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A STUDY ON CUSTOMER SERVICE SYSTEM IN TAMIL NADU TRANSPORT DEPARTMENT AT SALEM CITY BY USING STRUCTURAL EQUATION MODELLING

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Abstract
This article looks at the Tamil Nadu Transport department's customer service system, both internal and external customers. It examines the customers' perceptions, attitude, needs and expectations. The prime function of Transport Department is essential convenience with which people not just connect but progress. Throughout history, people's progress has been sustained on the convenience, speed and safety of the modes of transport. Road Transport occupies a primary place in today's world as it provides a reach unparalleled by any other contemporary mode of transport.

The main objectives of the study are to study the effect of customers' perception on customer service system in Tamil Nadu Transport Departmentat Salem City, and also to identify the differences perceived by the customers of Tamil Nadu Transport Departmentat Salem City.This study is very useful for understanding the customers' perception on customer service system in Tamil Nadu Transport Department. It may helpful to frame new strategies and improve the quality of services of Tamil Nadu Transport Department.The sample unit of the study is internal and external customers' of Tamil Nadu Transport Department in Salem city. The total sample of the study is 130. Primary research data is collected in the form of structured survey results from various respondents in Salem city. Secondary research data is collected in the form of reference literature on the research topic. The collected data were analyzed by using IBM SPSS AMOS version 20 for data input and analysis.

Key Words: Customer, Service, Quality, Customer Complaints and Customer Satisfaction.

INTRODUCTION

Quality of service is a broad term that is used in both customer care evaluations and in technological evaluations. In both applications, it has to do with measuring the incidence of errors within a process that result in the creation of issues for an end user. The goal of any evaluation is to minimize the incidence of transmission issues and the error rates that may result. In terms of customer care, quality of service (QoS) is often measured in terms of issues that have a direct impact on the experience of the customer. From this perspective, only events that produce a negative effect on the goods and services received by the customer come under scrutiny. Many companies go to great lengths to generate as low a percentage of customer-effecting errors as possible. In general, corporations in many industries seek to have a 2% or less error rate as part of their overall customer care strategy. Evaluating quality in this manner does not mean companies do not address internal problems that have yet to affect customers. Corporations often evaluate each step of the manufacturing and delivery process in hopes of finding ways to streamline operations to minimize costs and still deliver products to customers in a timely manner. From this perspective, companies seek to eliminate issues before they have a chance to lead to customer-effecting situations.

REVIEW OF LITERATURE

Blumner*et al.* (1998) further indicated that TQM seeks to improve the quality of both internal and external customers goods and process by identifying the type and quality of goods desired by both and providing what each customer wants. In this perspective, Barnett (2003:1) defines user satisfaction as the ultimate requirement that everyone must strive to meet whether the user is an internal or an external customer.The external customers are known by Bain *et a!.*(2000:1) as the "outside-in" concept which involves looking outside the organization to understand citizens' and key stakeholders' views and needs and to respond by developing policies and programs that reflects these needs and expectations.Joubert (2002:44) indicated that teamwork inevitably leads to easier identification and resolution of problems as more people take interest in the entire process. To this end, it implied that empower employees by giving them the authority to do what it takes to satisfy customers.

NEED FOR THE STUDY

The prime function of Transport Department is essential convenience with which people not just connect but progress. Throughout history, people's progress has been sustained on the convenience, speed and safety of the modes of transport. Road Transport occupies a primary place in today's world as it provides a reach unparalleled by any other contemporary mode of transport.

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OBJECTIVES OF THE STUDY

- To study the effect of customers' perception on customer service system in Tamil Nadu Transport Department at Salem City.
- To identify the differences perceived by the customers of Tamil Nadu Transport Department at Salem City.

SCOPE OF THE STUDY

This study is very useful for understanding the customers' perception on customer service system in Tamil Nadu Transport Department. It may helpful to frame new strategies and improve the quality of services of Tamil Nadu Transport Department.

LIMITATION OF THE STUDY

- The research was conducted only in Salem city therefore to generalize the results for the entire transport department may not be possible.
- The assessment of the pretest and post test was conducted it is unavoidable that in this study, certain degree of subjectivity can be found. In fact, it had been decided by two or three examiners.

RESEARCH METHODOLOGY

Data were collected using questionnaire, the most common tool to evaluate the customers' perception on customer service system in Tamil Nadu Transport Department at Salem City. The sample unit of the study is internal and external customers' of Tamil Nadu Transport Department in Salem city. The total sample of the study is 130. Primary research data is collected in the form of structured survey results from various respondents in Salem city. Secondary research data is collected in the form of reference literature on the research topic. The collected data were analyzed by using IBM SPSS AMOS version 20 for data input and analysis.

DATA ANALYSIS AND INTERPRETATION

Structural Equation Modeling (SEM): Model fit assessment

Structural equation modeling was used to analyze the suitability of the model based upon the collected samples. As recommended by Anderson and Gerbing (1988), measurement model to test the reliability and validity of the survey instrument was analyzed first, and by using AMOS version 20 the structural model was analyzed. The structural equation model (SEM) is most useful when assessing the causal relationship between variables as well as verifying the compatibility of the model used (Peter, 2011). Structural equation modeling evaluates whether the data fit a theoretical model. In order to evaluate the model, emphasis was given to Chi-square/degrees of freedom, CFI, GFI, AGFI, TLI, IFI, RMSEA and PGFI **(Table 1).** As per the result, Chi square statistics with p = 0.475 does it show a good fit of the model. Common model-fit measures like chi-square/degree of freedom, the comparative fit index (CFI), root mean square error of approximation (RMSEA), the normed fit index (NFI), incremental fit index (IFI), and the Tucker Lewis index (TLI) were used to estimate the measurement model fit. Table 1 shows the estimates of the model fit indices from AMOS structural modeling.

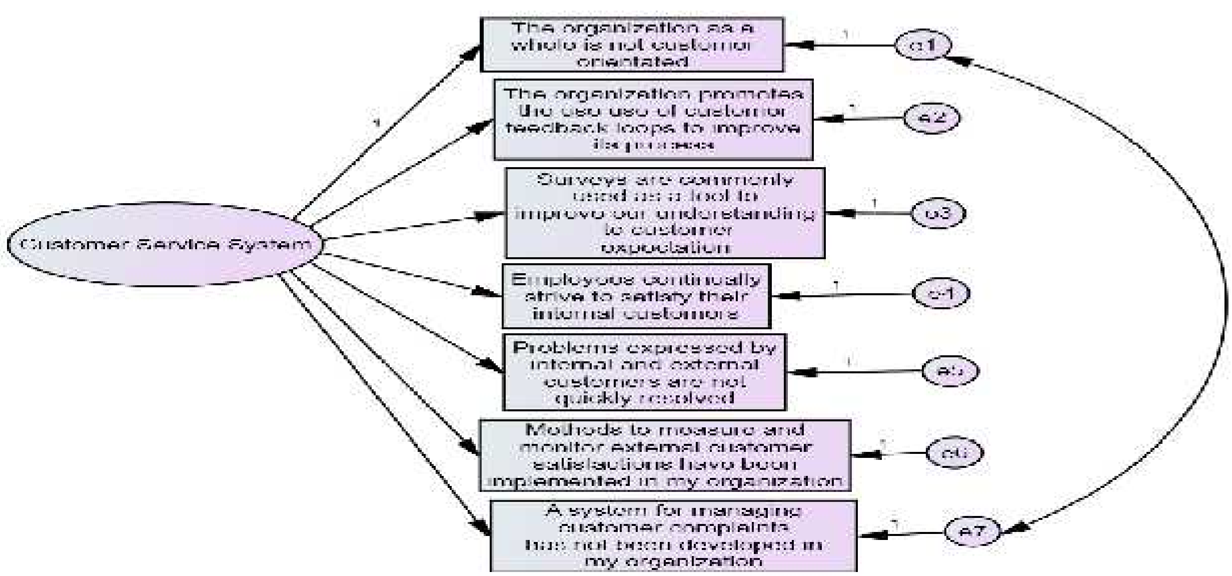
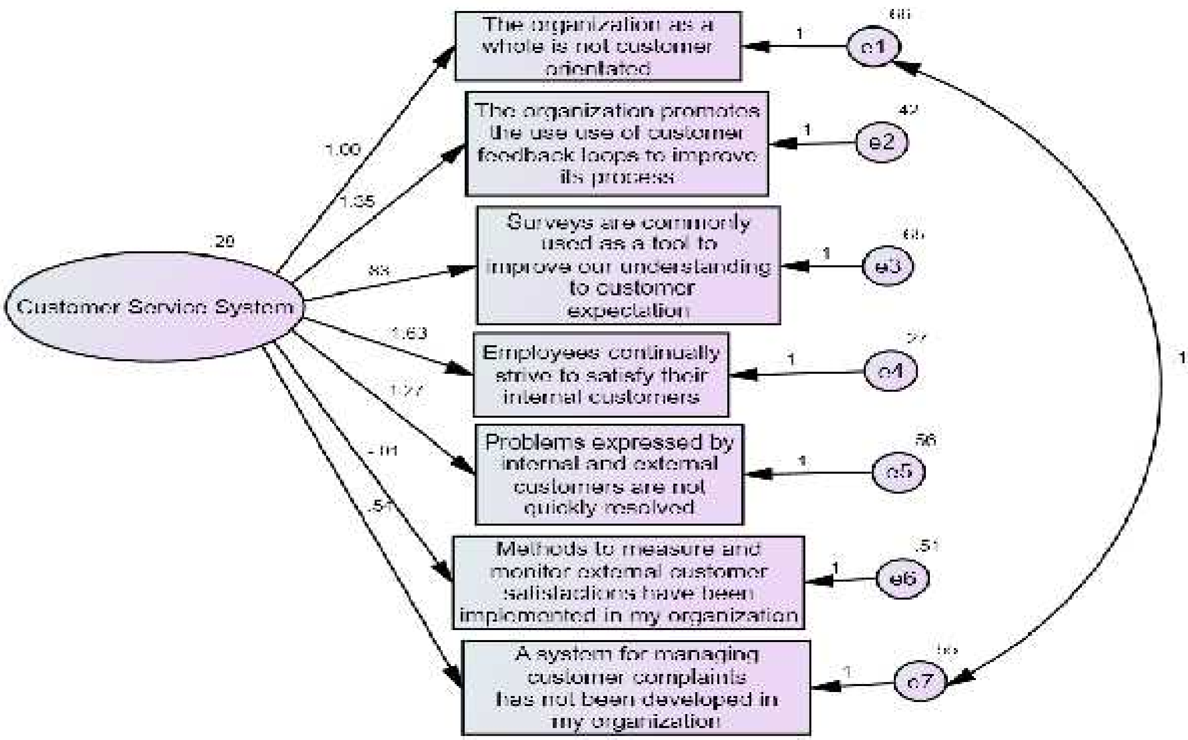


Figure 1: Proposed Conceptual Model

Figure 2: Proved Empirical Model



Legend: * One way arrows stand for regression weights, Two way arrows stand for Covariance, and **e** is the prediction error. According to Gerbing and Anderson (1992), the criteria for an acceptable model are as follows: RMSEA of 0.08 or lower; CFI of 0.90 or higher; and NFI of 0.90 or higher. The fit between the data and the proposed measurement model can be tested with a chi-square goodness-to-fit (GFI) test where the probability is greater than or equal to 0.9 indicates a good fit (Hu and Bentler, 1999). The GFI of this study was 0.974 more than the recommended value of 0.90 the other measures fitted satisfactorily; AGFI = 0.944, CFI = 1.000, TLI = 1.003, IFI = 1.002 and NFI = 0.944 with chi-square/degree of freedom <13 at 12.654and RMSEA = 0.000 (Bagozzi and Yi, 1988) indicate a good absolute fit of the model. Goodness of fit indices support the model fit and these emphasized indices indicate the acceptability of this structural model. For the purpose of testing the model fit null hypothesis and alternative hypothesis are framed.

Hypothesis

Null hypothesis (H_0): The hypothesized model has a good fit.
Alternate hypothesis (H_1): The hypothesized model does not have a good fit.

Table 1: Model Fit Indices

Fit Indices	Results	Suggested values
Chi-square	12.654(0.475) 13	P-value > 0.01
Chi-square/degree of freedom	0.973	≤ 5.00 (Hair et al., 1998)
Comparative Fit index (CFI)	1.000	> 0.90 (Hu and Bentler, 1999)
Goodness of Fit Index (GFI)	0.974	> 0.90 (Hair et al. 2006)
Adjusted Goodness of Fit Index (AGFI)	0.944	> 0.90 (Daire et al., 2008)
Normated Fit Index (NFI)	0.944	≥ 0.90 (Hu and Bentler, 1999)
Incremental Fit Index (IFI)	1.002	Approaches 1
Tucker Lewis Index (TLI)	1.003	≥ 0.90 (Hair et al., 1998)
Root mean square error of approximation (RMSEA)	0.000	< 0.08 (Hair et al., 2006)
Parsimony goodness-of-fit index (PGFI)	0.452	Within 0.5 (Mulaik et al., 1989)

As per the **above table 1**, it is clear that values of all the items are above the suggested value of 0.01 (Hair et al., 2006). According to Bollen (1989a), the higher the probability associated with Chi-square, the closer the fit between the hypothesized model and the perfect fit. The test of our null hypothesis H_0, that shown in **Figure 2**, yielded a chi-square value of 4.808 with 13 degrees of freedom and a probability of higher than 0.01 (p <0.475). It is suggesting that the fit of the data to the hypothesized model is entirely adequate. As per the result, Chi square statistics with *p* = 0.475does show a good fit of the model.

According to Barbara (2009), both the sensitivity of the Likelihood ratio test to sample size and its basis on the chi-square distribution, which assumes that the population (that is, H_0 is correct), have led to problems of fit are now widely known. According to Jöreskog and Sörbom (1993), chi-square statistic equals (N-1) FMIN, (sample size-1, multiplied by the minimum fit function) this value tends to be substantial when the model does not hold and when sample size is large. Barbara (2009) stated that, researchers have addressed the chi-square limitations by developing goodness-of-fit indices that take a more practical approach to the evaluation process. Hair et al. (1998) suggested the value for the fit statistic minimum discrepancy/degrees of freedom (CMIN/DF), otherwise chi-square/ degrees of freedom as ≤ 5. As per the **Table 1**, the value for the chi-square/degrees of freedom is 0.973 which is less than the accepted cut off value of ≤ 5.

Table 2: Unstandardized Estimate Regression Weights: (Group Number 1 - Default Model)

S/N		Factor	Unstandardized Estimate	S.E.	C.R.	P
The organization as a whole is not customer orientated (Factor1) (e1)	<---	Customer Service System (F1)	1.000			
The organization promotes the use of customer feedback loops to improve its process (Factor2) (e2)	<---	Customer Service System (F1)	1.348	0.235	5.731	0.001
Surveys are commonly used as a tool to improve our understanding to customer expectation(Factor3) (e3)	<---	Customer Service System (F1)	0.827	0.191	4.323	0.001
Employees continually strive to satisfy their internal customers (Factor4) (e4)	<---	Customer Service System (F1)	1.634	0.271	6.025	0.001
Problems expressed by internal and external customers are not quickly resolved (Factor5) (e5)	<---	Customer Service System (F1)	1.266	0.234	5.405	0.001
Methods to measure and monitor external customer satisfactions have been implemented in my organization (Factor6) (e6)	<---	Customer Service System (F1)	-0.012	0.129	-0.091	0.927
A system for managing customer complaints has not been developed in my organization (Factor7) (e7)	<---	Customer Service System (F1)	0.543	0.178	3.050	0.002

Significance tests of individual parameters

Table 2 shows the unstandardized coefficients and associated test statistics. The amount of change in the dependent or mediating variable for each one unit change in the variable predicting it is symbolized by the unstandardized regression coefficient. The **Table 2** shows the unstandardized estimate, its standard error (abbreviated S.E.), and the estimate divided by the standard error (abbreviated C.R. for Critical Ratio). Under the column P, the probability value associated with the null hypothesis that the test is zero is exhibited.

Level of significance for regression weight

When F1 goes up by 1, Factor1 goes up by 1. This regression weight was fixed at 1.000, not estimated.

The probability of getting a critical ratio as large as 5.731in absolute value is less than 0.001. In other words, the regression weight for F1 in the prediction of **Factor2** is significantly different from zero at the 0.001 level (two-tailed).

The probability of getting a critical ratio as large as 4.323in absolute value is less than 0.001. In other words, the regression weight for F1 in the prediction of **Factor3** is significantly different from zero at the 0.001 level (two-tailed).

The probability of getting a critical ratio as large as 6.025in absolute value is less than 0.001. In other words, the regression weight for F1in the prediction of **Factor4** is significantly different from zero at the 0.001 level (two-tailed).

The probability of getting a critical ratio as large as 5.405in absolute value is less than 0.001. In other words, the regression weight for F1 in the prediction of **Factor4** is significantly different from zero at the 0.001 level (two-tailed).

The probability of getting a critical ratio as large as -0.091in absolute value is less than 0.001. In other words, the regression weight for F1 in the prediction of **Factor5** is significantly different from zero at the 0.001 level (two-tailed).

The probability of getting a critical ratio as large as 0.091 in absolute value is .927. In other words, the regression weight for F1 in the prediction of **Factor6** is not significantly different from zero at the 0.05 level (two-tailed).
These statements are approximately correct for large samples under suitable assumptions.

Table 3: Standardized Regression Weights: (Group Number 1 - Default Model)

Factors	**Standardized Estimate**	**S.E.**	**C.R.**	**P**
Customer Service System (F1)	0.279	0.090	3.096	0.002
The organization as a whole is not customer orientated (e1)	0.660	0.089	7.389	0.001
The organization promotes the use of customer feedback loops to improve its process (e2)	0.416	0.067	6.196	0.001
Surveys are commonly used as a tool to improve our understanding to customer expectation (e3)	0.648	0.085	7.621	0.001
Employees continually strive to satisfy their internal customers (e4)	0.270	0.066	4.074	0.001
Problems expressed by internal and external customers are not quickly resolved (e5)	0.561	0.082	6.877	0.001
Methods to measure and monitor external customer satisfactions have been implemented in my organization (e6)	0.511	0.064	8.031	0.001
A system for managing customer complaints has not been developed in my organization (e7)	0.552	0.071	7.798	0.001

Table 3 shows the standardized estimates for the fitted model. Relative contributions of each predictor variable to each outcome variable can be evaluated by standardized estimates. Figure 2 shows the customers' perception towards the customer service system in Tamil Nadu Transport Department'sstructural model. As per **Figure 2**, it is clear that customers attach more values to the organization as a whole is not customer orientated (e1)(0.660) in Tamil Nadu Transport Department at Salem city.

Confirmatory factor analysis is furthermore known as measurement model. The root mean square error of approximation enlightens us how the model, with unknown parameter estimates would fit the population covariance matrix (Byrne, 1998). According to Kline (2005), CFI, RMSEA can be utilized along with Chi-Square test to calculate the measurement model fit. As an alternative to Chi-square test, goodness-of-fit statistic (GFI) formed by Jöreskog and Sorbom, (1993) is able to calculate the proportion of variance (Tabachnick and Fidell, 2007).

Model can be evaluated with the help of Normed fit index by means of comparing the Chi-square value of the model with Chi-square of the null model (Bentler and Bonnet, 1980). CFI is important in all SEM programs because its measure is least affected by sample size (Fan et al., 1999). According to McDonald and Ho (2002), CFI, GFI, NFI and the NNFI are the most frequently used fit indices in structural equation modeling.

Covariances: (Group number 1 - Default model)

			Estimate	S.E.	C.R.	P
The organization as a whole is not customer orientated (e1)	<-->	A system for managing customer complaints has not been developed in my organization (e7)	-0.193	0.058	-3.323	0.001

Bayesian Analysis for Estimation of Mediation Model

Bayesian statistics is a system for describing uncertainty using the mathematical language of probability. In the 'Bayesian paradigm,' degrees of belief in states of nature are specified; these are non-negative, and the total belief in all states of nature is fixed to be one. Bayesian statistical methods start with existing 'prior' beliefs, and update these using data to give 'posterior' beliefs, which may be used as the basis for inferential decisions. The Bayesian analysis is applied for determining the convergence statistic value. During the iteration of Bayesian estimation, **unhappy face (red)** is appeared in the Bayesian window due to the large value of Convergence Statistic (C.S). Reflecting the satisfactory convergence, AMOS displays **"a happy face" (yellow)** in which values of C.S is smaller are sufficient and it is conservative. Judging that the MCMC chain

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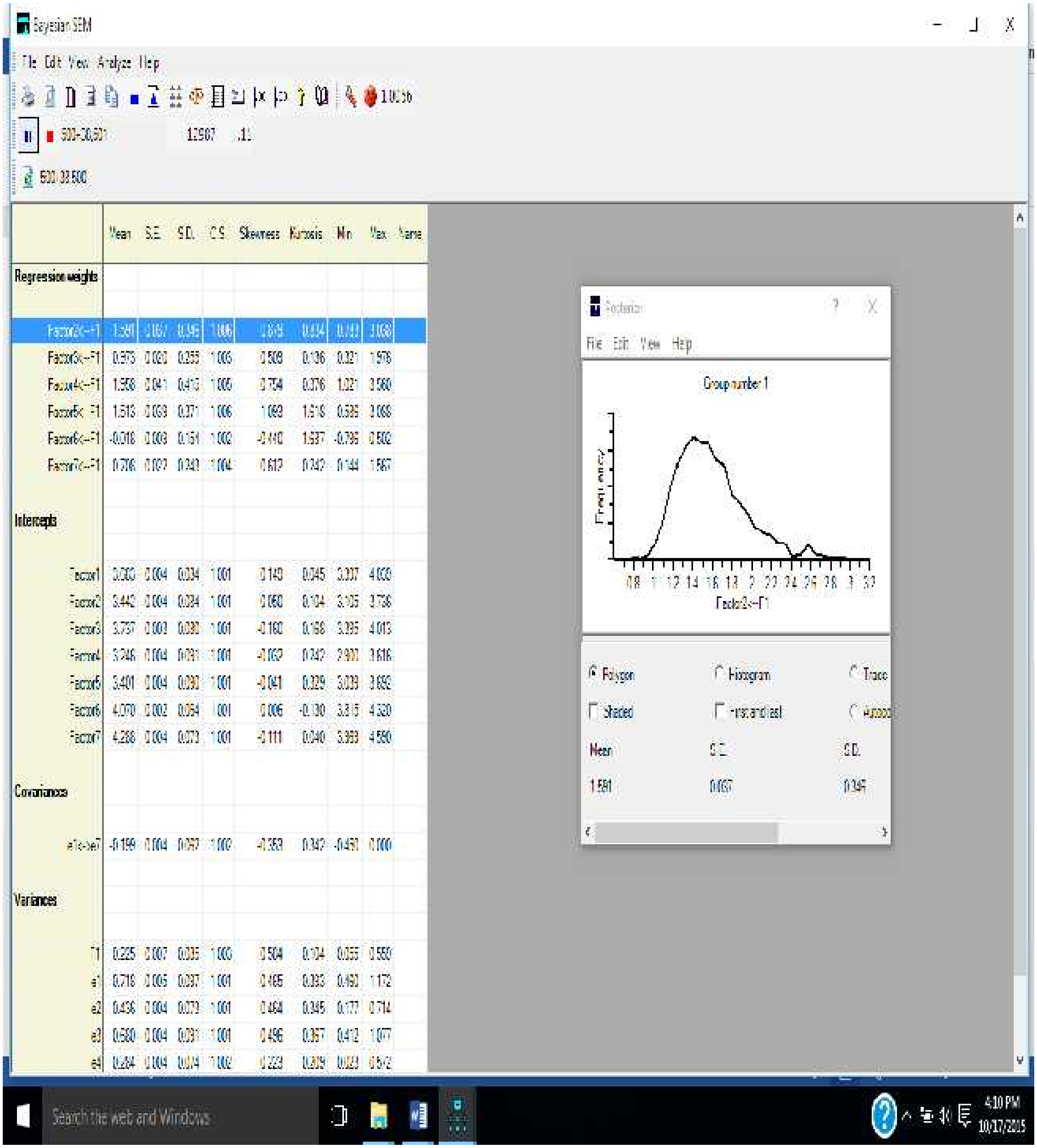
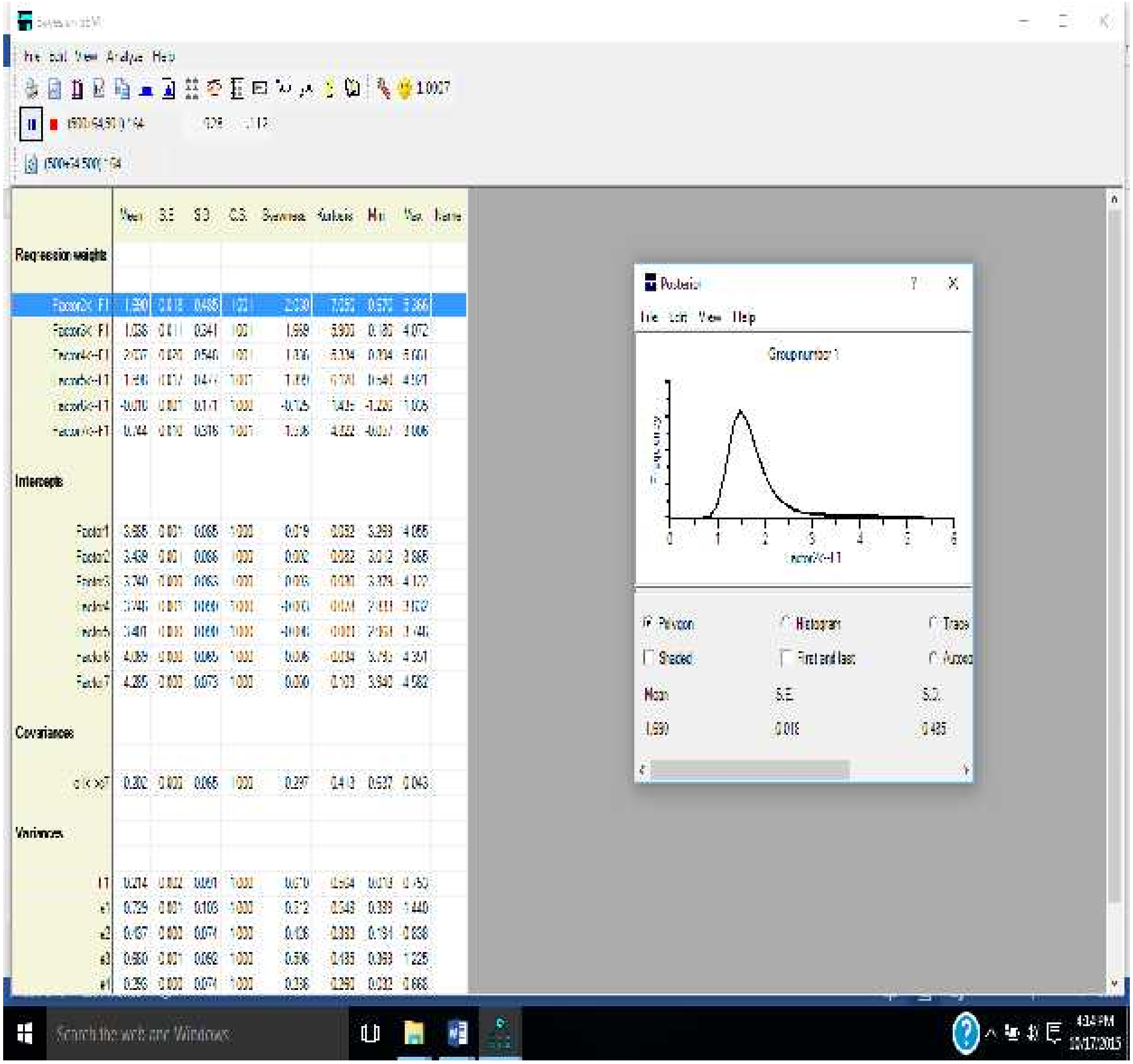
has converged by this criterion does not mean that the summary table will stop changing. As the overall convergence statistic (C.S.), C.S. value on the toolbar approaches 1.000. Finally the posterior dialog box displays a frequency polygon (like normal distribution) of the distribution shows that samples collected for the structural model has more precision.

AMOS provides several diagnostics that help to check convergence. Notice the value will be 1.0056 on the toolbar of the Bayesian SEM window. AMOS displays an "**Unhappy Face**" when the overall C.S. is not small enough.

UNHAPPY FACE



HAPPY FACE



Reflecting the satisfactory convergence, AMOS now displays a "**Happy Face**" (Yellow). The value of C.S will be 1.0007; there is a more precision to be gained by taking additional samples, so it might stop as well. The Posterior dialog box now displays a frequency polygon of distribution of The organization as a whole is not customer orientated, The organization promotes the use of customer feedback loops to improve its process, Surveys are commonly used as a tool to improve our understanding to customer expectation, Employees continually strive to satisfy their internal customers, Problems expressed by internal and external customers are not quickly resolved, Methods to measure and monitor external customer satisfactions have been implemented in my organization, and A system for managing customer complaints has not been developed in my organization factors predicting to the customers' perception towards the customer service system in Tamil Nadu Transport Department at Salem city across the samples is proved.

CONCLUSION

It could be very well concluded that the hypothesized seven-factor model fits the sample data. Based on the viability and statistical significance of important parameter estimates; the considerably good fit of the model (CFI, GFI, AGFI, NFI, IFI, TLI, RMSEA), it can be concluded that the five-factor model shown in Figure 2 represents an adequate description of Customers' Perception on Customer Service System in Tamil Nadu Transport Department at Salem City goodness of fit

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indices support the model fit and these emphasized indices indicate the acceptability of this structural model. Definitely, this study will be useful to Tamil Nadu Transport Department to ascertain the importance given by their customers for the various important factors pertaining to service quality system.

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