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Bayesian Analysis on Predictors of Employee Satisfaction at Debre Markos University: A Cross Sectional Study Design

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Abstract		Original Research Article

Background: Human resource is considered as the most important resource to affect job performance in organizations. Hence, the effectiveness and efficiency of any organization cannot be achieved without effective management of its human resource. The aim of this study was to assess the satisfaction level and identify the significant predictors of employee satisfaction at Debre Markos University staff.

Methods: Institutional based cross-sectional study was conducted among 560 academic and administrative staff working in Debre Markos University. Data was collected using self-administered structured questionnaires. Bayesian logistic regression analysis was employed on Gibbs sampler algorithm.

Results: The overall level of job satisfaction was 36% and most (67.1%) of the employee were male and about 22.7% of them were satisfied. About, 60.9% of academic staff, 23.9% were satisfied and 37% were dissatisfied. Moreover, about 33.6% of the total respondents were administrative staff and 10.4% of them were satisfied.

Conclusion: The overall job satisfaction level was low and most of employees were male and master's holders. Among the job satisfaction related factors, salary, relationship, work environment, work itself, responsibility, promotion significantly influences the job satisfaction of workers since the 95% credible interval of these variables does not include zero (at least one category).

Keywords: Bayesian Estimation, Debre Markos University, Job Satisfaction, Employee Satisfaction, Predictors of Employee

BACKGROUND

Human resource is also considered as the most important resource to affect job performance in organizations. Hence, the effectiveness and efficiency of any organization cannot be achieved without effective management of its human resource [Redman, T. & Wilkinson, A., 2013]. Several researches conducted globally showed that there is a positive association between job satisfaction of employees and organizational performance. With regard to this, [Amburgey, W. D., 2005] stated that job satisfaction is an important element of success in an organization.

Human Resource Management is getting more important in the business nowadays. One of the main aspects of Human Resource Management is the measurement of employee satisfaction. Companies have to make sure that employee satisfaction is high among the workers, which is a precondition for increasing productivity, responsiveness, quality, and customer service. Satisfaction is a measure of how happy employees are with their job and working environment. It is a key factor when measuring the organizational success [Swaroopa D. and Sudhir B.].

Employee satisfaction one of the most key challenges faced by the institutions. Employees are the most valuable resource for all institutions because the longer an employee works for a organization the more valuable it becomes. In short, employee

satisfaction is all about employees being satisfied in the organization with a strong belief that working with that particular organization is their best option [Gnaneshwar K. & R.Perumal, 2019].

A well trained, motivated workforce is an engine to make organization's success real. Productivity, quality and customer relations and satisfactions are the preconditions for the success the company and these depend on performance of its employees. Employees can perform effectively if they can target appropriate motivation and recognition from their organization [Armstrong, M., 2010]. The success of organization largely depends on the quality of its employees which is measured by their performance. Like all other systems, employees" job performance does not function when their components do not work together smoothly and efficiently [Bratton, J., & Gold, J., 2017].

All organization needs to pay attention on employee's job performance in order to achieve pre- stated objectives, and employees accomplish their duties based on specific standard stated by their managers [Mullins, L., 2010]. Universities in the modern world are expected to seek and cultivate new knowledge, provide the right kind of leadership and strive to promote equality and social justice [Daniel, D., Liben, G., & Adugna, A., 2017]. Many firms including universities begin to track their customers' satisfaction through measuring their level of service quality [Collart, D.].

Whatever theoretical approach is used to study job satisfaction, most of the researchers have identified two groups of variables: environmental factors and personal characteristics of individuals [Kefyalew, B., Tafer, M., & Ayalew, M., 2020, Saif, S. K., Nawaz, A., Jan, F. A., & Khan, M. I., 2012]. However, Herzberg's theory is the most useful model to study job satisfaction [Kim, S., 2015]. Moreover, [Karimi, S., 2007] found out that as it helps in understanding the job satisfaction in the educational settings.

The study conducted by [Wasaf I. & Muhammad J. K., 2021], satisfied employees were better in performance as compared to dissatisfied employees, thus contributing significant role in the uplifting of their organizations. Moreover, job satisfaction determines organizational performance [Danica B., 2016].

Debre Markos University is one of the services providing of Ethiopian higher education institution where its success has been relied on the performance of its employees to deliver service for the students with its partnerships. Hence, this study identifies the level of satisfaction employer, students and partners at Debre Markos University. The general objective of the study was to assess the satisfaction level and significant predictors of employee at Debre Markos University. Specifically: to assess the satisfaction level of employees and to identify the significant factors of satisfaction of employees at Debre Markos University

staff.

METHODS
Study Area and Design
This study was conducted at Debre Markos University staff in 2022. Debre Markos University is one of the public Universities in Ethiopia which is located in East Gojjam Zone; Amhara Region. The cross sectional study design was conducted in Debre Markos staff to assess the level of satisfaction and significant predictors of satisfaction for employee.

Data Collection and Variable
In this study, primary data was used through structured interviewer administrative questionnaire from selected staff of Debre Markos Uiversity.

The response variable of the study was staff level of satisfaction and socio demographic independent variables were gender, age, marital status, job type, experience, educational level. In addition, ten parameters to measure the level of satisfaction were vision/mission/policies, relationship, leadership style, salary, Work environment, work itself, responsibility, promotion, success and Recognition.

Sampling Technique and Sample Size Determination
Simple random sampling method was employed to take data from Debre Markos University staff. Sample size is determined by considering different situations such as objective of the research, design of the research, cost constraint, and degree of precision required. Based on these important ideas, the sample size of this study was determined by [Cochran WG, 1997]. Based on the above situation, 560 sample staff was considered.

Data Analysis
Both descriptive and inferential statistical analyses were employed to meet the objectives of the study. Descriptive analysis was analysed using SPSS software and winBUGS was used for Bayesian estimation on logistic regression. Bayesian logistic regression method is used to make inference about the parameters of the model from posterior distribution, and Gibbs sampler algorithm was used. In Bayesian estimation, the significant variables were identified by the 95% credible interval, that is, the credible interval of significant variable does not include zero in the interval (at least one category).

Ethics Approval and Consent to Participate
Ethical approval for this study was obtained from Debre Markos University board of research and community service reviewers. Permission was obtained from the concerned bodies of Debre Markos University quality assurance

directorate through a formal letter. All study participants were informed that they have full right not to participate in the study at any time they wish if that was their choice. All information obtained in the study was kept confidential. All methods were performed in accordance with the guidelines and regulations of Debre Markos University.

RESULTS
Socio Demographic Characteristics of Employee

Based on the result, most (67.1%) of the employee were male and about 22.7% of them were satisfied. The rest 32.9% were female employee and about 13.8% of them were satisfied. Out of 60.9% of academic staff, 23.9% were satisfied and 37% were dissatisfied. Moreover, about 33.6% of the total respondents were administrative staff and 10.4% of them were satisfied. The majority (47.3%) of the respondents was master degree holders, and only 15.9% of them were satisfied. In addition, only 9.3% of sample data were assistant and above educational level, and most (5.9%) of them were satisfied (Table 1, Figure 1).

Table 1: Employee satisfaction level by covariate (cross tabulation)

| Variable	Category	Satisfaction level		Total
		Dissatisfied	Satisfied	
Gender	Male	249 (44.5)	127 (22.7)	376 (67.1)
	Female	107 (19.1)	77 (13.8)	184 (32.9)
Types of job	Academic staff	207 (37)	134 (23.9)	341 (60.9)
	Technical staff	19 (3.4)	12 (2.1)	31(5.5)
	Administrative	130 (23.2)	58 (10.4)	188 (33.6)
Educational level	Diploma and below	50 (8.9)	20 (3.6)	70 (12.5)
	Bachelor degree	111 (19.8)	62 (11.1)	173 (30.9)
	Masters' degree	176 (31.4)	89 (15.9)	265 (47.3)
	Assistant and above	19 (3.4)	33 (5.9)	52 (9.3)
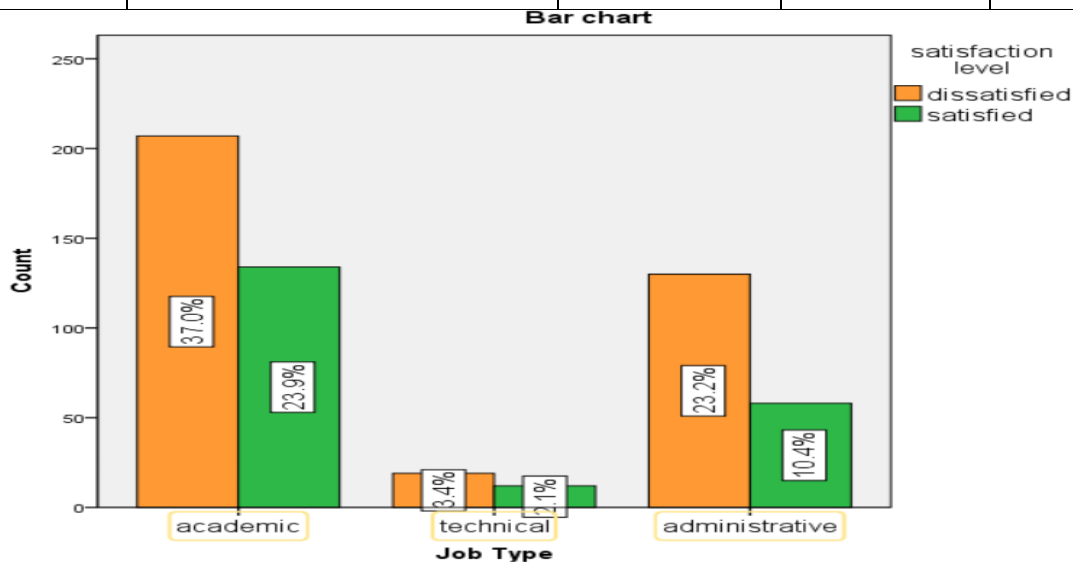
Figure 1: Level of satisfaction for employee across three types of job.

Overall Satisfaction Level of Employee in Debre Markos University

From total sample (560), about 6.1%, 30.4% of the respondents were very satisfied and satisfied respectively, whereas about 48% and 15.5% of them were dissatisfied and very dissatisfied respectively. Overall, about more than one third (36.4%) of employee were satisfied (Table 2, figure1).

Table 2: The overall satisfaction level of employee, 2022.

Satisfaction level	Frequency	Percent	Valid Percent	% Satisfaction
very dissatisfied	87	15.5	15.5	63.6
Dissatisfied	269	48.0	48.0	
Satisfied	170	30.4	30.4	36.4
very satisfied	34	6.1	6.1	
Total	560	100.0	100.0	

Satisfaction of Employee in Ten Parameters

To measure the level of satisfaction of employee, ten parameters were used. According to the result, about 25.2% and 8.8% of the respondent were satisfied and very satisfied on the University vision/mission/policies respectively. Nearly four-fifth of the respondent were satisfied and very satisfied (33% and 46.3%) on relationship with peers/supervisor/subordinate/management. On the leadership style of the university, most of the respondent were satisfied, that is about 9.6%, 18.4%, 32.5% and 39.5% of the employee were very dissatisfied, dissatisfied, satisfied and very satisfied respectively. Most of employee were very dissatisfied (75.7%) and dissatisfied (13.4%) on their salary, whereas only about 5.5% and 5.4% of them were satisfied and very satisfied respectively. From the given respondent, about 41.8% and 32.9% were dissatisfied and satisfied on their working environment suitability respectively, and about 42.7% and 20.7% of the employee were satisfied and very satisfied on their work respectively. In general, more than half of Debre Markos University employee were satisfied (satisfied and very satisfied) on their relationship, leadership style, work and responsibility but, more than half of employee were dissatisfied on their promotion issue, success, vision/mission/policies and recognition. Moreover, three-fourth (75.7%) of the respondent were very dissatisfied on their salary (Table 3).

Table 3: Employee satisfaction in ten parameters, 2022.

Parameter of satisfaction	Level of satisfaction			
	Very dissatisfied	Dissatisfied	Satisfied	Very satisfied
Vision/mission/policies	170 (30.7)	198 (35.4)	141(25.2)	49 (8.8)
Relationship	42 (7.5)	74 (13.2)	185 (33.0)	259 (46.3)
Leadership style	54 (9.6)	103 (18.4)	182 (32.5)	221 (39.5)
Salary	424 (75.7)	75 (13.4)	31 (5.5)	30 (5.4)
Work environment	86 (15.4)	234 (41.8)	184 (32.9)	56 (10.0)
Work itself	88 (15.7)	117 (20.9)	239 (42.7)	116 (20.7)
Responsibility	94 (16.8)	151 (27.0)	212 (37.9)	103 (14.4)
Promotion	230 (41.1)	198 (35.4)	101 (18.0)	31 (5.5)
Success	161 (28.8)	154 (27.5)	175 (31.3)	70 (12.5)
Recognition	225 (40.2)	184 (32.9)	109 (19.5)	42 (7.5)

Result of Bayesian Logistic Regression Analysis

The aim of this study was to identify the significant predictors of job satisfaction of employee at Debre Markos University. To meet the aim, Bayesian logistic regression analysis was used. The analysis (estimation) was done using the Gibbs sampler algorithm on Win BUGS software. Based on the result of this estimation, the significant predictors of satisfaction level were eight parameters (mission/vision/policies, relationship, salary, work environment, work itself, responsibility, promotion and success) of employee since the 95% credible interval of these variables does not include zero (at least one category). But gender, educational level and work experience of employee had no significant effect on the level of satisfaction (Table 4).

Table 4: Bayesian Logistic Regression Analysis Result (n=560), 2022

Variable	Node	Mean	Sd	MC error	95% credible interval	
Constant	beta[1]	-10.86	1.557	0.0677	-13.99	-8.140
Gender (ref: male)	Female	0.778	0.404	0.0053	-0.011	1.564

Experience (ref :<2 years)	2-5 years	-0.884	0.636	0.0144	-2.158	0.355
	6-9 years	-1.215	0.647	0.0141	-2.501	0.041
	> 9 years	0.053	0.721	0.0154	-1.374	1.461
Education (ref: diploma and less)	Bachelor Degree	-0.812	0.641	0.0125	-2.074	0.413
	Master's degree	-1.172	0.615	0.0129	-2.388	0.002
	Assistant prof. & above	-0.371	0.920	0.0140	-2.188	1.433
Vision/mission/ policies	Satisfied	2.337	0.402	0.0082	1.571	3.148
Relationship	Satisfied	3.175	0.845	0.0298	1.620	4.889
Salary	Satisfied	3.619	0.856	0.0226	2.009	5.358
Work environment	Satisfied	1.891	0.393	0.0065	1.144	2.688
Work it self	Satisfied	2.894	0.636	0.0164	1.694	4.188
Responsibility	Satisfied	3.127	0.538	0.0134	2.131	4.239
Promotion	Satisfied	4.499	0.651	0.0182	3.306	5.854
Success	Satisfied	2.211	0.413	0.0083	1.424	3.034

NB. For last eight variables, the ref. was dissatisfied.

Assessment of convergence was done using the time series plots, Gelman-Rubin statistic and density plots. These plots indicated in the given plots below that in any plot of significant predictors the convergence of the algorithm was attained (figure 2, 3 & 4).
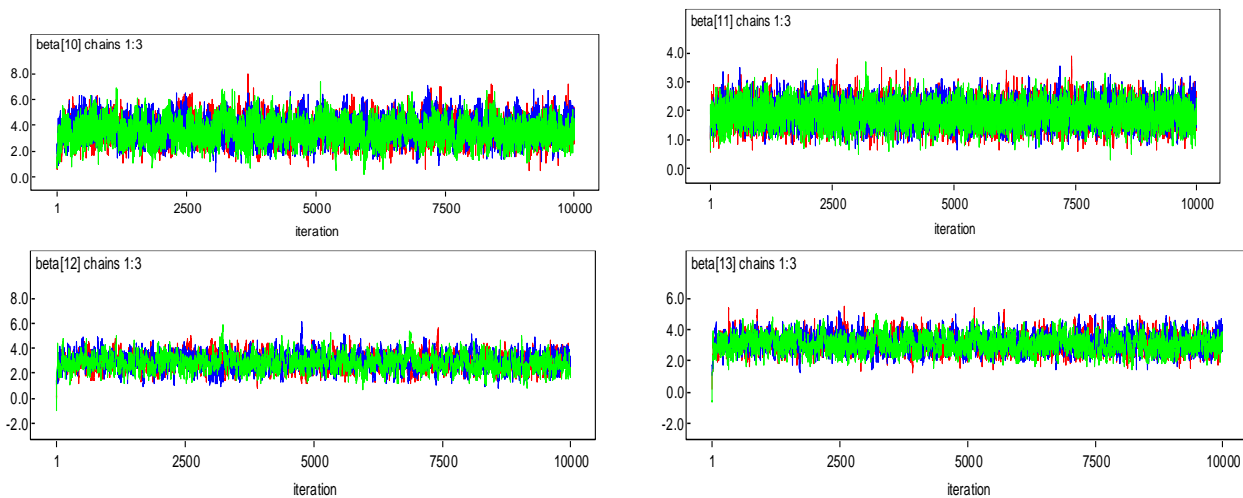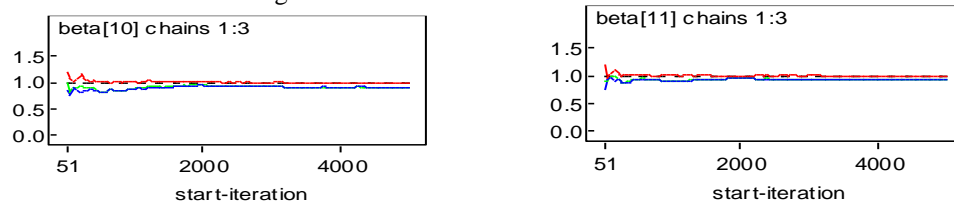
Figure 2: Time series plot

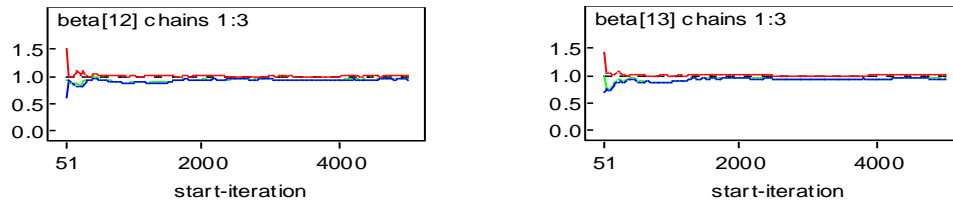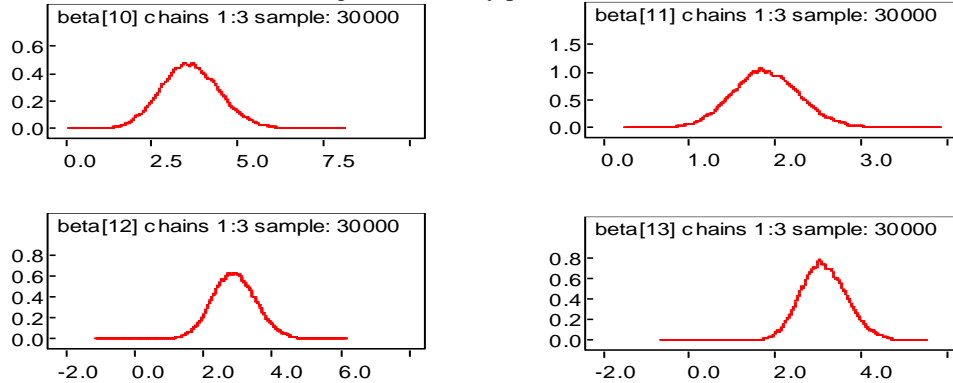

Figure 3: Gelman Rubin statistics

Figure 4: Density plot

DISCUSSION

The aim of the study was to assess the satisfaction level and significant predictors of employee at Debre Markos University. From the result, about more than one third (36.4%) of employee were satisfied whereas most of employee are not satisfied with their current job. This result was lower than that found in study conducted by [Mesfin A., Waleleng W., Wogayehu T., Yimer M., Hussene U., Amelework A., Sintayehu A., Alemnesh H., and Endalkachew B., 2020, Beyazin K. D., Shimele O. S., Berhane M. E. and Abebe S. B., 2017] in which the overall level of job satisfaction were 53.8% and 41.46% respectively. The reason behind may be the difference of job type.

From Bayesian regression analysis, the significant predictors of satisfaction level were mission/vision/policies, relationship, salary, work environment, work itself, responsibility, promotion and success of employee.

This result shown that relationship was the significant predictor for job satisfaction and the result was similar with the study on [Biniyam K. D. and Samson M. D., 2021; Neeraj K., 2011] and salary was significantly and positively related with satisfaction of employee and this is also consistent with the following studies [Beyazin K. D., Shimele O. S., Berhane M. E. and Abebe S. B., 2017; Biniyam K. D. and Samson M. D., 2021; Mulu A. A., 2013; Tala H. and Malak A., 2021]. In addition, promotion was significant variable for job satisfaction of employee and the result was same with study conducted by [Neeraj K., 2011; Birhan K., Matebe T. & Meseret A., 2020; Mehari H. and Peteti P., 2017] and work environment has significant effect on job satisfaction and this is consistent with

[Yenesew F. G., 2021], but the result was inconsistent with the study [Biniyam K. D. and Samson M. D., 2021].

In this study gender, educational level and work experience of employee had no significant effect on the job of satisfaction. Based on the result, gender, experience, educational level and marital status of the employee were not significant variables for satisfaction. The result of gender was consistent with the study conducted by [Wasaf I. & Muhammad J. K., 2021; Biniyam K. D. and Samson M. D., 2021] but not consistent with studies [Gnaneshwar K. & R.Perumal, 2019; Mulu A. A., 2013]. In addition, experience was significant predictors in the following studies [Gnaneshwar K. & R.Perumal, 2019; Mulu A. A., 2013; Biniyam K. D. and Samson M. D., 2021], the difference may be due to work type and workplace, and the result of current study was similar with [Birhan K., Matebe T. & Meseret A., 2020]. Moreover, in this study educational level was insignificant predictor for job satisfaction and this result was not similar with the following studies [Gnaneshwar K. & R.Perumal, 2019; Wasaf I. & Muhammad J. K., 2021; Biniyam K. D. and Samson M. D., 2021; Mulu A. A., 2013], the reason behind may be due to study area and type of work for these studies.

CONCLUSIONS

The objective of this survey was to assess the level of satisfaction of employee at Debre Markos University. The result of this survey shown that, the overall job satisfaction level was low and most of employees were male and master's holders. Most of the employees were satisfied on their relationship, leadership style, work and responsibility, however

more than half of employees were dissatisfied on their promotion issue, success, institutional vision/mission/polies and recognition. Furthermore, almost all of employees were dissatisfied on their salary. Among the job satisfaction related factors, salary, relationship, work environment, work itself, responsibility, promotion significantly influences the job satisfaction of workers. There was no significant association between job satisfaction and gender, experience and educational level of workers.

RECOMMENDATIONS

Based on the result of the study, the recommendations are given as follows.
- ✓ The University should give more awareness on vision/mission/policies for employees.
- ✓ The University should create a comfortable working environment for the employees
- ✓ The University should promote and recognize the employer using different mechanisms.
- ✓ Ministry of education as well as Universities should improve the salary of employee in higher institutions.

Authors' Contributions
YFG developed the proposal, designed, involved in data collection, analyzed, writes up and drafted the manuscript. TMD was involved in data collection and help the preparation of the manuscript. All the authors have read and approved the final version of the manuscript.

Data Availability
The primary data set collected from employee and analyzed during the current study is available from the corresponding author.

Declarations
Ethics Approval and Consent to Participate
Ethical approval for this study was obtained from Debre Markos University board of college of natural and computational science research and community service reviewers. All study participants were informed that they have full right not to participate in the study at any time they wish if that was their choice. Written consent was obtained from all participants before the interview and all information obtained in the study was kept confidential. All methods were performed in accordance with the guidelines and regulations of Debre Markos University.

Consent for Publication
Not applicable.

Competing Interests
The authors declare no competing interests.

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