Analyzing the Factors Essential for B2C Websites

Tanushree Chauhan[*]   **Pankaj Dalal**   **Sumangla Rathore**
M.Tech Scholar   *Associate Professor*   *Assistant Professor*
India   *India*   *India*

Abstract- The growth of B2C e-commerce is totally based on the satisfaction which user get during accessing the websites therefore many websites fail to reach their objectives because they neglect consumer's perspective. In this competitive world everyone wants to reach the top therefore; companies must identify their consumer's behavioral characteristics to become the main explorer in sense of B2C e-commerce trading. This research paper deals with the investigation of B2C quality factor specially the current practice for the development of quality B2C e-commerce websites. Data, for the research work was gathered through questionnaire. Simple descriptive statistics such as mean, frequency and percentage were calculated and further factor analysis was done using SPSS software. Factors generated through the survey part will be analyzed to generate main factors which are essential for B2C websites

Index Terms- E-commerce, Factor Analysis, Descriptive Statistics, Statistical Analysis, Sampling

I.   INTRODUCTION

Now-a-days people mainly deal with online trading for which B2C e-commerce is preferred. In B2C e-commerce, consumers purchase a product or a service that is advertised on a website. They can use a variety of functions available such as comparison of goods in terms of price, quality; new trends available in the market and so on. It describes the activities of businesses in selling products or services. The catalogues hold details of products available at the site.

These catalogues make use of shopping cart software that allows user to place orders of numbers of items. It describes the activities of businesses in selling products or services. Transactions are carried out between the organization and consumer. It involves display of products and services to the customer, taking orders and delivery of services or products. *Amazon.com* is general merchandise that sells consumer products to retail consumers [1]. The B2C model of e-commerce deals with the customers directly over the internet.

For example, when someone buys a TV set from a retailer it is termed as B2C transaction. While in case of B2B transaction, the purchase of components like screens, plastics, etc; are bought from the manufacturer, and then sold to the retailer from the manufacturer.

There are many differences between B2C and traditional retailing.

- No face to face contact between the seller and the purchaser, all transactions take place online.
- The consumer cannot touch the product. The decisions are made on the base of pictorial view or multimedia of the product.
- The consumer can search for a variety of products at different sites.
- Security of financial transactions is also a big issue. This may prevent the customer from online transactions.

Different factors also affect the online shopping behavior of users. This research paper further describes the Descriptive statistical analyze followed by the Factor analysis using SPSS software. SPSS is a software package which is used for statistical analysis. In addition to statistical analysis, data management (case selection, file reshaping, creating derived data) and data documentation (a metadata dictionary is stored in the data file) are features of the base software.

II.   DESCRIPTIVE STATISTIC ANALYZE

Prior to the study a pilot survey of 550 online users was conducted to find out the reasons for online shopping the respondents were mainly students, self employed (Technical as well as non-technical) and academician. On the basis of information collected from the pilot study six probable reasons for online shopping were identified and included in the questionnaire as well as factors related to B2C website was also identified. Responses for these variables were generated with the help of a five point Likert type scale.

TABLE 1
DESCRIPTIVE TABLES OF REASONS

Reasons	Minimum	Maximum	Mean	Std. Deviation
Convenience	3.00	5.00	4.4200	0.5891
Time Saving	2.00	5.00	4.4300	0.6705
Inclination towards new thing	2.00	5.00	3.8700	0.7740

Price comparison	2.00	5.00	4.0700	0.7000
Easily Accessible	3.00	5.00	4.3800	0.6259
Information Availability	1.00	5.00	4.2600	0.7570

In table 1, descriptive statistic is presented based on the reasons why people prefer online shopping. As per the data collected, the main preference towards online shopping is calculated with the help of mean value and the reasons are convenience (4.42), time saving (4.43) and easily accessibility (4.38).

The questionnaire was also related to the different factors important for the successful B2C website. Some of the main factors were security, efficiency and trustworthiness. In table 2, descriptive statistic is presented based on the factors important for website development. As per the data collected, the main factors calculated on the basis of the descriptive statistic table according to mean value are trustworthiness (4.40), efficiency (4.39), content (4.38) and security (4.36).

TABLE 2: DESCRIPTIVE TABLE FOR FACTORS

Features	Minimum	Maximum	Mean	Std. Deviation
Content	3.00	5.00	4.3800	0.6159
Presentation	3.00	5.00	4.3300	0.6522
Navigation Ease	3.00	5.00	4.1700	0.7115
Searching Process	2.00	5.00	4.2900	0.6079
Security	3.00	5.00	4.3600	0.7180
Understandability	2.00	5.00	4.1700	0.6675
Response Time	3.00	5.00	4.2500	0.5573
Interactivity	2.00	5.00	4.1700	0.6522
Trustworthiness	3.00	5.00	4.4000	0.7385
Confidentiality	3.00	5.00	4.2900	0.7823
Efficiency	3.00	5.00	4.3900	0.7371

III. FACTOR ANALYSIS

It refers to the representation of a set of variables in form of hypothesis using different statistical technique [2]. In this study the objective of factor analysis was to reduce the eleven variables (factors for online shopping through B2C website) into three or four better identifiable groups of variables. The first step in the procedure is to check suitability of factor for factor analysis. For this purpose KMO and Bartlett's test, inbuilt in the SPSS package was performed. The KMO measure of sampling adequacy is an index used to examine the appropriateness of data for factor analysis. High values of KMO test (between .5 and 1.0) indicate that sample size is adequate for such analysis. The Bartlett's test of 'Sphericity' is used to examine the hypothesis that the variables are uncorrelated in the population. In other words, each variable correlates with itself, but has no correlation with other variables [3].

TABLE 3: KMO AND BARLETT'S TEST TABLE

Kaiser-Meyer-Olkin Measure of Sampling Adequacy		0.830
Bartlett's Test of Sphericity	Approx. Chi-Square	902.945
	Df	55
	Sig.	0.000

The KMO value in this analysis is 0.830 indicating that sample size is adequate for factor analysis. For Bartlett's test the significance value is 0.00 suggesting the rejection of the hypothesis. It means the variables are correlated hence the factor analysis is an appropriate test in this situation.

Factor analysis can be performed by using two different approaches: principal component analysis and common factor analysis. In principal component analysis, the total variance in the data is considered. The method is used when the primary concern is to determine the minimum number of factors that will account for maximum variance in the data. Common factor analysis, the factors are estimated based only on the common variance. The principal component analysis method finds out factors or components produced from a linear combination or weighted components of the variables in the data set [3].

Mathematically, it can be represented as:

$$PC_1 = W_{11}X_1 + W_{12}X_2 + W_{13}X_3 + \ldots\ldots + W_{1P}X_P$$

Where, PC_1 = Principal Component

W_{11}, W_{12}, W_{13} = weights of the respective variables.

In common factor analysis, the factors are estimated based only on the common variance. Looking to the objectives of the study the principal component method was considered more suitable. The amount of variance a variable shares with all the other variables being considered is explained by communality. This is also the proportion of variance explained by the common factors. The variables having low communality don't combine with other variables.

TABLE 4
COMMUNALITIES TABLE

Features	Initial
Content	1.00
Presentation	1.00
Navigation Ease	1.00
Searching Process	1.00
Security	1.00
Understandability	1.00
Response Time	1.00
Interactivity	1.00
Trustworthiness	1.00
Confidentiality	1.00
Efficiency	1.00

A number of factors can also be decided with the help of Scree plot obtained from SPSS output. A Scree plot is the plot of the Eigenvalues against the number of factors in order of extraction. The shape of the plot is used to determine the number of factors. Typically, the plot has a distinct break between the slop of factors, with large Eigen values and a gradual trailing off associated with the rest of factors [3].
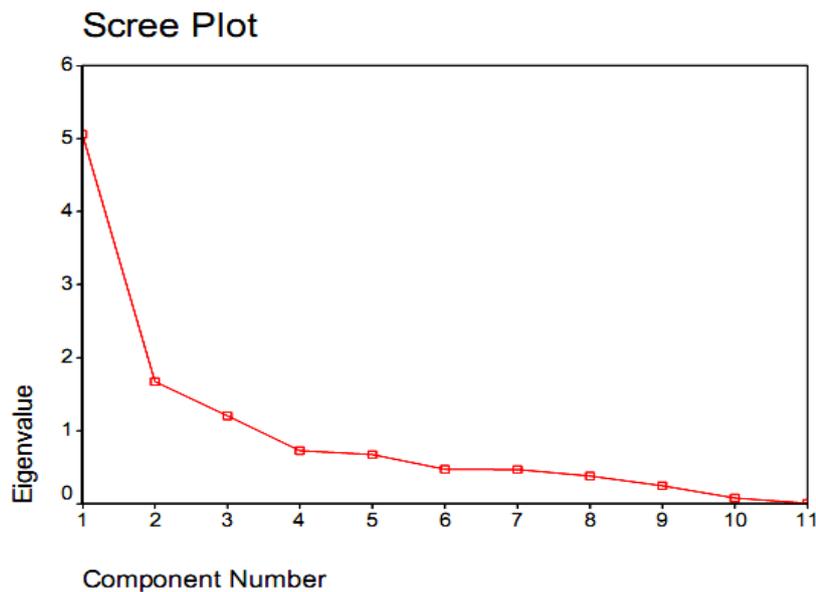

Fig. 1: Scree Plot Graph

In the plot above, gradual trailing is noticed after three components, therefore a three factor solution was considered. The total variance explained by the four factors is presented in the table 5. The three factors extracted from the data using the principal component analysis approach explained 72 percent variance in the given data set regarding reasons for online buying through internet.

A) Rotated factors:
A factor matrix contains the coefficients used to standardize variables in terms of factors. These coefficients known as factor loadings represent the correlations between the factors and variables. A coefficient with a large absolute value indicates that the factor and the variable are closely related. The coefficients of the factor matrix are used to interpret the factors [2].
Rotation redistributes the variance explained by the individual factors; hence it may result in identification of different factors. The most commonly used method of rotation is the varimax rotation. This is an orthogonal method that minimizes the number of variables with high loadings on a single variable, thereby enhancing the interpretability of the factor [3].

TABLE 5
TOTAL VARIANCE EXPLAINED TABLE

Component	Initial Eignvalues			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	5.059	45.987	45.987	3.531	32.099	32.099
2	1.674	15.222	61.209	2.466	22.419	54.518
3	1.204	10.945	72.155	1.940	17.636	72.155
4	0.728	6.617	78.771			
5	0.674	6.130	84.901			
6	0.474	4.311	89.212			
7	0.471	4.278	93.491			
8	0.381	3.462	96.953			
9	0.247	2.248	99.201			
10	7.945E-02	0.722	99.923			
11	8.478E-03	7.707E-02	100.00			

TABLE 6
ROTATION COMPONENT MATRIX TABLE

Features	Component		
	1	2	3
Content			0.4670
Presentation		0.4950	
Navigation Ease			0.7780
Searching Process			0.8550
Security	0.8800		
Understandability		0.7540	
Response Time		0.8300	
Interactivity		0.7720	
Trustworthiness	0.9360		
Confidentiality	0.8580		
Efficiency	0.9420		

It can easily be noticed from the table above that the first factor is loaded heavily on the variables like: Trustworthiness (0.936), Efficiency (0.942), Confidentiality (0.858) and Security (0.880), these four variables can be summarized into a single benefit, "**Website Security and Trustworthiness**". This factor explains 32 percent variance in the shopping behavior of the customer. The second factor is loaded on variables like: Response time (0.830), Interactivity (0.772), Understandability (0.754) and Presentation (0.495), these variables can aptly be clubbed together as "**Usability**". The third factor is loaded on variables like: Searching process (0.855), Navigation ease (0.778) and Content (0.467), these three variables may again be summed as "**Ease of navigation**".

IV.   CONCLUSION
In the research paper, factor analysis procedure was implemented, with the help of which factors were analyzed which are essential for any B2C website development. The factor analysis procedure summarized the features of website into three main components. These are: website security and trustworthiness, usability and ease of navigation. These quality factors are essential in each phase of SDLC thus the factors calculated will help the programmer to emphasis more on these factors will developing any websites.

FUTURE RESEARCH WORK
Further research factors can be used to evaluate any B2C e-commerce website and the model can be established as a generalized model and the quality factors as the critical quality factors. Secondly, the proposed model can be used as a checklist for inspections in the early stages of the B2C website development to reduce the maintenance cost and time. The factor analysis model can be tested for individual B2C website for in different areas like E banking, Retail, supply chain, E pharmacy, E tourism and travel, Transportation, Online services, Online health care, to establish it as

a general quality control model for the B2C e-commerce websites. The model can be tested by ranking and assigning weight to each of the factors to calculate the priorities of these factors.

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