in the Indian sub-continent. To capitalize on this growth there has been a deluge of e-retail portals. However, the demographic scenario and the needs of Indian population are changing rapidly. The current study is an attempt to understand the dynamics of the major factors that consumers look into any of these e-tailers and identify the major dimension that helps in binding the consumers with these portals. For meeting this objective, the top 5 e-retail portals have been selected, based on multiple parameters for evaluating the traffic and importance of a website. These sites are Flipkart, Ebay, SnapDeal, Jabong and Myntra. Subsequently, these websites have been evaluated using the dimensions extended from SERVQUAL. A systematic approach has been taken in evaluating these portals using the theories of Analytic Hierarchy Process for group decision making.

1 Introduction

At the turn of the 21st century, when retailing started shifting from its traditional brick-and-mortar image to the digital image, people were initially sceptical about its acceptance and its growth. However, from being the '*next big thing*' to being an '*everyday reality*', e-tailing has surely come a long way. For the consumers, it is as if they are having a shopping exercise through the "digital mall". A wide variety of products, wider reach, purchase action any place any time and low cost are some of the factors that have contributed to the speed with which e-retail has

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grown in scope and acceptance. India is currently in the transition phase of a Digital revolution. India, with 120 million users connected to the net, ranks third in the world with reference to the number of internet users and this number is expected to grow to 330-370 million by 2015. Economically, revenue from Internet sales contributes to about 1.6% of the Gross Domestic Product (GDP) and this is projected to rise to about 2.8-3.3% of GDP by 2015. If the internet reach is widened with timely and rapid deployment of quality infrastructure India can target the digital inclusion of nearly 40% of its population. This aggressive strategy, built upon many factors like, low-cost internet usage, improved internet literacy and favourable regulatory environment, can enable India to reach out to nearly 500 million of its population.

In this context, there is a growing need to understand the dynamics of the consumers and their needs. With online market space in the country burgeoning in terms of offerings ranging from travel, movies, hotel reservations and books to the likes of matrimonial services, electronic gadgets, fashion accessories and even groceries, consumers are being drowned in a pool of portals. What do the consumers need and what they perceive as being of qualitative value to them are some questions that the e-portals need to ask themselves and answer in the form of service implementation. A non-existent switching cost to the consumer and the low-cost competitiveness amongst e-portals presumably are the main business growth catalysts. Attracting new customers, retaining them and enhancing their interaction experience with the e-portal are some of the key processes e-tailers are focussing on. The quality of service provided by the e-tailers to the consumers will help in building up the loyal customer base of any e-portal. This creates a need for the e-tailers to identify the key service attributes that consumers look for in their e-portal usage. Leveraging upon these attributes positively could build up a relationship between the e-tailer and the customer which will sustain for a longer period and in turn result in revenue benefits for the e-tailer.

2 Literature Review

2.1 Analytic Hierarchy Process

Analytic Hierarchy Process (AHP) is a multi-criteria decision-making approach developed and introduced by Saaty [35, 37]. The process has appropriate measures which will help in prioritising amongst the evaluating parameters as represented in a study [2, 9]. The pair-wise comparison methodology provides a more meaningful analysis for developing a competitive set of service attributes that will satisfy customers and assist the e-tailers in outperforming its competitors. AHP uses a fundamental scale of absolute numbers that has been proven in practice and validated by physical and decision problem experiments. The fundamental scale has been shown to be a scale that captures individual preferences with respect to quantitative and qualitative attributes just as well or better than other scales as the study suggests [35, 37]. It converts individual preferences into ratio scale weights

that can be combined into a linear additive weight for each alternative. Several papers have highlighted the AHP success stories in very different fields for decision making involving a complex problem with multiple conflicting and subjective criteria as well as multiple hierarchies of decision making processes [16, 19, 23, 28, 40]. A fuzzy extension of the AHP has been used in this study to accommodate the subjectivity of the individual respondent which making the tradeoffs between the relative prioritization of the evaluation criteria and performance scores against the evaluation criteria [47].

2.2 SERVQUAL

SERVQUAL parameters have long been a scale for measuring the quality provisions of service or retail organizations. Based on this premise, we have tried to gauge the perception of people towards the above selected e-tailers against the five SERVQUAL parameters, Tangibles, Reliability, Responsiveness, Assurance and Empathy. Many research papers [29, 30, 31, 32] have suggested adapting the SERVQUAL instrument to measure service quality in relation to competition. SERVQUAL is a well-established "gap-assessment" methodology that can be used to develop service-improvement initiatives by examining the "gap" between expectations and perceptions. The adapted SERVQUAL instrument uses a non-comparative evaluation model – that is, customers visiting the e-tailer are asked to evaluate the firm against a particular parameter based on what they perceive is the value provided by the firm for the specific parameter. This perception gives an indication as to the customers' perception alongside their expectations of the service. The SERVQUAL scores thus calculated provide the foundation for highlighting the gaps which the consumers presume about any firm. Individual SERVQUAL parameters have been ranked using the AHP methodology combined with the pair-wise comparison approach.

Many researchers unanimously agree on the fact that though there are different aspects to service quality, emphasis should be on the customers' perception of the service [46, 29, 30, 31, 32, 46].Organizations can measure business excellence through quality control in services. Service quality is considered as the difference between customer expectations of service and perceived service. If expectations are greater than performance, then perceived quality is less than satisfactory and hence customer dissatisfaction occurs [22]. There is general agreement that the aforementioned constructs are important aspects of service quality, but many scholars have been sceptical about whether these dimensions are applicable when evaluating service quality in other service industries [3]. This has more explanatory power than measures that are based on the gap between expectation and performance. In addition, it has been argued that SERVQUAL focuses more on the service delivery process than on other attributes of service, such as service-encounter outcomes (i.e. technical dimensions). While there have been efforts to study service quality, there has been no general agreement on the measurement of the concept. The majority of the work to date has attempted to use the

SERVQUAL methodology in an effort to measure service quality [8, 24, 38]. In the past few decades, service quality has become a major area of attention for practitioners, managers and researchers owing to its strong impact on business performance, low costs, customer satisfaction, customer loyalty and profitability [3, 13, 15, 20, 21, 40, 41]. There has been a continued research on the definition, modelling, measurement, data collection, procedure, data analysis etc., issues of service quality, leading to development of sound base for the researcher.

2.3 E-tailers

With the advent of internet in the 1990's and its adoption in retailing, the whole canvas of shopping changed. Internet's unmatched potential for global connectivity, through its ability to 'open up new avenues for business' [33] attracted retailers to the digital world. E-tailing became the new beacon for shopaholics and brick-and-mortar was replaced by click-and-brick. Retailers who viewed e-commerce as a new front on which to compete and gain advantage over their rivals managed to get that first mover advantage [1]. The initial review of internet literature influenced considerably the scheme of things to follow. Internet's ability to provide information, facilitate two-way communication with customers, collect market research data, promote goods and services online and ultimately to support the on-line ordering of merchandise provided an extremely rich and flexible new retail. Relevant exogenous factors which moderate consumer adoption of new self-service technologies and internet shopping systems [4, 27] are "consumer traits" [4, 5], "situational factors" [43], "product characteristics" [12], "previous online shopping experiences", and "trust in online shopping" [44]. Indeed, e-shopping is now estimated to be the fastest growing arena for Internet usage and thus greater exploration is required on the major dimensions that users look forward to, in evaluating the service provided by the e-tailers.

3 Focus of the Paper

There have been heaps of studies to understand the implementation of AHP for e-tailer selection. However, speaking from the Indian perspective, there has been virtually no study to focus on implementation of AHP for e-tailer selection. Academically there was a need to address this gap. The current study is an attempt to exhibit the application of theories for consensual group decision making using the AHP along with the SERVQUAL parameters for e-tailer selection.

Firstly, the study aims at exhibiting the AHP theory for prioritization and aggregation of the e-portal preferences of a group of decision makers based on the SERVQUAL parameters. Secondly, vis-á-vis the weighted average of the individual responses for the SERVQUAL parameters, aggregated decision from the viewpoint of 101 respondents was achieved on the preferred e-portal amongst the consumers and on the major dimensions for evaluating service quality.

Thirdly, the study highlights the core competency of the leading e-tailers in terms of the service evaluation dimensions.

However it should be noted that the focus of this study is on providing group decision support for the e-tailer service evaluation problem by listening to the voice of the customer, and no attempt has been made to explore other e-portal selection issues, like the suitability of existing or new evaluation criteria for the context.

4 Computational Approach

To evaluate the service quality of e-tailers in India, a survey was conducted to rate them on five dimensions (reliability, assurance, tangibility, empathy and responsiveness); and analyze the importance of each dimension by comparing them with each other; then we evaluated each e-trailer on the five dimension by using Likert scale. After collecting the responses, the judgments and performances were mapped according to logical approach of AHP which been described subsequently.

1. Estimation of individual judgments

In this stage, the relative importance given to a pair of evaluation criteria is estimated. Let A= $(a_1 \ldots a_5)$ be the multi-dimensional consensus vector such that a_i is the aggregated priority of 'criteria i' estimated as described in the following section such that $\Sigma a_i = 1$. Let D= $(d_1 \ldots d_n)$ be the set of n decision makers having a relative importance of ψi such that $\psi = (\psi_1 \ldots \psi_n)$ is the weight vector of the decision makers and $\Sigma \psi_i = 1$.

Comparative fuzzy judgments M= $(a)_{n \times n}$ would be coded from linguistic comparisons as described in Figure 2. A triangular fuzzy function has been used for coding the judgments since there is equal probability of the response of the next level as is to the response of the previous level, when a comparative judgment is made by an expert decision maker. The entropy of an individual judgment has been optimized by maximizing the Shanon function for the middle element defined as $S(\mu) = {}_{\mu}\ln_{\mu} - {}_{(1-\mu)}\ln_{(1-\mu)}$ [47].

Table 1 Mapping linguistic judgments to fuzzy judgments

Linguistic judgment	Judgment values in fuzzy set ($\tilde{k}$)	
Equal importance	$\tilde{1}$	{(1,*0.25*), (1,*0.50*), (3,*0.25*)}
Moderate importance	$\tilde{3}$	{(1,*0.25*), (3,*0.50*), (5,*0.25*)}
Strong importance	$\tilde{5}$	{(3,*0.25*) (5,*0.50*) (7,*0.25*)}
Very strong importance	$\tilde{7}$	{(5,*0.25*), (7,*0.50*), (9,*0.25*)}
Extreme importance	$\tilde{9}$	{(7,0.25), (9,0.50), (9,0.25)}

After taking multiple responses from N decision makers, it would be coded as fuzzy rules to generate the judgment matrix which will be used for subsequent rounds of prioritization.

2. Collective preference of the group for delivering the decision vector can be estimated subsequently by the aggregation of individual priorities for consensus development such that the aggregate priorities (collective vector) is defined as

$$W_C = W_{C1}, W_{C2} \ldots\ldots\ldots W_{Cr} \quad (1)$$

$$W_{Ci} = (\pi_{n1} (W_{ki}))^{\psi} / \Sigma_r 1\ \pi_{n1}(Wki)^{\psi} \quad (2)$$

Here WC is collective priority vector derived by GMM and is weight vector or relative importance of decision maker.

3. Let 'e-tailer i' have a performance vector of E_i, a set of performance score against 5 dimension $E_i = (e_{i1} \ldots e_{i5})$. Here, e_{ij} is the score on a 5 point Likert scale of e-tailer i within a predetermined range for dimension j. The score against a particular criterion offering the highest utility would be coded as 5, and the score offering the lowest utility would be coded as 1. The intermediate scores can be computed from a linear transformation function as demonstrated:

$$S_{i,j} = \frac{e_{i,j} - e_{j(max)}}{e_{j(max)} - e_{j(min)}} \quad (3)$$

Here, e_{ij} is the absolute score of e-tailer i for criteria j, while $e_{j(max)}$ and $e_{j(min)}$ are the maximum and minimum absolute score on criteria j for all the e-tailers. The final performance score for 'e-tailer i' will be computed by the sum-product approach.

$$S_i \bullet X = (S_{i1}, \ldots S_{i7}) \bullet (x_1, \ldots, x_7) = |S_{i1} \times x_1 + \ldots S_{i7} \times x_7| \quad (4)$$

Based on this sum-product score, the e-tailers may be ranked such that a higher score would indicate a more suitable e-tailer and a lower score would indicate a less suitable e-tailer based on the priorities of a specific respondent.

5 Research Methodology

Five e-retail web-sites, namely Flipkart, Ebay, SnapDeal, Jabong and Myntra, were selected for this study. These websites were selected based on the Yahoo India Finance ranking as well as based on their Google page ranks and Alexa Traffic Rank. An extended questionnaire was implemented online to all for capturing their responses. The questionnaire was not limited to or restricted for only the GenY. Gen Y represents the demographic group of people who were born

in the 1980's and early 90's. Responses were encouraged and captured from all willing to take part in the research survey. The questionnaire, means for secondary research, was designed such that participants were made to compare these portals based on the SERVQUAL parameters. The questionnaire captured what parameters were important for the user and how the users rated the five selected e-tailers on SERVQUAL parameters.

Since the questionnaire had 19 questions, a sample size exceeding 95 respondents was sufficient to generalize the outcome of the study. A purposive sampling technique was used for identifying the participants of this study. A total of 101 highly consistent responses (from 84 males and 17 females) were collected with 15.84% of responses from age group between 20-25, 81.19% from age group between 26-30 and rest from age >30. The responses were collected from people having diverse educational level such as doctorate, post graduates, graduates, higher secondary and secondary.

6 Analysis and Findings

Step 1: The responses were collected for comparing every dimension with one another and a reciprocal matrix was formulated to evaluate the final weight for each dimension which is shown in table below.

Table 2 Aggregate priority for the individual SERVQUAL parameters

Criteria	Reliability	Assurance	Tangibility	Empathy	Responsiveness
Priority	0.2068	0.1977	0.206	0.1824	0.2072

Step 2: Responses were collected by using five point Likert scale for the top five e-tailer on the service quality dimensions (Reliability, assurance, tangibility empathy and responsiveness) and geometric mean is taken for all the dimensions which is shown in the table below for different e-tailers:

Table 3 Geometric mean of the responses of participants for the individual parameters

	Reliability	Assurance	Tangibility	Empathy	Responsiveness
Flipkart	3.3708	3.6523	3.4312	3.4025	3.5985
Ebay	3.5717	3.4819	3.4755	3.1766	3.7026
Jabong	3.1523	3.2848	3.3268	3.0060	3.5605
Myntra	3.4705	3.1880	3.4264	3.3849	3.4079
Snapdeal	3.1873	3.2049	3.5335	3.3768	3.4088

Step 3: The final weight (step 1) of each dimension is then multiplied with mean of respective dimension (step 2) for all the e-tailers. Results are shown in the below table.

Table 4 Product of priority weights with geometric mean of responses

	Reliability	Assurance	Tangibles	Empathy	Responsiveness
Flipkart	0.6971	0.7221	0.7068	0.6204	0.7455
Ebay	0.7386	0.6884	0.7159	0.5793	0.7671
Jabong	0.6519	0.6494	0.6853	0.5482	0.7376
Myntra	0.7177	0.6303	0.7058	0.6172	0.7060
Snapdeal	0.6591	0.6336	0.7279	0.6158	0.7062

The results shows that consumer prefer flipkart, Ebay and Jabong because of responsiveness whereas Myntra for Relibility and Snapdeal for tangibility.

Step 4: For evaluating the best e-tailer on the five service dimension, Sum-product method is applied on the geometric mean of dimensions and final weights and thus we obtain the rating for the individual e-tailers. Flipkart scored the highest among all these e-tailers.

Table 5 Final scores for ranking the e-tailers

E-tailer	Flipkart	Ebay	Jabong	Myntra	Snapdeal
Overall Rate	3.4919	3.4892	3.2723	3.3770	3.3425

7 Conclusion

The study revealed that users viewed Flipkart, overall, as the preferred e-tailer closely followed by eBay. It was found that users felt that the employees of Flipkart, Ebay and Jabong showed more willingness in giving timely service and resolving their queries and were thus rated high in responsiveness dimension. Flipkart was rated highest on assurance which meant Flipkart and its employees were able to convey trust and confidence in their communication. Flipkart was also rated highest on empathy showing that they were more caring towards the customers' needs.

Myntra and eBay were rated highest on reliability dimension implying that they delivered what was promised on more occasions than others. Snapdeal was rated highest on the tangibility dimension and were thus most physically visible when compared to other e-tailers. The research showed that consumers weighted reliability, tangibility and responsiveness as more important dimensions than assurance and empathy when measuring service quality. Flipkart was rated the highest as it scored well on these three dimensions. E-tailers that want to gain customer loyalty would have to strive hard and respond quickly to the ever changing dynamics of the e-tailing industry.

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