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PLS Modeling in Order to Satisfaction Criteria Selection of Bus System (Case Study: Bus System of Zanjan

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ABSTRACT

The term "quality of service" refers to how well a company meets its customers' needs. Increasing the number of people who own cars requires careful evaluation and enhancement of the quality of bus service. Since customer happiness is directly tied to service quality, studying its components is crucial. According to previous research, the following six factors are prioritized by citizens: journey time, convenience, accessibility, pricing, comfort, information, and safety. Indicators of service quality in the Zanjan, Iran, bus system were modeled for this study. The most crucial elements of consumer satisfaction were thus determined by these metrics. Empirical study was conducted by surveying actual travelers, with the resulting data analyzed with Smart PLS. It's important to remember that in the end, a model was created to ascertain consumer satisfaction with the aforementioned characteristics (quality indicators), with the largest weights going to security, comfort, speed, and ease of use. In addition, 59% of users were pleased with this system.

Key words: Structural models, Satisfaction indicators, Urban bus system, PLS.

1. INTRODUCTION

Too many cars on the road leads to wasted time, higher energy use, more pollution, more noise, and so on (1) because of the road network's limited capacity. As a result, encouraging public transportation's efficiency and encouraging its increased proportion of passenger movement are two key strategies for mitigating these issues. In reality, a significant step toward better traffic conditions is the sustainable expansion of the public transportation system, which increases supply while decreasing demand. Improvements to the bus system, especially the emergence of rapid bus transit, are the primary, least expensive, and quickest alternatives to other forms of public transportation (2). Correcting the pattern of consumption in urban management is the primary motivation behind this system's design goals (3), which include increasing bus utility, enhancing passenger transportation efficiency, decreasing environmental pollutants and fuel consumption, and bettering the traffic situation. Indicators of macro policies should be factored into the planning, design, and execution of bus routes. Congestion, safety, air pollution, energy consumption, etc., are all improved by switching to high occupancy vehicles, which operate on the idea of more passengers traveling with fewer automobiles. (2). A customer's overall degree of satisfaction with public transportation may be calculated as a percentage of their expectations being satisfied. One way to learn more about what motivates customers to keep using a company's bus services is to inquire into their level of happiness with these services (4). Customers assess the pertinent service parameters based on suitable indications, criticisms, and suggestions, and then design and carry out activities to enhance the services supplied to them. customers. Enhanced customer satisfaction leads to higher system use, positive publicity, and positive brand perception (5) for transportation providers. To answer the questions of what satisfaction is and how it is created, it is sufficient to note that any customer may be generally dissatisfied or satisfied after receiving a service or purchasing and using a product. Satisfaction is a positive emotion that occurs in the individual after the use of the goods or the receipt of the service. When client expectations meet supplier delivery, the intended emotion results (6). Customers will be happy with a product or service as long as it meets or exceeds their expectations; if it falls short, they may develop dissatisfaction and look elsewhere for their needs. Customers' expectations aren't met, and they leave. Satisfaction, discontent, and preferences vary from person to person and are always correlated with the gap between high expectations and the supplier's actual performance in terms of product or service quality (7). Manufacturers may use potent engineers to create a product or service when they have a clear understanding of the customer's demands and needs. This phase entails defining and designing the features of the intended product or service across several dimensions of consumer demand and expectation. We have to wait for client discontent after getting and utilizing products or services (8) if the definition and design of this adaption do not go effectively. According to Töpfer, an organization's capacity to match the anticipated quality of the client is more important than the nature of the business it conducts or its standing in the market (9). According to Oliver, the disparity between a client's expectations and the quality he has got is what ultimately determines whether or not the consumer is satisfied. According to Oliver, the disparity between what a consumer expects and what he or she really receives is what determines whether or not they are satisfied with a product or

service after making a purchase. According to Oliver's definition (10), contentment refers to assessments of whether or not a product's features or the product itself have met the needs of the user in a satisfactory manner. When people talk about being satisfied with a service, they often mean how well it works or how well it looks (11). Customers typically know little to nothing about technical services. Therefore, functional quality is the primary determinant of how customers rate a service's overall quality (12). Quality of service is defined as the extent to which a service delivers on its promise to the consumer (13). The perception, expectations, satisfaction, and attitude of customers are used to evaluate a company's level of service quality (14). Ekinci said back in 2003 (15) that happy customers would result from evaluating service quality. Emotional reactions to services are a good barometer of satisfaction (16). In this study, we look at how the quality of Zanjan's bus services affects riders' happiness. Several studies have focused on particular aspects of service quality. Lehtinen (2008) and Gronroos (1884) looked at the service's interactivity, physicality, and structure, while Gronroos (1884) focused on its technical, functional, and historical features (11). Hedvall and Paltschik (1988) centered their research on the relationship between the motivation to serve and the availability of both psychological and medical care for those in need (18). Trustworthiness, accountability, competence, access, modesty and suitability, communication, credibility, security, customer awareness, and the ability to formulate the service quality framework (SERVQUAL) (19) are the ten main factors that can be understood by service providers and customers in the basic service quality models. In 1988, these 10 considerations were narrowed down to only five: dependability, assurance, tangibility, and responsibility (PATER). By analyzing customer feedback, businesses may pinpoint exactly what makes their clients happy and work to improve those areas (20). Different indices of service quality have been studied in other contexts. According to TCRP 100's second chapter, for instance, knowing how well the public transportation system functions from the riders' perspective is crucial to improving it. In addition, TCRP 88 presents five criteria suggested for gauging passenger-perceived performance: First, the system's accessibility, second, the services' monitoring, third, trip time, and fourth, the system's safety and security, And 5 - the mechanics of making and keeping itineraries (21). According to Agrawal (2008), the conduct of employees is the most significant and useful indicator of consumer satisfaction in the Indian rail system (22). According to a survey conducted by Hood in 1996 in New York City, riders' disdain for the bus system ranks high among the causes of their lack of civic engagement (23). Considering the factors that may affect the bus system's capacity, Graham and Ian came to the conclusion that installing air conditioning and installing CCTV cameras in the buses and terminals could lead to a 3–4% increase in ridership (24). Several factors, such as shelter and sofa availability at bus stops, cleanliness, overcrowding, information systems, safety, staff safety, employee support and advice, and conditions, are cited by Aboli and Mazzulla (2007) as indications of consumer satisfaction with the bus system. actual stops for the bus (5). Shelter, waiting room and its chairs, ports, stairs, escalators, information signs and displays, public address systems, and Passenger amenities (including shelter, bench, garbage cans, lighting, telephone booths, art, and eye-catching landscaping) (21) were identified as indicators for the provision of convenient bus terminals in the TCRP 100 report. Bus ridership satisfaction can be affected by many factors. For this purpose, we can mention the socio-economic status of the passengers and the conditions and facilities of the system. In a study conducted in Taiwan in 2010, the relationship between the behavioral goals of travelers and the various factors affecting it indicates that the greater use of passengers by public transport is influenced by the assessment of passengers and their satisfaction. Further use can act as a facilitator in the relationship between service evaluation and behavioral purposes (25). On the other hand, a research conducted in Calgary, Canada in 2010, shows that the time shift is most important among other variables that affect the level of satisfaction of the individual (26). In 2008, Felson and Freeman examined the perceived customer satisfaction in eight cities in Stockholm, Barcelona, Copenhagen, Genoa, Helsinki, Vienna, Berlin, Manchester and Oslo by comparing public transport services in European cities, and it was found that the bus and the design of the bus station makes it easy for the customer to enjoy the experience of travel and staffing skills and provides safety in the bus and bus stops (27).

2. METHODOLOGY

The purpose of this research is to determine the most significant and useful components of the bus system's customer satisfaction index. Previous research has shown that there is no unanimity on the idea that customer pleasure is a measure of service quality. Therefore, the primary purpose of this research is to isolate the variables that have the greatest impact on service quality and create a model that incorporates these variables. The Likert scale, one of the most common and trusted methodologies, is employed in this study to measure participants' opinions and actions. Multiple-choice responses (such as "I totally disagree" to "I totally agree") are used to evaluate actions and beliefs using a Likert scale. The Likert scale, in contrast to "yes/no" questions, can expose respondents' opinions, which is especially helpful for controversial or delicate subjects; also, researchers benefit from having a wider range of responses to better discover patterns (28). Seven main factors and eighteen secondary criteria are included in the questionnaire to gauge tourists' contentment with the service they received. Table 1. It should be noted that these factors and variables have been gathered from various sources and past studies.

Table 1. Independent variables affecting the satisfaction of passengers with service quality

Criteria	Sub Criteria	Criteria	Sub Criteria	Criteria	Sub Criteria
Travel Time (C1)	In Vehicle Time (CS1)	convenience (C2)	Light and brightness (CS7)	Relaxation (C5)	Self-paced passenger (CS13)
	Fleat Size (CS2)		The quality of the shadows (CS8)		Relaxation in terms of travel equipment (CS14)
	Access Time (CS3)	Price (C3)	Fare price (CS9)	Notifying (C6)	Bus destination notification (CS15)
	Timeline and reliability (CS4)		Access price (CS10)		bus arrival information (CS16)
convenience (C2)	Enough space to sit (CS5)	Access (C4)	Bus Ticket Price (SC11)	Safety (C7)	Chance of crash (CS17)
	Ventilation (CS6)		Competitor Mode Price (Taxi) (SC12)		Protect the lives of travelers in the crash (CS18)

3. CASE STUDY

The case area in this study is Zanjan Municipality BusSystem which currently has 160 bus vehicles in the private sector, 96 bus vehicles in the organizational sector and 246personnel. It has 24 inter-city and 9 inter-urban routes. In order to implement the plan, Zanjan Bus Station was commissioned (Sabz-e Meydan) (Figure 1).

Figure 1. Zanjan Bus Station (Sabz-e Meydan)

4. RESULT AND DISCUSSION

4.1. Reliability

Informational trustworthiness comes first. Whether or not the data collecting technology is functioning well, whether or not the data was properly obtained, and whether or not the findings are still valid are all questions that fall under the purview of reliability. (One possible reading of this statement is as to whether or not we should get the data again if we do so). In other words, sustainability refers to how confidently one can repeat an experiment using the same equipment. A reliability value of 0 denotes complete unreliability, whereas a reliability coefficient of one shows perfect accuracy. Tests and questionnaires, such as those used in screening and diagnosis, as well as those used in research, may all be evaluated based on their reliability. They're significant for two main reasons: First, reliability denotes that there is an unpredictable error in the measurement, and that this error is caused by factors related to the test, the test itself, the conditions under which it is administered, and the scoring procedure. So, more questions or a larger sample size should enhance confidence (29).

5.2. Validity

The second is validity, which addresses whether or not the data collecting tool (such as a questionnaire) is reliable and accurately assesses the variables of interest. Formal validity, where professionals evaluate validity, or statistical testing, are common methods for doing so (29).

5.3. Validity and reliability analysis

Questions having a factor load of larger than 0.7 are validated using this approach. To verify the questions, 50 questionnaires were sent out, and the software's analysis yielded the data shown in Table 2. items having a factor of less than 0.07 are automatically disqualified and highlighted in gray; these items are never included in the final survey.

Table 2. Questions and factor loadings of each of them

Factor	Question Number	Factor load	Factor	Question Number	Factor load	Factor	Question Number	Factor load
Travel Time	3	0.732	Convenient	27	0.636	Access	51	0.935
	4	0.865		28	0.887		52	0.630
	5	0.245		29	0.899		53	0.789
	6	0.964		30	0.610		54	0.177
	7	0.633		31	0.436		55	0.310
	8	0.724		32	.0.766	Relaxation	56	0.868
	9	0.904		33	0.635		57	0.753
	10	-0.266		34	0.981		58	0.797
	11	0.781		35	0.690		59	0.994
	12	0.854	Price	36	0.857		60	0.935
	13	0.974		37	0.933		61	0.726
	14	0.433		38	0.868	Notifying	62	0.778
	15	0.277		39	0.407		63	0.799
	16	0.877		40	0.771		64	0.798
	17	0.807		41	0.853		65	0.781
	18	0.381		42	0.666		66	0.868
Convenient	19	0.846		43	0.797		67	0.936
	20	0.924	Access	44	0.867		68	0.663
	21	0.877		45	0.717	Safety	69	0.864
	22	0.339		46	0.241		70	0.865
	23	0.753		47	0.637		71	0.869
	24	0.795		48	0.755		72	0.744
	25	0.836		49	0.398		73	0.765
	26	-0.223		50	0.799		74	0.950

continues until all factor loads larger than 0.7 are obtained.In Table 3, the final questions are visible.

Table 3. Final questions after several tests by software

Factor	Question Number	Factor load	Factor	Question Number	Factor load	Factor	Question Number	Factor load
Travel Time	3	0.767	Convenient	20	0.977	Convenient	37	0.757
	4	0.724		21	0.868		38	0.799
	5	0.833		22	0.859		39	0.768
	6	0.808	Price	23	0.757		40	0.792
	7	0.768		24	0.733	Notifying	41	0.808
	8	0.974		25	0.865		42	0.781
	9	0.760		26	0.767		43	0.778
	10	0.808		27	0.775		44	0.852
	11	0.848		28	0.807		45	0.844
	12	0.833	Access	29	0.833		46	0.753
Convenient	13	0.742		30	0.947	Safety	47	0.814
	14	0.934		31	0.873		48	0.720
	15	0.761		32	0.833		49	0.949
	16	0.839		33	0.764		50	0.857
	17	0.867		34	0.766		51	0.805
	18	0.948	Convenient	35	0.777		52	0.722
	19	0.731		36	0.972			

4.2. Convergent Validity

In this part, convergent validity was used to determine that each marker (Question Questionnaire) had the highest correlation with its own criterion than other criteria. When multiple indicators are used to measure any unknown variables (7 main criteria), the researcher should not only be sure of the confidence of the individual marker, but alsothe convergent validity of the criteria (29). Cross-factor load was used to study this issue. For this work, the correlation of each marker with all other structures of the model was calculated, which values should be higher than the other criteria for the selected criteria of the researcher. Results (Table 4) showed that convergent validity was confirmed.

Table 4. Convergent Validity Results

Question Number	Criteria						
	C1	C2	C3	C4	C5	C6	C7
3	0.757	0.518	0.714	0.757	0.313	0.578	0.472
4	0.724	0.06	0.668	0.215	0.674	0.396	0.713
5	0.833	0.093	0.337	0.58	0.727	0.536	0.705
6	0.808	0.457	0.58	0.43	0.643	0.322	0.335
7	0.768	0.853	0.126	0.288	0.608	0.697	0.638
8	0.974	0.245	0.101	0.666	0.263	0.591	0.715
9	0.76	0.486	0.231	0.277	0.539	0.19	0.409
10	0.808	0.351	0.671	0.085	0.202	0.144	0.644
11	0.848	0.168	0.526	0.221	0.488	0.571	0.237
12	0.833	0.467	0.707	0.342	0.633	0.716	0.227
13	0.533	0.742	0.277	0.754	0.593	0.329	0.366
14	0.741	0.934	0.136	0.621	0.696	0.119	0.169
15	0.028	0.761	0.176	0.565	0.553	0.802	0.448
16	0.722	0.839	0.163	0.404	0.675	0.308	0.281
17	0.221	0.867	0.065	0.308	0.665	0.582	0.321
18	0.662	0.948	0.621	0.072	0.753	0.76	0.285
19	0.699	0.731	0.308	0.111	0.707	0.307	0.025
20	0.67	0.977	0.381	0.387	0.381	0.191	0.66
21	0.663	0.868	0.462	0.135	0.103	0.254	0.76
22	0.615	0.859	0.437	0.215	0.192	0.225	0.145
23	0.608	0.67	0.757	0.671	0.753	0.484	0.707
24	0.138	0.381	0.733	0.43	0.24	0.421	0.49
25	0.586	0.4	0.865	0.669	0.41	0.648	0.643
26	0.659	0.726	0.768	0.636	0.52	0.127	0.508
27	0.326	0.67	0.775	0.337	0.243	0.164	0.64
28	0.625	0.535	0.807	0.253	0.696	0.596	0.124
29	0.271	0.064	0.666	0.833	0.723	0.599	0.646
30	0.834	0.177	0.166	0.947	0.56	0.503	0.258
31	0.115	0.35	0.715	0.873	0.664	0.046	0.615
32	0.161	0.464	0.544	0.833	0.427	0.494	0.457
33	0.679	0.127	0.668	0.764	0.664	0.66	0.117
34	0.566	0.483	0.533	0.766	0.705	0.338	0.677
35	0.017	0.226	0.065	0.747	0.777	0.014	0.572
36	0.499	0.516	0.529	0.347	0.972	0.606	0.283
37	0.525	0.424	0.346	0.763	0.757	0.476	0.085
38	0.171	0.164	0.664	0.11	0.801	0.578	0.516
39	0.276	0.263	0.226	0.664	0.758	0.396	0.381
40	0.173	0.597	0.26	0.382	0.792	0.536	0.463
41	0.679	0.452	0.559	0.529	0.745	0.808	0.728
42	0.366	0.277	0.054	0.016	0.67	0.781	0.278
43	0.214	0.49	0.664	0.337	0.048	0.768	0.183
44	0.71	0.559	0.2	0.452	0.16	0.852	0.472
45	0.241	0.285	0.184	0.447	0.691	0.844	0.657
46	0.469	0.707	0.695	0.758	0.727	0.753	0.886
47	0.257	0.666	0.374	0.255	0.345	0.157	0.814
48	0.299	0.337	0.476	0.626	0.358	0.67	0.718
49	0.324	0.217	0.508	0.081	0.599	0.338	0.949
50	0.048	0.269	0.169	0.747	0.244	0.27	0.857
51	0.702	0.67	0.88	0.347	0.98	0.659	0.805
52	0.184	0.266	0.94	0.764	0.745	0.477	0.722

In Figure 2, the final design grid contains factors and acceptable questions.

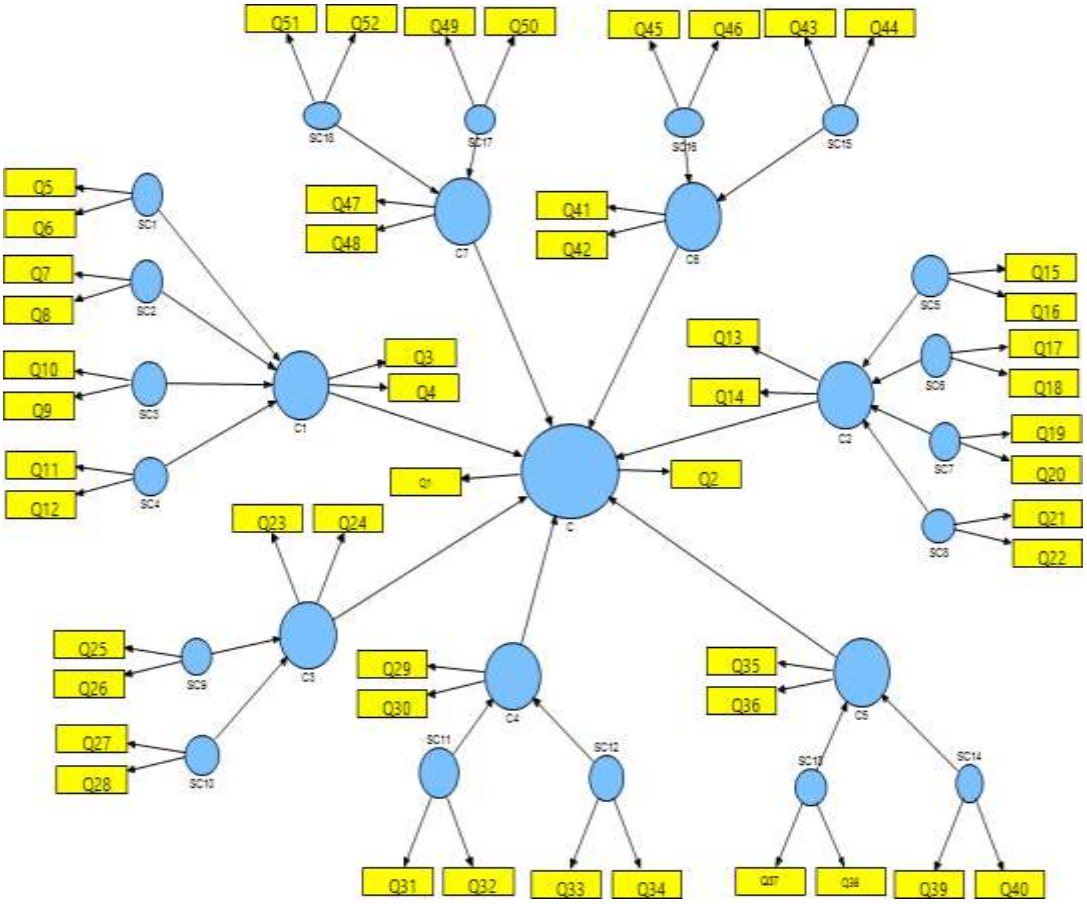


Figure 2. The final network of case study in Expert Choice

Q_i: **Question Number**

C: Customer satisfaction

4.3. Reliability test or internal consistency (alpha cronbach)

Cronbach invented the alpha coefficient to measure the reliability of instruments like surveys. The alpha coefficient shows how the replies of people are distributed, for instance if a research questionnaire is being reviewed and one section consists of 5 items. A first-person response to the first question about the 5-option spectrum would have a value of 1 in this case. Given that the first respondent has provided an answer to a dimension with a value of 1, his response to Question 2 should not deviate too much from 1. (If the person answers the first question with a value of 1, the second question cannot be worth 4, and if the person responds the dispersed questions, it is probable that the data do not have internal consistency, and their validity is ruled out. The following are the corresponding cronbach alpha values (30) from the 2016 research by George & Mallery:

High values of 0.9 = excellent;High values of 0.8 = good;
High values of 0.7 = Acceptable; High values of 0.6 = questionable;High values of 0.5 are weak;
As shown in Table 5, all alpha values are greater than 0.7,so their reliability is confirmed.

Table 5. Cronbach's alpha test results

Criteria	*Cronbach's alpha*	*Criteria*	*Cronbach's alpha*
C	0.810	SC6	0.872
C1	0.728	SC7	0.860
C2	0.770	SC8	0.715
C3	0.788	SC9	0.804
C4	0.713	SC10	0.771
C5	0.819	SC11	0.832
C6	0.739	SC12	0.841
C7	0.768	SC13	0.755
SC1	0.791	SC14	0.789
SC2	0.726	SC15	0.752
SC3	0.770	SC16	0.868
SC4	0.822	SC17	0.840
SC5	0.870	SC18	0.751

4.4. Composite Reliability

To verify the combination's validity of each of the factors (structures or criteria), the composite reliability criterion is used, the values should be greater than 0.7, which is in this

study according to Table 6, and the compositional validityof the structures is confirmed.

Table 6. Combined Reliability Test Results

Criteria	*Combined Reliability*	*Criteria*	*Combined Reliability*
C	0.828	SC6	0.783
C1	0.87	SC7	0.791
C2	0.759	SC8	0.74
C3	0.748	SC9	0.823
C4	0.729	SC10	0.713
C5	0.842	SC11	0.756
C6	0.753	SC12	0.809
C7	0.8	SC13	0.832
SC1	0.719	SC14	0.726
SC2	0.859	SC15	0.75
SC3	0.895	SC16	0.775
SC4	0.87	SC17	0.818
SC5	0.778	SC18	0.873

4.5. Validity AVE

The AVE criterion shows the correlation of a structurewith its indexes, the greater correlation, the greater the fit. The AVE criterion (mean extraction variance) is introduced for convergent validity. In the case of AVE, the

critical value is 0, 5 (29). This means that the AVE value above 0.5 equals the acceptable convergence validity. According to Table 7, values above 0.5 represent the integrity or internal validity of the models.

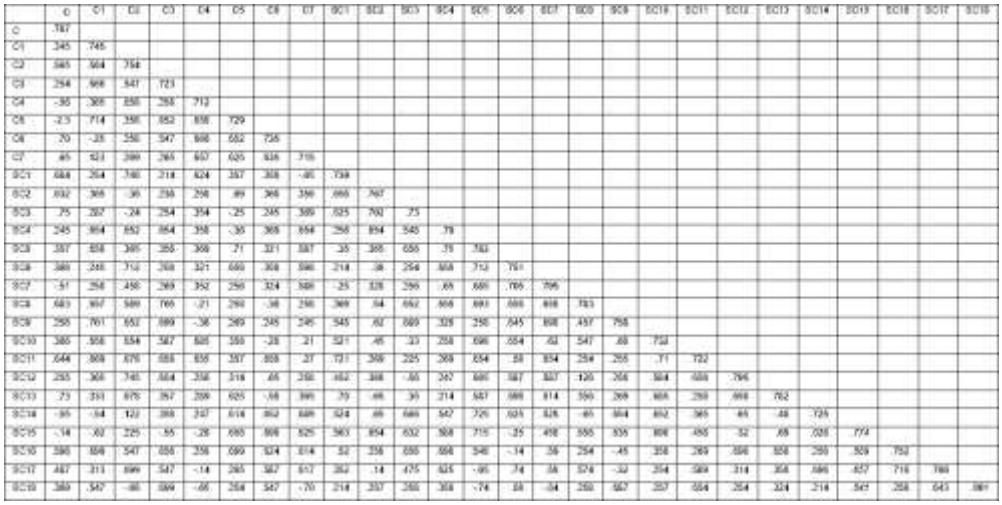
Table 7. AVE Validity Test Results

Criteria	*Validity AVE*	*Criteria*	*Validity AVE*
C	0.628	SC6	0.571
C1	0.562	SC7	0.639
C2	0.763	SC8	0.621
C3	0.665	SC9	0.581
C4	0.705	SC10	0.543
C5	0.539	SC11	0.529
C6	0.872	SC12	0.64
C7	0.518	SC13	0.619
SC1	0.661	SC14	0.533
SC2	0.595	SC15	0.606
SC3	0.702	SC16	0.573
SC4	0.796	SC17	0.594
SC5	0.618	SC18	0.648

4.6. Diagnostic validity

The purpose of this research was to find measures of customer satisfaction based on the quality of service provided by the bus system in Zanjan. The questionnaire and the model were both put through testing to ensure their validity and reliability. As a result, the original 74 questions were pared down to 52, and those are the ones that made it into the final survey. The model passed all of its validity and reliability tests with flying colors. The model's accuracy was also tweaked to account for the AVIF index, which was more than 5. Customers' satisfaction with the Zanjan Bus system was shown to be most strongly influenced by the indicators of "safety," "relaxation," "travel time," "Convenience," "Notifying," and "price," in that order. Even though the t test didn't prove it, the "access" condition was taken from the list. The final satisfaction index was 59%, calculated using the proposed relationship between Anderson and Fornell and the mean of each criterion; according to the questioner (all bus riders), this is a relatively low figure, and it is hoped that the Zanjan Bus Company's management will address these issues.

Table 8. Diagnostic Validity Test Results



4.7. Fit the structural model

In Table 9, the weight values of each criterion are shown inthe model. In addition, t test values and the result of the test are presented. As can be seen, criterion C4 and subcriteria SC6 and SC12 are rejected by t test.

Table 9. Direct Linear Effect of Criteria and Sub-criteria on Customer Satisfaction

Relationship		Weight	T-Statistics	Result
$C1$	$\rightarrow C$	0.66574	9.24264	Accept
$C2$	$\rightarrow C$	0.62175	6.33265	Accept
$C3$	$\rightarrow C$	0.13398	4.37687	Accept
$C4$	$\rightarrow C$	0.03165	0.93825	Reject
$C5$	$\rightarrow C$	0.71954	4.26654	Accept
$C6$	$\rightarrow C$	0.27284	2.66171	Accept
$C7$	$\rightarrow C$	0.79359	7.12745	Accept
$SC1$	$\rightarrow C_1$	0.66178	8.66189	Accept
$SC2$	$\rightarrow C_1$	0.59449	7.16198	Accept
$SC3$	$\rightarrow C_1$	0.15282	3.66445	Accept
$SC4$	$\rightarrow C_1$	0.36178	2.22153	Accept
$SC5$	$\rightarrow C_2$	0.75575	9.96178	Reject
$SC6$	$\rightarrow C_2$	0.07555	0.75826	Accept
$SC7$	$\rightarrow C_2$	0.27287	5.63241	Accept
$SC8$	$\rightarrow C_2$	0.48547	3.27287	Accept
$SC9$	$\rightarrow C_3$	0.13354	2.70574	Accept
$SC10$	$\rightarrow C_3$	0.21714	3.13156	Reject
$SC11$	$\rightarrow C_4$	0.47287	4.27284	Accept
$SC12$	$\rightarrow C_4$	0.03264	1.54826	Accept
$SC13$	$\rightarrow C_5$	0.66547	8.66178	Accept
$SC14$	$\rightarrow C_5$	0.46591	7.46579	Accept
$SC15$	$\rightarrow C_6$	0.17298	3.66178	
$SC16$	$\rightarrow C_6$	0.37247	6.55489	
$SC17$	$\rightarrow C_7$	0.66178	9.66576	
$SC18$	$\rightarrow C_7$	0.74854	8.22154	Accept

Finally, in order to show the validity of the findings of the research model, the index of the fitting of structural equation models using partial least squares method was used. The AVIF index is calculated at 2.088 and is below the crisis level of 5, indicating that multiple consistency in the model is well controlled and the accuracy of the model estimation in the prediction of the dependent variable has a

reliable reliability. Independent variables that affect the dependent variable have explained each individual part of the variance of the dependent variable. In addition, APC and ARS indices indicate that the relationships between variables are well recognized and the highest coefficient is used to test the hypotheses because its value is significant (Table 10).

Table 10. Credit Estimates of the Estimated Model

Index	*Value*	*significance level*	*Result*
ARS	0.328	0.001	A large part of the data variance is expressed in terms of existing relationships.
APC	0.252	0.001	Existing coefficients for the expression of causal relationship relationships can be repeated.

4.8. Customer Satisfaction Index

In this section, the value of the customer satisfaction inde

9 *w*

*100 (1)

Table 11. The mean and weight of the variables for the proposed formula for Anderson and Fornell

Variable	*Mean(* x_i*)*	*Standard deviation*	*Weight* (w_i)
C1	6.79	1.605	0.66574
C2	7.11	1.385	0.62175
C3	5.99	1.835	0.13398
C5	7.28	2.174	0.71954
C6	8.4	1.996	0.27284
C7	6.49	1.687	0.79359

By placing the values of Table 11 in equation (1), the satisfaction index is obtained by 59%. Given that the questionnaire was distributed solely among those who usedpublic transportation, 59% indicated a low satisfaction.

5. CONCLUSION

In this study, considering the design of the questionnaire and its confirmation, it was attempted to identify the indicators of customer satisfaction from the quality of service of the bus system of Zanjan. Also, tests were done to confirm the reliability and validity of the questionnaire and the model. Accordingly, the number of questions from the questionnaire dropped from 74 to 52, and the 52 questions were included in the final questionnaire. All reliability and validity tests of the model were approved. Inaddition, the validity of the model was also adjusted according to the AVIF index, which was larger than 5. In

this study, the "safety", "relaxation", "travel time", "Convenient", "Notifying" and "price" indicators respectively have the highest coefficients of impact (weight) on the satisfaction model of customers in Zanjan Bus system. As was seen, the "access" criterion was eliminated from the criteria, which was not confirmed in the t test. Finally, in accordance with the proposed relationship between Anderson and Fornell, and the average of each criterion, the satisfaction index was 59%, which according to the questioner (all of the users of the bus system), this number there are a few and it is expected that the officials of the Zanjan Bus Company will solve theproblems of this system and meet the needs of users.

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