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Employee Satisfaction of Academics in Sri Lanka: A Logistic Regression Approach

By D. P. N. P. Dias, T. M. J. A. Cooray & Wasantha Rajapakse

University of Moratuwa

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D. P. N. P. Dias [α], T. M. J. A. Cooray [σ] & Wasantha Rajapakse [ρ]

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I. Introduction

A high-quality academic staff is the cornerstone of an effective educational system. Therefore, it is essential to pay attention to satisfaction of the academic members. A positive and healthy university structure results in increased academic staff's job satisfaction. A good university atmosphere will not only increase the employee satisfaction of academic staff, but it will at the same time develop the learning environment. The employee satisfaction is affected by internal and external motivating factors such as the supervisor behavior, co-worker behavior, and the individual success or failure in their work (Lane, 2008).

Academic staff is essential and the most vital component in the process of achieving the mission and vision of an educational institute (Kodithuwakku, 2017). Because academic staff members are the first line of contact with students and require complex work in an increasingly demanding environment (Tai, 2014). To meet the relevant standards of education, the academics need an environment that allows them to work freely without problems. According to (Rashid, 2011), satisfaction has been extensively studied in the management literature due to its importance to the physical and mental wellbeing of the employee. Therefore it is essential to determine the factors affecting academic staff members' satisfaction. Also this will be useful to recognize that, which factors should be maintained by an institute/university to increase the employee satisfaction.(Perkins, 1973) Proposed that university lecturers fulfill three major functions, namely teaching, researching and administration and management. Consequently university lecturer satis-faction is related to the functions of higher education. According to (Mueller, 2008) there are two types of job satisfaction which are based on the feelings of employees regarding their jobs. The most studied is global job satisfaction, which in dicates the overall feelings of employees about their jobs. The second type of job satisfaction is job facet satisfaction, which refers to feelings about specific job attributes, such as salary, benefits, and co-worker behavior. This questionnaire can measure above mentioned both types of job satisfaction.

When it measures employee satisfaction, most of the variables that are going to collect are categorical variables. Therefore this analysis involves categorical data analysis. Most of the previous researches in the same context have used some of the statistical techniques which are not much applicable in categorical data analysis. If researchers use un suitable mathematical models, that could lead to bias and misconception of research findings. One of the most common mistakes in a predictive model is to use statistical variable selection algorithms to identify causes.

Therefore this research used advanced analysis technique such as multinomial logistic regression. The method used for the study is the multinomial logistic regression in predicting employee satisfaction. This method is well apposite in scenarios when there is a categorical dependent variable.

II. Literature Review

Different statistical methods such as descriptive statistics, chi-square, linear regression, multilevel modeling, and ordinal regression techniques have been commonly found in the literature to analyze satisfaction questionnaires to study satisfaction about various explanatory variables. These methods investigate the

Author α: Faculty of Humanities and Sciences, Sri Lanka Institute of Information Technology. e-mail: nilushi.d@sliit.lk

Author σ: Department of Mathematics, Faculty of Engineering, University of Moratuwa.

Author ρ: Faculty of Business, Sri Lanka Institute of Information Technology.

association between the explanatory variables and the outcome variable. Some of the previous researches which have used different statistical techniques are reviewed below.

a) Multinomial Logistic Regression

Several types of research which have used multinomial logistic regression in measuring employee satisfaction are reviewed below.

In (Tahir, 2010), Multinomial Logistic Regression is used to model Employment Satisfaction at higher education institutions of Lahore Pakistan. Data had collected from 145 educators. The data was analyzed using Multinomial Logistic Regression models. (Yousra H. AL JAZAIRY1, 2014) Aims to assess the influence of professional and personal characteristics on job satisfaction among dental assistants. Multinomial logistic regression was used to determine the relationship between overall job satisfaction and other variables.

Multinomial logistic regression is also used to measure the stress levels of the employees. (Nor Amira Mohamad, 2016) Has used a multinomial logistic regression model to model the stress level among secondary school teachers in KubangPasu District, Kedah. (Prasad, 2016) Has also reported the results of their investigation on causes of occupational stress, coping strategies adopted and their relationship with the teachers' performance in CBSE affiliated school teachers in and around Hyderabad. (Madhu, 2012) Examines the factors that affect work stress among the employees in the manufacturing industries in Kerala, India. They have identified that seven factors affect the work stress of the employees. All the above researches reviewed are carried out in India.

To measure the customer satisfaction multinomial logistic regression is used. (Satyakama Paul, 2014) Has developed a model for predicting after sales customer satisfaction using multinomial logistic regression insights from a South African car company.

b) Employee Satisfaction

Following are some of the past researches that have been done in the employee satisfaction domain.

Researches were carried out to measure the employee satisfaction of the academics. (Rajapakshe, 2007) Determines the perception of organizational climate has a significant effect on the job performance of some academics in Thailand. This study has used MANOVA and descriptive statistics for the analysis process. The same questionnaire was used in this study, because of the reliability of the factors in that. Another study has been carried out in the higher education sector and (Oshagbemi T., 1997) investigated job satisfaction among university professors. In here cluster analysis was used.

(Hagedorn, 1994) Examined the satisfaction of academic staff using various variables, including salary, perceived support from colleagues, satisfaction with administration, enjoyment of student interaction and stress levels. In here it has used Importance Satisfaction model, which is not much related to a statistical background.

In (Ceylan, 2009), they have used different statistical techniques such as reliability analysis, factor analysis, correlation analysis and regression analysis. They have used the Kaiser-Meyer-Olkin (KMO) test, and Bartlett's Test of Sphericity to measure the adequacy of the data. Eventually, they have obtained a model for Employee Satisfaction. In (Aguilar, 2009) also, they have used Regression Analysis and reliability analysis. Same as in (Ceylan, 2009) they have derived a regression model for employee satisfaction and here it has considered more independent variables.

In (Welly, 2014), to collect the data it had used the Job Descriptive Index (JDI) Questionnaire which has been used to evaluate job satisfaction. Data is analyzed with Descriptive Statistics which has contributed to identifying mean value for each independent variable and dependent variable. The results had indicated that the employees are being neutral about their job satisfaction. In (Dziechciarz-Duda, 2005), it has used multivariate analysis and clustering techniques which are the same approach as (Oshagbemi T., 1997). Using these methods, it has clustered the employees into three categories.

To measure the satisfaction levels of higher education teachers (M. Bojadjiev, 2015) has carried out a study. This study had issued a questionnaire to all teachers at a Higher Education Institute in Taiwan. Reliability analysis is carried out, and it has determined which quality attributes must be improved to raise employee satisfaction.

In (Kodithuwakku, 2017), the study is carried out to measure the employee satisfaction of the academics in government and private universities in Sri Lanka.This study has used both primary and secondary data. This study has used statistical techniques such as student's t-tests and one-way ANOVA tables though it is suitable to use techniques related to categorical data analysis. This analysis had not gone through profound statistical analysis.

Most of the researches reviewed above are related to employee satisfaction. Some of them have used linear regression analysis, and some have used very light statistical methods such as student's t-test, ANOVA and MANOVA, which are not much appropriate to use with ordinal dependent variables.

After reviewing the literature, the following factors were considered as factors affecting employee satisfaction.

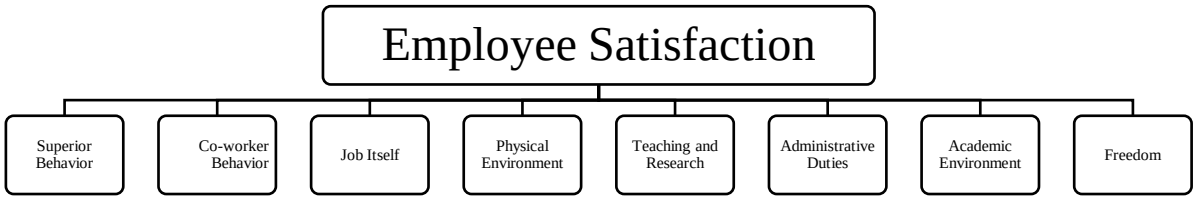

Figure 1: Factors affecting Employee Satisfaction

III. Methodology

a) Research Design

This study is survey research, and it is based on the data collected through the questionnaire. To analyze the data, different statistical methods were used. The unit of analysis is an academic from a Sri Lankan University.

b) Population and Sample

In this context, the population is all the university academics in government and private both sectors in Sri Lanka. There are seventeen state universities, nine Institutes and seven Post Graduate institutes available in the Tertiary Education system in Sri Lanka. Currently, there are 15 government universities in Sri Lanka. All these government universities employ around 5440 permanent university lecturers in all the universities according to "Sri Lanka University Statistics – 2016" (University Grants Commission, 2016). Still, there is no record on the number of academics in the private sector. However, the sample of the data should be composed of data from government and private universities both.

c) Data Collection

When collecting the elements for the sample, haphazard sampling was used. It is a non-probability sampling technique. With this sampling technique elements are selected in an aimless and assume that the population is homogeneous. The rationale for using this sampling method is due to lower cost, speedy data collection, and availability of population selection. Data collection was done from December 2017 to January 2018. 1116 questionnaires were distributed among academics in all private and government universities in Sri Lanka, and only 260 responses were received. Out of all 260 responses, only 230 could be used for the analysis process due to incompletely filled questionnaires. Hence the response rate was around 23.3% which is a slightly small value.

d) Questionnaire Design

For this research, the initial stage was to design the questionnaire. It was prepared based on previous research and specifically (Rajapakshe, 2007) has considered. This consists of some demographic data and also it covered different areas such as Superior behavior, co-worker behavior, the job itself, physical environment, teaching and research, administrative duties, academic atmosphere, and freedom. Collected demographic data include age, gender, academic rank, sector, the field of lecturing, years of service, salary, distance to work location, and number of research papers published. The Questionnaire consists of six questions to measure employee satisfaction. There are altogether 47 questions to measure these eight factors. Cronbach's alpha is used to determine the reliability, or internal consistency, of a set of variables. In other words, Cronbach's alpha is one way of assessing the strength of that consistency (Dennick, 2011). According to the results, except supervisor behavior, all the other factors have a positive Chronbach's alpha value. To measure supervisor behavior there are five questions, and there are negatively related questions and that can be the reason to obtain negative values for the chronbach's alpha. Therefore to overcome this problem two questions from supervisor behavior were re-coded. Once the first and third questions are recoded, Cronbach's alpha was again calculated, and the resulting value was 0.812 which is an acceptable value. It indicates that now the items in superior behavior are internally consistent.

e) Data Analysis Methods

To analyze data, Multinomial Logistic Regression was used. Logistic regression assumes that the dependent variable is a stochastic event and a dependent variable describes the outcome of this stochastic event with a density function (a function of cumulated probabilities ranging from 0 to 1). A binary logistic regression model is taken into account,and regression coefficients are estimated to predict the probability of the outcome of interest. Equation (1) shows a function of the probabilities results in a linear combination of parameters is,

$$\ln\left(\frac{prob\ (event\ )}{1-prob\ (event\ )}\right) = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \cdots + \beta_k X_k \quad \text{q. (1)}$$

The component in the Left-hand side is called as a logit. The coefficients in the logistic regression model indicate how much the logit changes based on the values of the independent variables.

There are five scalar measures of model fit: (1) Deviance; (2) McFadden's; (3) Cox and Snell Pseudo; (4) Nagelkerke Pseudo and (5) Test of Parallel Lines. There is no convincing evidence that selection of a model that maximizes the value of a given measure necessarily results in a model that is optimal in any

sense other than the model having a bigger (or smaller) of that measure (Long & Freese, 2001). However, the residual analysis was also used to measure the goodness of fit of the model.

IV. Results and Analysis

This section presents an analysis of the data using multinomial logistic regression. Questionnaire extracts demographic factors and factors which affect employee satisfaction. Those main factors include superior behavior, co-worker behavior, the job itself, physical conditions, teaching and research, academic environment and freedom. Initially, the demographic factors are analyzed with multinomial logistic regression.

a) Multinomial Logistic Regression Analysis of Demographic Factors and Employee Satisfaction

The demographic factors collected are age, gender, academic rank, sector, the field of lecturing, years of service, salary, distance to work location and number of research papers published. Multinomial logistic regression is applied to find the relationship between demographic factors and employee satisfaction.

Since there are six questions to measure employee satisfaction, to form one dependent variable, the mode of all the six variables was taken. Employee satisfaction was modeled with the demographic factors using multinomial logistic regression, and the following result was obtained.

Table 4.1: Model Fitting Information for the model between employee Satisfaction and Demographic Factors

Model	Model Fitting Criteria	Likelihood Ratio Tests		
	-2 Log Likelihood	Chi-Square	Degrees of Freedom	Significance
Intercept Only	207.804			
Final	139.256	68.548	24	.000

Table 4.1 gives the model fitting information and significance value is 0.000. It is less than 0.05, and it indicates that the model is significant at 5% level of significance.

Table 4.2: Pseudo R-Square the model between employee Satisfaction and Demographic factors

Cox and Snell	.261
Nagelkerke	.286
McFadden	.125

According to Table 4.2, Nagelkerke R-square value is 0.286. Therefore the model can explain 28.6% of the variation of the dependent variable.

Table 4.3: Likelihood Ratio Tests and Significance of the parameters

Effect	Model Fitting Criteria	Likelihood Ratio Tests		
	-2 Log Likelihood of Reduced Model	Chi-Square	Degrees of Freedom	Significance
Intercept	139.256[a]	.000	0	.
Sector	156.528	17.272	4	.002
Salary	168.672	29.417	16	.021
Gender	149.908	10.652	4	.031

According to Table 4.3, all the predictors, sector, salary, and gender are significant, because all these demographic factors have significance values less than 0.05. Therefore they are all significant at 5 % level of significance. It can be concluded that sector, salary and gender have a vital effect on employee satisfaction. In this context, the sector indicates whether the employee is either from private or government sector.

Table 4.4 gives the correct classification rate for the multinomial logistic regression model. According to the table, the overall correct classification rate is 60.8%. Observed and predicted frequencies for the model are given in Appendix II. It can be seen that, for most of the categories, predicted and observed percentages are approximately the same. Pearson residuals are also included in this table, and all those values are less than 2, and therefore it can be concluded that the model fits the data well.

Table 4.4: Correct Classification Rate of the model

Observed	Predicted					
	1	2	3	4	5	Percent Correct
1	0	0	1	10	0	0.0%
2	0	0	3	17	0	0.0%
3	0	0	6	28	0	17.6%
4	0	0	3	132	0	97.8%
5	0	0	0	27	0	0.0%
Overall Percentage	0.0%	0.0%	5.7%	94.3%	0.0%	60.8%

b) Multinomial Logistic Regression Model for Employee Satisfaction

After the reliability analysis, the main factors in the questionnaire were analyzed with multinomial logistic regression. After obtaining different models with employee satisfaction, the best model was obtained with four independent variables. Table 4.7 gives the model fitting information for the multinomial logistic regression model between employee satisfaction and main factors. According to the table, chi-square value is significant at the 5% significance level.

Table 4.7: Model Fitting Information for the model between employee Satisfaction and main factors

Model	Model Fitting Criteria	Likelihood Ratio Tests		
	-2 Log Likelihood	Chi-Square	Degrees of Freedom	Significance
Intercept Only	450.665			
Final	271.590	179.075	64	.000

According to Table 4.8, Nagelkerke R-square value is 0.596. Therefore the model can explain 59.6% of the variation of the dependent variable.

Table 4.8: Pseudo R-Square the model between employee Satisfaction and main factors

Cox and Snell	.543
Nagelkerke	.596
McFadden	.324

According to Table 4.9, four factors are significant, namely Q12, Q31, Q32, and Q83. All these factors have significance values less than 0.05 and therefore it can be concluded that all those factors are significant at 5% level of significance. These factors include freedom, superior behavior and the job itself. The questions that have become significant are listed in Table 4.10.

Table 4.9: Likelihood Ratio Tests and Significance of the parameters

Effect	Model Fitting Criteria	Likelihood Ratio Tests		
	-2 Log Likelihood of Reduced Model	Chi-Square	Degrees of Freedom	Significance
Intercept	271.590[a]	.000	0	.
Q12	315.921	44.330	16	.000
Q31	301.166	29.576	16	.020
Q32	323.125	51.535	16	.000
Q83	340.914	69.324	16	.000

One of the significant factors includes the behavior of the superior. Both of the next two factors are from the job itself and it indicates that fitting of the abilities, and knowledge with the work is a significant factor in employee satisfaction. Further, the ability to use the full potential in the work is another significant factor in predicting employee satisfaction. Another key factor that has become significant is the freedom of the lecturer.

Table 4.10: Significant items in the questionnaire

Question	Question in the Questionnaire	Factor
Q12	I believe that my superior is selfish	Superior Behavior
Q32	My job fits my abilities and knowledge	Job Itself
Q31	I can use my full potential in my job	Job Itself
Q83	I am allowed to give lectures in other Universities	Freedom

Table 4.11 gives the correct classification rate for the multinomial logistic regression model. According to the table, the overall correct classification rate is 67.7%. Pearson residuals for the model are given in Appendix. It has found that, for most of the categories, predicted and observed percentages are approximately the same. Pearson residuals are also included in this table, and all those values are less than 2, and therefore it can be concluded that the model fits the data well.

Table 4.11: Correct Classification Rate of the model

Observed	Predicted					
	1	2	3	4	5	Percent Correct
1	6	1	0	3	1	54.5%
2	1	5	0	13	1	25.0%
3	1	3	9	19	2	26.5%
4	1	4	3	121	7	89.0%
5	1	0	1	12	14	50.0%
Overall Percentage	4.4%	5.7%	5.7%	73.4%	10.9%	67.7%

V. Conclusion

This study was conducted to evaluate and determine the main factors affecting employee satisfaction of academics in Sri Lanka. Multinomial logistic regression is used to analyze demographic factors and all 7 factors namely superior behavior, co-worker behavior, the job itself, physical conditions, teaching and Research, administrative duties, academic environment and freedom against the employee satisfaction. All these seven factors were measured by 37 questions included in the questionnaire. Results obtained from the analysis can be incorporated to improve the employee satisfaction of the Sri Lankan academics in future. Findings obtained from the analysis indicated that, out of all the demographic factors, sector, salary and gender were significant factors when modeling employee satisfaction with multinomial logistic regression. According to the model, sector, salary and gender can explain 28.6% of the variation of the employee satisfaction. As suggested by (David Bernal, 1998), this study also confirms that salary is related to employee satisfaction. (Shihadeh, 1994) Have found out of that, women are more satisfied with their job than men and that indicates that there is a relationship between employee satisfaction and gender. This study is able to confirm the result that employee satisfaction is associated with gender.

Before the analysis of the main factors, internal consistency of each factor was tested with the Cronbach's alpha and except the first factor (Superior behavior) all other factors gave positive values. When it is tested with superior behavior, it gave a negative value for Cronbach's alpha and therefore in order to make it internally consistent two questions were re-coded and it resulted in an acceptable Cronbach's alpha value which shows that all 5 items in superior behavior are internally consistent. Reliability analysis is used in many researches.

Multinomial logistic regression resulted in a model for employee satisfaction with four factors. This model has shown that, superior behavior, job itself and freedom are significant factors in predicting employee satisfaction. That is, this analysis has found that, fitting of job with abilities and knowledge, use of the employer's full potential in the job, superior's behavior and freedom are significant factors in the model. This model was evaluated with R-square values, residuals, percentage of correct prediction and significance of parameter estimates. However, the R-square value is 59.6% for this model and therefore it indicates that this model is explaining 59.6% of the variation of the dependent variable.(Rajapakshe, 2007) Has found that co-worker's behavior, job itself and freedom are significant factors on employee satisfaction. Therefore it shows that there is a slight difference between the results of this study and the results of (Rajapakshe, 2007). But most of the significant factors in this study were much similar to (Rajapakshe, 2007).

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