



Determining Students' Satisfaction Level towards their University Hostel Management Service using a SERVPERF Model

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Abstract.

Determining for factor located in the 'Action Opportunity' quadrant is always crucial in the service field, since this quadrant reflects the factor considered important by customers, however the performance provided is not up to the expectation. This study aimed to develop a Relative Action Diagram based on the Importance-Performance analysis (IPA) of a Service Performance (SERVPERF) model, for the context of students' satisfaction on their university' hostel management. A government university is selected as case study for this purpose. A SERVPERF model is first built with identifying number of factors and reliable variables with respect to the study field using exploratory factor analysis, further developing a second level measurement model using the confirmatory factor analysis to determine the important factors. Finally, factors from the SERVPERF model were regressed to a variable 'overall satisfaction', thus important factors were determined. The study found all three factors obtained (Tangible, Working Style and Empathy) were important factors and students were weakly satisfied with service for all the three factors. Thus, there is no any factor located in the 'Action Opportunity' quadrant. Therefore, it is recommended to the hostel management to continue their good job, perform better and aware of all the three important factors and its variables.

Keywords: Factor Analysis; Structural Equation Modelling; Importance-Performance Analysis

1 INTRODUCTION

A crucial factor in both public and private enterprises is quality. A high standard of service guarantees client contentment. According to [1], the services rendered by government agencies in Malaysia are supposed to guarantee customer satisfaction and conform to the criteria established. Customer satisfaction, on

the other hand, has to do with how satisfied customers are with the level of service they received. It is the outcome of contrasting the service that customers actually received with what they had anticipated, according to [2]. If the service meets or exceeds the customer's expectations, they are considered satisfied; if not, they are considered unsatisfied.

Given that service quality has a major influence on an institution's success, evaluating the degree of service quality provided by universities or other higher education institutions has been a major focus of research over the past ten years [3]. By getting to know their expectations and views of service quality, higher education providers aim to be the students' first choice for postsecondary education and keep them there. Methodological and organizational frameworks, reputational studies, learning environments, faculty research output, and student experiences and results are some of the factors that define the quality of services provided by universities and other higher education institutions [4]. One technique for evaluating service performance in higher education is the SERVPERF model [5]. Silva et al. (2017) [6] and Sydorov et al. (2020) [7] mentioned that the SERVPERF scale is recommended for assessing the validity, reliability, and methodological soundness of service quality.

It is interesting that Fuchs, Fangpong, and Southam (2022) found that age (study year) has a substantial impact on students' reported levels of service quality when using the SERVPERF dimensions to measure service quality in higher education [5]. Additionally, Salazar (2015) suggested that it would be a good research practice to use both favorably and negatively phrased items when measuring the SERVPERF model [8]. Eugenia Enríquez-Mora and Ríos-Zaruma (2022) employed the SERVPERF model at the Private Technical University of Loja to investigate how students perceive the attention management strategy [9]. Results from this study illustrate the connection with the findings of other similar research by enabling an understanding of the student's perspective and the dependability of the tool used. The model's output indicated that the reaction times were the most pertinent factor.

In a separate study, Mohammad et al. (2012) used Service Quality (SERVQUAL) to evaluate the facilities management services provided in post-graduate dormitories and discovered that students' expectations and opinions of the services' quality differed significantly [10]. Furthermore, Pankaj et al. (2019) found that most hostel amenities exceeded expectations when they used the SERVQUAL approach to assess the quality of hostel management services provided to technical students in New Delhi. [11]. Additionally, using the SERVQUAL model, Vijesh (2021) examined the performance of the hostel's amenities and identified six key performance areas: visual comfort, thermal comfort, auditory comfort, fire safety, hygiene, and communication [12]. By computing the difference between intended and perceived performance, the quality and performance of the services can be assessed. The service perfor-

mance (SERVPERF) and quality (SERVQUAL) models are two notable developments of the idea gap hypothesis. To identify the service gap, the SERVQUAL method examines facility satisfaction and customer expectations. As such, SERVPERF is a development that contrasts with SERVQUAL, which only considers how service performance is perceived in higher education institutions' management of the hostel.

Using the SERVPERF paradigm, this study takes a new tack by evaluating service quality in government agencies, where client demands could be lower than in the private sector. This is because there has been relatively little research done thus far within government universities in Malaysia regarding students' satisfaction with their hostel management. Among the 1500 students enrolled at the government university, a sample of 313 respondents was chosen at random to participate in a survey. The introduction of this paper defines quality, highlights the importance of evaluating service quality in the context of colleges and other higher education establishments, and goes on to analyze some of the associated findings. There are five sections in the paper. The SERVPERF model's history and an overview of the Factor Analysis approach, which will be utilized to develop the SERVPERF model for this investigation —are covered in the second section, Materials and Methods. The study's Results, Discussion, and Conclusion are presented in the third, fourth, and fifth sections, in that order.

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2 LITERATURE REVIEW

2.1 SERVPERF Model

The Service Performance model (SERVPERF) is one of several models that may be used to evaluate customer satisfaction, as stated in [13]. This model, which only focuses on the service performance component, is a subset of the Service Quality (SERVQUAL) model created by Parasuraman et al. Five unique variables were discussed to make up the SERVPERF model which tangible, responsive, assured, reliable, and empathic [14]. According to [15] and [16], Every one of these factors provides a different perspective on the caliber of service rendered to clients:

2.1.1 Variables of SERVPERF Model

2.1.1.1 Tangible

The word "tangible" refers to the physical characteristics and mannerisms of the staff members and other clients. Physical components are what are referred to as tangibles. It was evident from the staff look, the staff-maintained waiting area, the parking amenities, and the cleanliness of the restrooms.

2.1.1.2 Reliability

Reliability assesses the company's capacity to provide accurate and trustworthy services. The capacity to deliver precise and timely service with dependability is known as reliability. It has to do with how adequate flight information is, including the presence of trustworthy officials and information displays about luggage placement.

2.1.1.3 Responsive

Reactive evaluates the company's willingness to assist and provide prompt assistance. Being responsive means having the ability to quickly and resolutely attend to the requirements and requests of clients. It includes quick entry to the airport and a smooth and successful security clearance process.

2.1.1.4 Assurance

Assurance measures staff members' level of expertise and courtesy, two qualities that can comfort customers. Assurance encompasses the staff's expertise, demeanor, abilities, and dependability in addition to being risk-free, doubtless, and safe.

2.1.1.5 Empathy

Empathy is a measure of a company's ability to demonstrate that it values each individual customer and offers personalized service. distinct service domains have distinct standards for service quality because different variables have varying effects on client delight. It is the ability to relate to people easily, communicate effectively, give individual attention, and comprehend the needs of clients. The availability of waiting times for immigration inspection, reclamation services, and check-in for each individual consumer is indicative of this.

Studies indicate that service quality measures should be modified to fit the research setting, as stated in [17], as a result. Therefore, the objective of empirical research based on SERVPERF scales should be determined, along with whether the scale will be used to provide a greater explanation of variances, develop a theoretically sound model, or perform diagnostics. Understanding the service attributes and their pertinent dimensions is the main advantage of employing the dimensional method.

Students at higher education institution are seen to be the consumers in the context of service quality since they have the right to expect that their opinions be taken into consideration and addressed. Since they actively participate in the selection and acquisition of services, the main customers and partners of higher education institutions are their students. The significance of student satisfaction in assessing the veracity and correctness of the services rendered has been emphasized by past studies. In higher education institutions, student satisfaction is a critical performance indicator of the caliber of services offered, per several prior studies [18]. In order to compare the quality of educational services offered in various universities and ascertain the correlation between educational service quality and university rankings both nationally and internationally, SERVPERF is required for online surveys of students from various universities[19]. While evaluating the services quality offered by numerous higher education institution, it is important to identify the areas that are most important to the service users, the students, and the ones that lead to varying degrees of student satisfaction. Individual attribute groups in the instance of higher education institution had to be modified to fit the particulars of how they operated[20]. The aim of the paper is to develop a Relative Action Diagram for the context of students' satisfaction with the administration of their university's dormitory, based on the IPA of a SERVPERF model.

3 METHODOLOGY

3.1 Factor Analysis

The study made use of primary data that was gathered via survey forms. The survey was given to students living in the university residence halls using a convenience sampling method. A total of 313 complete responses were retrieved, which is sufficient for 1500 students based on the sample size calculation using the Krejcie and Morgan table [21].

The idea that every variable affects one or a few indicators is the basis of an exploratory factor analysis (EFA) for a reflective model. Every variable should

have a substantial loading that satisfies the minimal magnitude criteria. Additionally, each variable needs to be differentiable from the others. The concept of factor analysis for a reflecting model is explained in Figure 1.

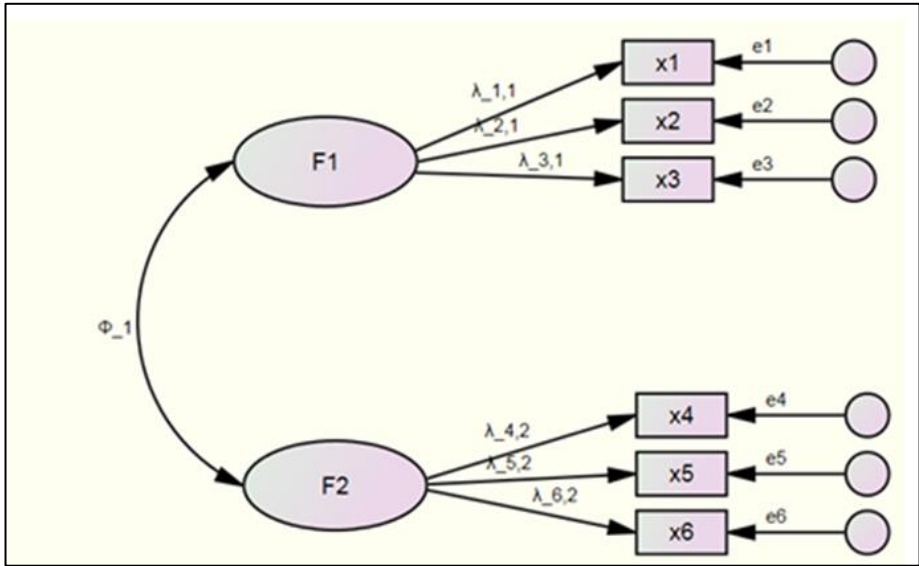


Figure 1. Factor Analysis Method for a Reflective Model.

The above model also can be described in equations as the following:

$$\left. \begin{aligned} x_1 &= \lambda_{1,1}F_1 + e_1 \\ x_2 &= \lambda_{2,1}F_1 + e_2 \\ x_3 &= \lambda_{3,1}F_1 + e_3 \\ x_4 &= \lambda_{4,2}F_2 + e_4 \\ x_5 &= \lambda_{5,2}F_2 + e_5 \\ x_6 &= \lambda_{6,2}F_2 + e_6 \end{aligned} \right\} \quad (1)$$

where x_n refers to the reflective measure, $\lambda_{n,n}$ refers to effect of F_n on x_n , whereas F_n and e_n are factor/latent construct and error, respectively.

The prior equation (1) can also be written as the following matrix:

$$\begin{bmatrix} x_1 \\ x_2 \\ x_3 \\ x_4 \\ x_5 \\ x_6 \end{bmatrix} = \begin{bmatrix} \lambda_{1,1} & 0 \\ \lambda_{2,1} & 0 \\ \lambda_{3,1} & 0 \\ 0 & \lambda_{4,2} \\ 0 & \lambda_{5,2} \\ 0 & \lambda_{6,2} \end{bmatrix} \begin{bmatrix} F_1 \\ F_2 \end{bmatrix} + \begin{bmatrix} e_1 \\ e_2 \\ e_3 \\ e_4 \\ e_5 \\ e_6 \end{bmatrix}$$

The extraction method employed in this study's EFA was Principal Axis Factoring (PAF). Using the scree plot to double-check the analysis of the eigenvalue, the number of factors is ascertained. Significant factors are those that

have an eigenvalue larger than one. By counting the points on the screen map up to the inflection point, this is further confirmed. To aid in comprehension, the created factors are then rotated. Previous research indicated that the factors had a strong correlation with one another, therefore oblique rotation using the ProMax approach was selected.

A pattern matrix analysis was performed to ascertain which variables were loaded into the generated factors. Before proceeding on, each variable's minimum loading value should be determined. Minimum loadings of 0.71 (50% or -0.5 overlapping of variance) are shown to be excellent, 0.63 (40% or -0.4 overlapping of variance) to be very good, 0.55 (30% or -0.3 overlapping of variance) to be good, 0.45 (20% overlapping of variance) to be equal, and 0.32 (10% or -0.1 overlapping of variance) to be weak, according to [22] and [23]. The variable has greater meaning when the loading value is higher. Choosing a high loading value, however, might result in the removal of additional variables, which would miss crucial details and problems. Therefore, when determining the minimal loading value, researchers should carefully weigh the advantages and disadvantages.

Confirmatory Factor Analysis (CFA) may be performed to verify that the included variables accurately reflect their respective latent components for this research population once the empirical model has been created using the aforementioned EFA [24]. With adjustments and residual correlations permitted [26], CFA is predicated on testing the hypothesis that there is a link between the latent component or factors and their observable variables [25]. In contrast to the other study, CFA and structural equation modeling (SEM) in general employ many measurement tools before determining the model's fit and suitability for the dataset [25]. Validity (convergent validity, discriminant validity for reflective models) and fitness (ratio of chi-square to degree of freedom, fitting indexes, parsimony indexes) are two examples of measuring methods that may be employed [27–28]. The reliability test, which is based on the Cronbach alpha value and is conducted at the start of the study, is the other measuring technique used in this investigation.

3.2 Relative Action Diagram based on the Importance-Performance analysis

The Importance-Performance Analysis (IPA), known as a two-layered framework, is utilized to assess the strategies of an organization, pinpointing the issues for further improvement, and make appropriate plans accordingly. IPA is direct, intuitive, and needs low to minimal statistical skill to interpret. It assists supervisors to locate regions with effective performance and prioritize areas for development according to the four quadrants [30].

The first quadrant, 'keep up the good work', describes attributes seen as important by the customers' and in which the organization performed well too.

The second quadrant, 'possible overkill' demonstrates less significant attributes, yet the organization performed well. The third quadrant, 'low priority', consists of attributes which is considered less priority by customers and at the same time, organizations also performed averagely only. The fourth quadrant, 'concentrate here', it has significant attributes however organization did not perform well, thus proposing the organization to give more importance and work better on that attribute. As a sum, IPA shows a preview of how well the organization meets customer concerns and offers customers guidelines for future resource allocation decision making [29-32]. This is graphically represented as the following Figure 2.

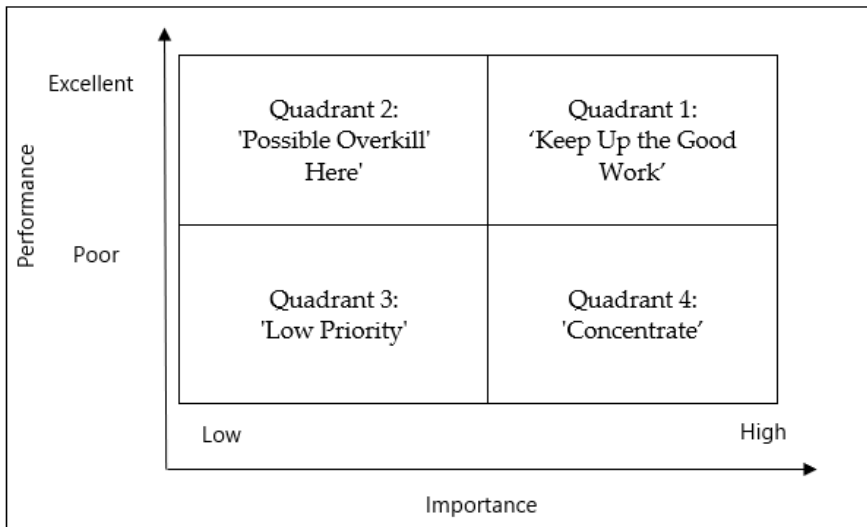


Figure 2. Relative Action Diagram based on IPA Quadrants
Source: Martilla and James (1977)

4 RESULTS

Firstly, all the 22 independent variables which makes up the five dimensions of the SERVPERF model is listed as in Table A1, in Appendix section. Next, in order to determine the number of dimensions formed for the SERVPERF model of this case study, EFA and PAF are carried out first, in which few requirements consisting normality, linearity, checking for any possible outlier need to be done before concluding the suitability of the dataset for the EFA and PAF analysis.

Once all these requirements are fulfilled, correlation coefficient matrix are formed and oblique rotation can be chosen since there is strong correlation (>0.30) among the variables. Next, the KMO and Barlett's Test of Sphericity is also conducted to ensure the sample size used is sufficient. Finally, as all the

above test meet the requirements, EFA is carried out and number of factors formed were concluded using the eigen value and scree plot, in which both were align to have three number of factors. All these analyses are summarized in Appendix A since they are explained in detailed in a separate writing [46]. Thus, the results section starts with the table of pattern matrix formed with different loading values, shown as in the following Table 1.

Variable	Factor 1					Factor 2					Factor 3				
	Loading Value					Loading Value					Loading Value				
	0.32	0.45	0.55	0.63	0.71	0.32	0.45	0.55	0.63	0.71	0.32	0.45	0.55	0.63	0.71
1											0.65	0.65	0.65	0.65	
2											0.89	0.89	0.89	0.89	0.89
3											0.58	0.58	0.58		
4											0.51	0.51	0.51		
5						0.76	0.76	0.76	0.76	0.76					
6						0.83	0.83	0.83	0.83	0.83					
7						0.81	0.81	0.81	0.81	0.81					
8						0.89	0.89	0.89	0.89	0.89					
9						0.68	0.68	0.68	0.68						
10						0.56	0.56	0.56							
11						0.77	0.77	0.77	0.77	0.77					
12						0.76	0.76	0.76	0.76	0.76					
13						0.71	0.71	0.71	0.71						
14	0.61	0.61	0.61												
15	0.53	0.53				0.33									
16	0.58	0.58	0.58			0.39									
17	0.55	0.55				0.32									
18	0.89	0.89	0.89	0.89	0.89										
19	0.84	0.84	0.84	0.84	0.84										
20	0.97	0.97	0.97	0.97	0.97										
21	0.91	0.91	0.91	0.91	0.91										
22	0.66	0.66	0.66	0.66											

Table 1. A Comparison: Pattern Matrix with a Minimum Value of 0.32, 0.45, 0.55, 0.63 and 0.71

The loading value of 0.63 was chosen by the study because it is the best minimum loading value that can describe how relevant the variable is in relation to its related component. The model is regarded as trustworthy [34] since Table 2 below explains the Cronbach value of 0.958 with the other 15 variables.

Cronbach Alpha Value	Number of Variables
0.958	15

Table 2. Test of Reliability for All Selected Variables Together

Among the 15 variables created for this SERVPERF Model, the findings indicate three factors. As in the original SERVPERF Model, variables 1 and 2 combine to form the first component, known as Tangible. The variables 5, 6, 7, 8, 9, 11, 12, and 13 combine to form the second element, which is called Working Style. The original SERVPERF Model had these variables in two distinct components. The second element, known as Reliability, had factors 5 through 9, while the third factor, known as Assurance, contained variables 10 through 13.

The third component, empathy, is constructed from variables 18, 19, 20, 21, and 22. The SERVPERF Model originally had these variables in two distinct components. In the fourth element, which was called responsiveness, were variables 14 through 17, while in the fifth factor, which was called empathy, were variables

18

through

22.

CFA is performed using the three latent constructs that were collected and all of the aforementioned variables, making adjustments as needed. The underlying premise of this analysis is that H0: the model fits the data against H1: the model does not. Following the necessary adjustments (creating correlation among some of the residuals for the unexplained variance of the model), the final CFA model with a preference for H0 appears as shown in Figure 3.

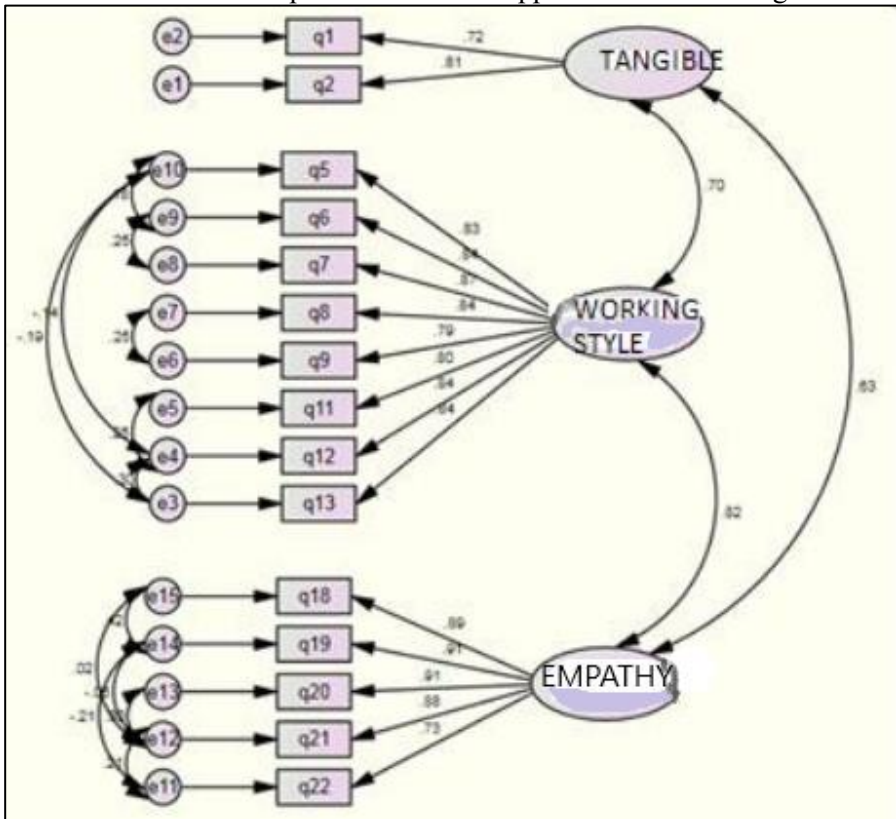


Figure 3. Measurement Model after Modification

Source: Loshini Thiruchelvam and Sabri Ahmad (2014).

Detailed development procedures for this study are described in [33–35]. In order to ascertain if each of the generated factors (empathy, working style, and Tangible) is significant in the SERVPERF model from the perspective of the students, a second-stage assessment model is then created, as shown in Figure

4.

The following alternative hypotheses are the subject of this analysis:

H1: Tangible is an important factor for this SERVPERF model

H2: Working Style is an important factor for this SERVPERF model

H3: Empathy is an important factor for this SERVPERF model

with a factor is considered as important if it has a loading value of at least 0.5, which is half the total loading value.

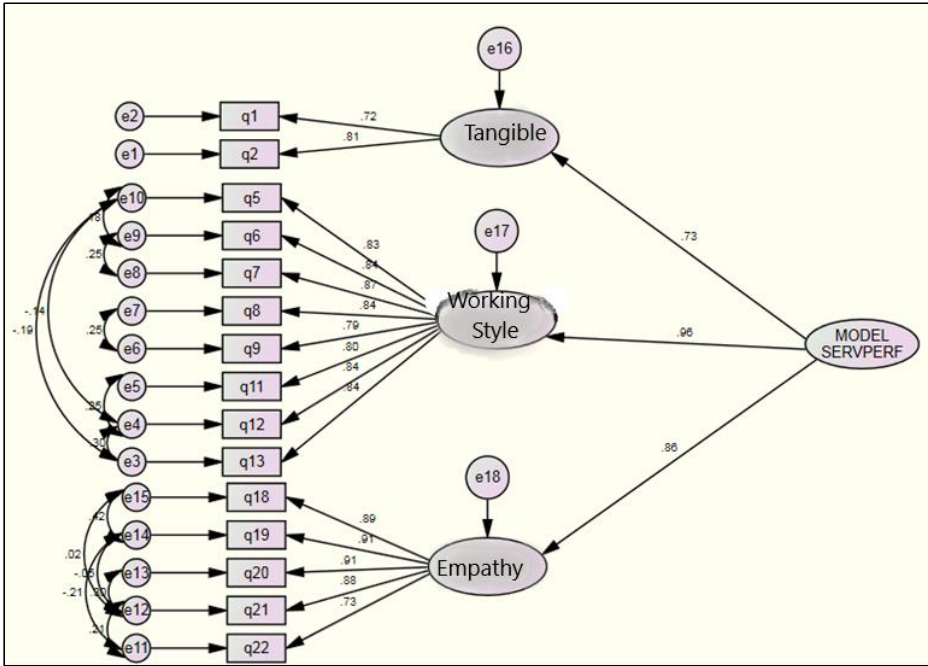


Figure 4. Second Level Measurement Model

The most significant component, according to the aforementioned research, is the working style factor (loading value of 0.96), which is followed by the tangible and empathy aspects (loading values of 0.86 and 0.73, respectively). All three of these parameters can be considered significant when compared to the overall loading value of 1.0. H1, H2, and H3 are therefore all recognized alternative hypotheses.

Additionally, a structural model is created to identify the aspects that the pupils find satisfactory. This is accomplished by regressing the constructed measurement model, as shown in Figure 2, on the variable labeled Overall Satisfaction. The regression coefficient is used to assess the degree of satisfaction, while the p-value is used to determine the significance of the results. The results are displayed in Figure 5 and Table 3 below.

Table 3. Significance at *p*-value of 0.05

Relationship	<i>p</i> -value	Conclusion
Tangible towards Overall Satisfaction	***	Significant
Working Style towards Overall Satisfaction	***	Significant
Empathy towards Overall Satisfaction	***	Significant

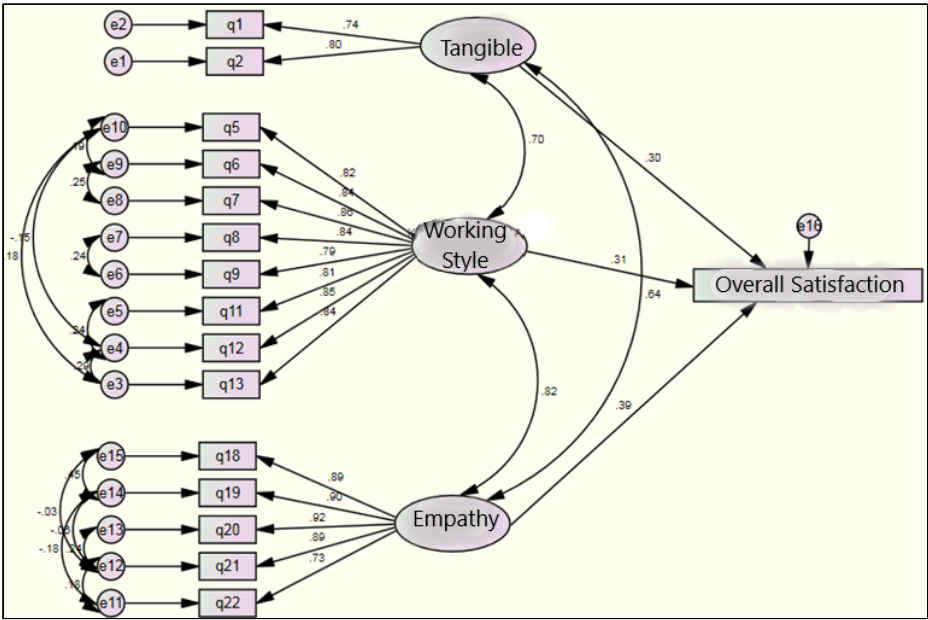


Figure 5. Students’ Satisfaction Value for Each Factor

While Table 3 demonstrates that there is a significant relationship between each factor and the overall satisfaction variable, Figure 5 suggests that students are only moderately satisfied, as indicated by the standardized regression coefficients of 0.30, 0.31, and 0.39 for the factors of tangible, working style, and empathy, respectively. A Relative Action Diagram is created based on Figure 5, Table 3, and Figure 4. This diagram is crucial for identifying any factors that are deemed significant and require improvement[36–41]. The value of the standardized regression coefficient (loading value) in Figure 5 represents the x-axis of importance provided by the students; factors with an importance value more than 0.5 (i.e., half

of the total value of one) will be in the second square, and vice versa. Referring to Figure 5, the factor with a positive regression coefficient value on the y-axis of performance will be in the second square, and vice versa. This occurs as a result of the regression coefficient's value falling between -1 and 1. Figure 6 shows the action diagram created for this study, where T, W, and E stand for the tangible, working style, and empathy aspects, respectively.

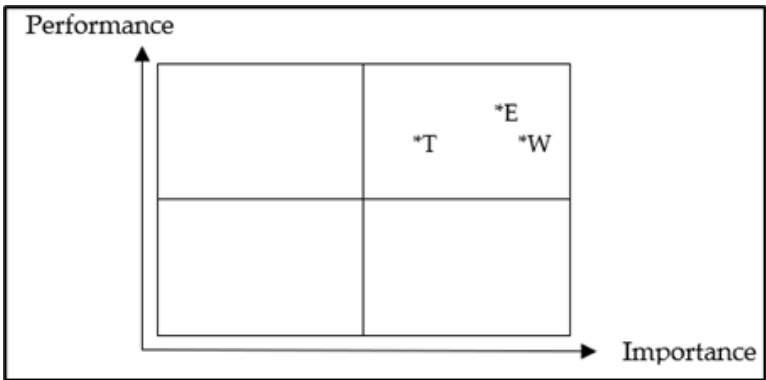


Figure 6. Relative Action Diagram

Based on the Relative Action Diagram in Figure 6, students consider all the three factors as important and they are satisfied with the management with respect to all the above factors.

5 DISCUSSION

Tangibility, working style, and empathy are three aspects of service quality that were examined in this study in relation to students' satisfaction with the administration of their university's residence halls. These three dimensions were found to significantly improve students' satisfaction with the hotel management at their university. The results of this study indicate that working style significantly affects student satisfaction. This indicates that the hostel's administration, tolerance, and ability to foster trust have a significant impact on students' evaluations of the quality of the management services. Empathy is the second most significant factor in the research findings, as it was found to have a significant impact on students' happiness [39–42]. The act of comprehending, being conscious of, and showing compassion for a student is known as empathy in educational situations. This may be achieved by implementing customer-friendly policies and processes and ensuring that staff members possess the necessary interpersonal skills. Lastly, the study discovered that pupils are also satisfied with the tangible elements (Tangible) which comprises the hostel's amenities, bedroom furniture such a bed, wardrobe, and

study table, and the staff's and faculty's polished look all contribute to students' perceptions of the caliber of higher education institutions. Prior studies conducted in higher education settings have also found that facilities and extracurricular activities affect students' satisfaction. [18,42-47].

6 CONCLUSION

This study looked at how satisfied are the students towards their hostel management in higher education institutions was impacted by service quality. According to the study, all three of the criteria—empathy, working style, and tangible—are significant, and students are happy with the services they received for each of the three. This indicates that none of the elements are in the "Action Opportunity" quadrant. As a result, it is advised that the hostel administration keep up their good work and be cognizant of all three significant components and their variations. This study have shown that students' satisfaction is greatly impacted by tangibility, working style, and empathy. Overall, the authors of this paper were able to explain the process of creating empirical SERVPERF models using EFA and CFA, as well as some potential extensions to the SERVPERF model and the idea of a Relative Action Diagram that can also be applied in the service industry for various case studies.

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Appendix

Table A1. Variables of the SERVPERF Model.

Variable
X_1 : The furniture's are up to date
X_2 : The hostel environment is good
X_3 : The hostel staffs looks neat and clean
X_4 : The hostel has all the facilities required
X_5 : Hostel staffs fulfill their saying
X_6 : Hostel staffs sincerely listen to students' complains and problems
X_7 : Hostel staffs work independently and do not always need instructions from upper management
X_8 : Hostel staffs provide the service within the promised time
X_9 : Hostel staffs keeps students information carefully
X_{10} : Hostel staffs are able to announce the commencement of any new matter
X_{11} : Hostel staffs able to provide immediate service
X_{12} : Hostel staffs are always willing to help students
X_{13} : Hostel management will never say they are busy and could to provide service as required by the students
X_{14} : Hostel staffs can be trusted for any personal matters of the students
X_{15} : Students feel safe while communicating with the hostel management
X_{16} : Hostel staffs are polite towards the students
X_{17} : Hostel staffs have the full support from the hostel management
X_{18} : Hostel management gives individual attention to the students
X_{19} : Hostel staffs gives individual attention to the students
X_{20} : Hostel staffs know the need of the students
X_{21} : Hostel management knows the need of the students
X_{22} : Hostel office operates at the time which is suitable to the students

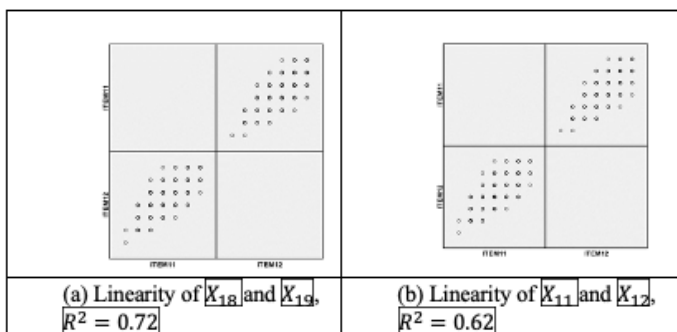


FIGURE A1. Linearity of few selected variables

TABLE A2. Elements in Descending Order of p-values to Determine for Any Possible Outlier.

Mahalanobis Distance	p-value
42.00	0.0626
41.72	0.0668
41.35	0.0775
41.20	0.0788
41.03	0.082

TABLE A3. Coefficient Correlation Matrix.

Variable	X ₁	X ₂	X ₃	X ₄	X ₅	X ₆	X ₇	X ₈	X ₉	X ₁₀	X ₁₁	X ₁₂	X ₁₃	X ₁₄	X ₁₅	X ₁₆	X ₁₇	X ₁₈	X ₁₉	X ₂₀	X ₂₁	X ₂₂
X ₁	1	0.521	0.327	0.423	0.372	0.353	0.360	0.345	0.313	0.319	0.344	0.318	0.317	0.337	0.330	0.332	0.368	0.364	0.397	0.377	0.345	0.336
X ₂	0.521	1	0.485	0.574	0.548	0.553	0.508	0.525	0.501	0.502	0.482	0.493	0.480	0.498	0.491	0.480	0.497	0.528	0.551	0.560	0.521	0.479
X ₃	0.327	0.485	1	0.460	0.513	0.526	0.522	0.539	0.566	0.475	0.450	0.508	0.511	0.561	0.554	0.556	0.560	0.494	0.495	0.463	0.472	0.466
X ₄	0.423	0.574	0.460	1	0.651	0.652	0.620	0.617	0.590	0.567	0.576	0.588	0.516	0.567	0.571	0.543	0.580	0.539	0.558	0.553	0.549	0.529
X ₅	0.372	0.548	0.513	0.651	1	0.765	0.737	0.753	0.689	0.647	0.637	0.643	0.640	0.642	0.636	0.582	0.648	0.595	0.603	0.595	0.608	0.548
X ₆	0.353	0.553	0.526	0.632	0.765	1	0.766	0.756	0.715	0.643	0.650	0.684	0.677	0.680	0.655	0.657	0.659	0.660	0.659	0.659	0.637	0.554
X ₇	0.360	0.508	0.522	0.620	0.737	0.766	1	0.788	0.713	0.622	0.644	0.689	0.672	0.646	0.623	0.630	0.654	0.647	0.638	0.630	0.633	0.578
X ₈	0.345	0.525	0.539	0.617	0.753	0.756	0.788	1	0.753	0.649	0.721	0.736	0.689	0.664	0.662	0.637	0.664	0.636	0.634	0.634	0.623	0.565
X ₉	0.313	0.501	0.566	0.590	0.689	0.715	0.713	0.753	1	0.679	0.689	0.719	0.709	0.667	0.667	0.678	0.712	0.615	0.615	0.579	0.581	0.580
X ₁₀	0.319	0.502	0.475	0.567	0.647	0.643	0.622	0.649	0.679	1	0.742	0.714	0.718	0.655	0.685	0.632	0.681	0.608	0.635	0.598	0.601	0.554
X ₁₁	0.344	0.482	0.450	0.576	0.637	0.650	0.644	0.721	0.689	0.742	1	0.787	0.752	0.647	0.668	0.626	0.686	0.637	0.637	0.611	0.608	0.557
X ₁₂	0.318	0.493	0.508	0.588	0.643	0.684	0.689	0.736	0.719	0.714	0.787	1	0.830	0.704	0.713	0.703	0.728	0.625	0.636	0.623	0.629	0.605
X ₁₃	0.317	0.480	0.511	0.516	0.640	0.677	0.672	0.689	0.709	0.718	0.752	0.830	1	0.680	0.691	0.693	0.733	0.621	0.608	0.605	0.625	0.574
X ₁₄	0.337	0.498	0.561	0.567	0.642	0.680	0.646	0.664	0.667	0.655	0.647	0.704	0.680	1	0.823	0.751	0.769	0.705	0.689	0.705	0.673	0.642
X ₁₅	0.330	0.491	0.554	0.571	0.636	0.655	0.623	0.664	0.667	0.685	0.688	0.713	0.691	0.823	1	0.788	0.793	0.699	0.688	0.642	0.642	0.629
X ₁₆	0.332	0.480	0.556	0.543	0.582	0.657	0.630	0.662	0.678	0.632	0.626	0.703	0.693	0.751	0.788	1	0.814	0.686	0.674	0.630	0.617	0.624
X ₁₇	0.368	0.497	0.560	0.580	0.648	0.659	0.654	0.637	0.712	0.681	0.686	0.728	0.733	0.769	0.793	0.814	1	0.710	0.715	0.697	0.695	0.654
X ₁₈	0.364	0.528	0.494	0.539	0.595	0.660	0.647	0.664	0.615	0.608	0.637	0.625	0.621	0.705	0.699	0.686	0.710	1	0.849	0.758	0.731	0.653
X ₁₉	0.397	0.551	0.495	0.558	0.603	0.659	0.638	0.636	0.615	0.635	0.637	0.636	0.608	0.689	0.688	0.674	0.715	0.849	1	0.770	0.742	0.656
X ₂₀	0.377	0.560	0.463	0.553	0.595	0.659	0.630	0.634	0.579	0.598	0.611	0.623	0.605	0.705	0.642	0.630	0.697	0.758	0.770	1	0.850	0.701
X ₂₁	0.345	0.521	0.472	0.549	0.608	0.637	0.633	0.634	0.581	0.601	0.608	0.629	0.625	0.673	0.642	0.617	0.695	0.731	0.742	0.850	1	0.718
X ₂₂	0.336	0.479	0.466	0.529	0.548	0.554	0.578	0.565	0.580	0.554	0.557	0.605	0.574	0.642	0.629	0.624	0.654	0.653	0.656	0.701	0.718	1

TABLE A4. KMO and Barlett's Test of Sphericity

Test	Value
Kaiser-Meyen-Olkin Measure of Sampling Adequacy	0.963
Barlett Test of Sphericity	Approximate of Chi-Square
	Degree of Freedom
	Significance
	0.000

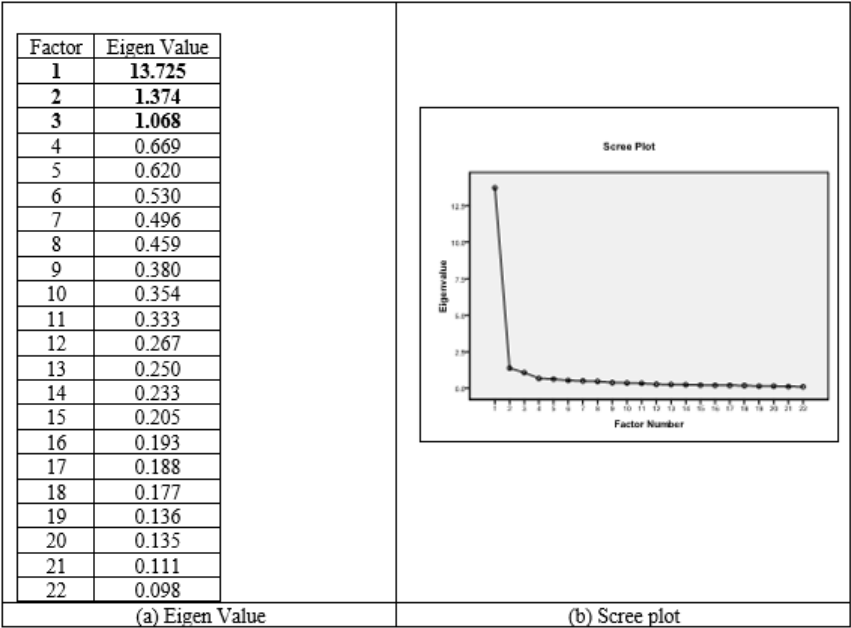


FIGURE A2. Determining number of factors

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