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PRINCIPAL COMPONENT FACTOR ANALYSIS OF RATER SERVICE QUALITY DIMENSIONS FOR TRAVEL AGENTS IN PUNJAB: A CUSTOMER PERSPECTIVE

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ABSTRACT

This research study is the part of an assessment of service quality provided by travel agents in the state of Punjab. The main aim is to validate the RATER service quality dimensions measured with SERVQUAL scale related to travel agents across Punjab. Principal component analysis (PCA) was carried out for orthogonal transformation of variables by using IBM SPSS -20. The sample size of 1000 customers was surveyed from different travel agents in a single cross sectional survey wherein a SRQ (self administrated questionnaire) was used. In given research study, the researcher further divided twenty-one questions into the five elements suggested by SERVQUAL researchers Parasuraman. These five elements are tangible, reliability, responsiveness, assurance, and empathy.

Keywords: *SERVQUAL, RATER, Principal component analysis, travel agents.*

1. INTRODUCTION

In the past literature there are many service quality methods and techniques to measure service quality. SERVQUAL (Parasuraman, Zeithaml, & Berry, 1985) instrument was widely used and discussed by researchers for measuring service quality perceived by the customers. No study is found in past empirical research studies that conducted to assess the dimensionality of SERVQUAL scale by using Principal component analysis (PCA) in travel agents sector. To cover this gap, researcher attempted to measure the reliability and examine the dimensionality by using data from travel agents customers. Factor analysis (Eigen & All, 2011) technique used to find underlying subsets of variables from the set of observed variables. Main purpose of the factor analysis (Decoster & Hall, 1998) is to help in data interpretation and to reduce the number of variables. Researcher can find different set of factors and interpreted differently from same set of data (He et al., 2013). This research study was conducted to validate the RATER service quality dimensions related to SERVQUAL scale related to travel agents across Punjab

2. RIEVEIW OF LITERATURE

The purpose of principal component analysis (Decoster & Hall, 1998) is data reduction. Small numbers of components were derived from large number of measures with same variability. (He et al., 2013) investigated the relationship and represent the large number normally of variables to construct the factor analysis data set. (Pierce, 2003) conducted many longitudinal studies with the help of cognitive interference questionnaire examinations and produced significant interpretations while using PCA. (Beaumont, 2012) analysed that observed variables in PCA related to the latent variables and variability within each observed observation is disregarded. (Garrett-Mayer, 2006) not fully supported the use of this widely used and misused data reduction method. PCA confirmed hypothesis and reduce infinite number of variables into manageable set of variables. (Cornish, 2007) obtained loading for the k^{th} proportional of the principal component coefficient and contradict the results obtained from PCA. After that the series of statistical assumptions were tested to make data output ready for factor analysis model (Tucker & MacCallum, 1997).

3. NEED OF THE STUDY

The research study was a part of the study on assessment of service quality provided by travel agents in the state of Punjab to validate the RATER service quality dimensions measured by using SERVQUAL scale related to travel agents across Punjab. The travel agents begun focusing and discover better strategies for customers focusing on the specific needs and wants. So it was important to assess the dimensionality of SERVQUAL scale by using Principal component analysis (PCA) in travel agents sector to discover new measurement instruments.

4. RESEARCH OBJECTIVES

1. To determine the ability of a predefined factor model to fit an observed set of data
2. To test the significance of a specific factor loading.
3. To test the relationship between two or more factor loadings.

5. RESEARCH METHODOLOGY

The 21 item modified SERVQUAL (Parasuraman et al., 1985) was used to measure the RATER dimensions of service quality. Assumption conditions of linearity, normality and homoscedasticity were verified. Violation of these conditions can be minimized if there exist sufficient correlations among data (He et al., 2013).

6. DATA ANALYSIS AND INTERPRETATION

This part of the research presents the results for factor analysis in order to achieve research objective.

6.1. KMO and Bartlett's Test

Table number 1, presented the test of assumptions. The Kaiser-Meyer-Olkin Measure of Sampling Adequacy reading is 0.59, which is greater than 0.70 revealed that the number of items were sufficient for factor analysis (Garrett-Mayer, 2006). The statistical significant value is 0.00 < 0.05 revealed that correlation matrix was statistically different from identity matrix. The correlations between all variables are all equals to zero.

Table.1: KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.859
Bartlett's Test of Sphericity	Approx. Chi-Square	8461.434
	df	210
	Sig.	.000

6.2. Communalities Inspection

Table number 2, represents the relationship between variable and all the other variables, which is also called squared multiple correlation relation between the one item and all the other given items before the actual rotation was performed. By initial inspection, it was revealed that almost all the values of the communalities table are greater than 0.30 output table number 2 interpreted undistorted and statically statistically results (Bitner & Gremler, 2010).

Table.2: Communalities

SERVQUAL ITEMS	Initial	Extraction
Item 1	1.000	.769
Item 2	1.000	.608
Item 3	1.000	.573
Item 4	1.000	.576
Item 5	1.000	.706
Item 6	1.000	.683
Item 7	1.000	.591
Item 8	1.000	.496
Item 9	1.000	.788
Item 10	1.000	.799
Item 11	1.000	.744
Item 12	1.000	.606
Item 13	1.000	.737
Item 14	1.000	.726
Item 15	1.000	.724
Item 16	1.000	.600
Item 17	1.000	.407
Item 18	1.000	.714
Item 19	1.000	.722
Item 20	1.000	.722
Item 21	1.000	.522

Extraction Method: Principal Component Analysis.

6.3. Total Variance Explained

The table number 3 shows the output matrix of total variance explained matrix with Extraction Method: Principal Component Analysis. Variance was divided into 21 SERVQUAL scale factors. First five factors have eigenvalues or explained variance > 1. Factor number 1 with eigenvalue 6.374 explained variance equals to sum total of next four factors. Percentage of variation column represents co variation before and after the rotation. Nearly 57.995% of the variance is accounted by top 5 factors as shown in table number 3.

Table.3: Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	6.374	30.351	30.351	6.374	30.351	30.351	3.114	14.828	14.828
2	2.311	11.003	41.353	2.311	11.003	41.353	2.851	13.576	28.405
3	1.517	7.224	48.577	1.517	7.224	48.577	2.343	11.157	39.562
4	1.359	6.470	55.047	1.359	6.470	55.047	2.065	9.835	49.397
5	1.209	5.757	60.804	1.209	5.757	60.804	1.806	8.598	57.995
6	.942	4.962	65.766						
7	.868	4.136	69.902						
8	.759	3.614	73.516						
9	.725	3.451	76.967						
10	.623	2.968	79.935						
11	.567	2.701	82.637						
12	.519	2.472	85.109						
13	.491	2.336	87.445						
14	.438	2.088	89.533						
15	.391	1.864	91.397						
16	.349	1.660	93.057						
17	.346	1.647	94.703						
18	.322	1.534	96.237						
19	.305	1.451	97.688						
20	.257	1.226	98.914						
21	.228	1.086	100.000						

Extraction Method: Principal Component Analysis.

6.4. Rotated Component Matrix[a]

In table number 4, the items were grouped into 5 clusters represents the highest loading on respective item. The extraction method was Principal component analysis and rotation method was Varimax with Kaiser Normalization. All the 21 SWERVQUAL items questions (item 1 to item 21) are sorted into 5 overlapping groups namely Reliability (Items 1 to Items 4), Responsiveness (Items 5 to Items 8), Assurance (Items 9 to Items 12), Empathy (Items 13 to Items 17) and finally Tangibility (Items 18 to Items 21). None of the factor have loading less than 0.30 and every loading has some loading value for every factor as shown in the table. Each of 21 items related to RATER quality dimensions reflects a perception of competence mathematical relation and provide support for conceptualizing the results (Chaubey & Patil, 2015). Thus none of the sub item from RATER dimension needs to be eliminated. All items have some loading value for every factor.

Table.4: Rotated Component Matrix[a]

	Component				
	1	**2**	**3**	**4**	**5**
Item 1					.871
Item 2					.703
Item 3					.478
Item 4					.613
Item 5				.832	
Item 6				.787	
Item 7				.629	
Item 8				.671	
Item 9		.866			
Item 10		.857			
Item 11		.783			
Item 12		.626			
Item 13	.771				
Item 14	.815				
Item 15	.798				
Item 16	.610				
Item 17	.482				
Item 18			.792		
Item 19			.800		
Item 20			.749		
Item 21			.436		

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalization.

7. LIMITATIONS

Interpretation of the factor analysis depends upon the knowledge and interpretation of the researcher (Bordons, Fernández, & Gómez, 2002). Factor analysis is a very complex multistep process (Thurstone, 1931). Naming of overlapping clusters of items is not always possible (Decoster & Hall, 1998). It's very difficult to decide the number of factors to be included (Torres-Reyna, 2007). Factor analysis results are not absolute true (Gorsuch, 1997). Sometimes structures of factors are not corroborated with empirical research studies (Trninić, Jelaska, & Štalec, 2013).

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