Journal of Information Technology Management

ISSN #1042-1319

A Publication of the Association of Management

CAREERS IN INFORMATION TECHNOLOGY: AN ANALYSIS OF JOB SATISFACTION AMONG AFRICAN AMERICAN MALES AND AFRICAN AMERICAN FEMALES

EMMANUEL U. OPARA
PRAIRIE VIEW A&M UNIVERSITY
Emmanuel_opara@pvamu.edu

VANCE ETNYRE
UNIVERSITY OF HOUSTON-CLEAR LAKE
etnyre@cl.uh.edu

MOHAMMAD A. ROB
UNIVERSITY OF HOUSTON-CLEAR LAKE
rob@cl.uh.edu

ABSTRACT

This study examines job satisfaction among African American males and African American females in the field of Information Technology (IT). It finds that male and female African American IT professionals have high levels of job satisfaction. For African American female workers, this high job satisfaction is associated with high levels of satisfaction with salary. For male African American workers, the situation is more complex. African American male IT workers who are satisfied with their salaries are also satisfied with their jobs. Some male African American IT workers who are not satisfied with their salaries are satisfied with their jobs. This satisfaction is related to opportunities for advancement and other job facets.

Keywords: Job satisfaction, African American, Information Technology.

INTRODUCTION

Recent studies by Harrington [9] and Quilling [11] have found that effectively managing an ethnically diverse work force, especially in an Information Technology (IT) organization, is a necessity in today's global business. The 21st century IT platform has shown that more minorities, especially African Americans, are joining the IT work force [3 – 6, 10]. Businesses are encouraged to provide more incentives to retain this group. Knowledge of human resources management preferences of African-American employees is an intangible asset for competitiveness. However, women and African-Americans are underrepresented in technology-based careers especially at the managerial levels [1, 2, 7, 8, 12-14]. Some of this under representation could be due to the lack of early access or exposure to computer technology, minimal level of math and science achievements, emotional and social perception, as well as attitude about computers.

Friedman [8] noted that minority IT workers are glad that they have pursued an IT career. Smith [13] noted that Caucasian IT workers, when compared with their African American counterparts, have higher levels of job satisfaction and commitment to their employers. This

could be caused by companies that have insufficient understanding of work place practices valued by African American and other minority employees.

According to Smith [13], Job satisfaction is a person's emotional response to aspects of work such as pay, supervision and benefits; or the work itself. Job satisfaction is determined by various factors, e.g. how well our needs and wants are met through work, work conditions, sense of belonging to the company, self-achievement, fulfilling personality traits, relationships with superiors, etc. [2]. A job that is rewarded fairly, a service that is recognized by the employer or a client, or a product that often generates feedback from the public, could be a positive motivational factor to an African American employee.

Many [11, 12] suggest that females may have higher aptitude and success initiatives than their male counterparts because of their higher work needs. Further, minorities in the United States have higher numbers of single parent families. The single parent is usually the mother, which presents a dominant female role position in the household.

Many of the barriers that prevented African-Americans from excelling in the information technology career may be overcome by corporate America by enhancing effective diversity and cooperative learning programs in the workplace. At many educational institutions, non-traditional teaching and learning practices can foster African American students' participation in high-tech programs and careers. These non-traditional practices include early intervention programs, mentoring, and encouragement of internships in IT companies as early as the sophomore year. Furthermore, reducing social and educational barriers to high-tech careers can also help university educators move African American students into high-tech careers in which they have been underrepresented.

This study contributes to the field of behavioral science and information technology literatures in several ways. It is based on African Americans currently working in the field of Information Technology. One purpose of the study is to find out whether members of this group are satisfied with their jobs. Another purpose is to find out why members of this group might be satisfied with their jobs. These issues are significant to the African American culture because many African Americans are venturing into the IT field. Most universities in the nation are experiencing increasing number of African American freshmen admitted into the field of information technology and computer science. This research should provide some valuable information to agencies and organizations struggling to fill their IT workforce gaps.

PROBLEM STATEMENT

The purpose of this study is to find if there are relationships between job satisfaction of African American males and African American females with regards to salary, advancement, stress management, training and challenges. To answer our research questions, it is important to develop a model that can help analyze the job satisfaction of African American male and African American females in the information technology area. This study will attempt to develop such a model. The null hypothesis in this study is that no significant relationship exists between the dependent variable, job satisfaction, and any of the independent variables mentioned above.

RESEARCH DESIGN AND DATA COLLECTION

Our study was designed to measure the job satisfaction levels of African American workers in the IT field and to examine associated factors that might help explain job satisfaction for this group. The data used in this study was collected from a survey questionnaires distributed to eight IT organizations that have pools of African Americans employed as IT professionals in their organizations. See Table 1. The sampled industries are financial services, health care, information technology consulting, electronic information providers, computer software, and computer hardware. The survey was followed by face to face interviews with twenty workers. The randomly selected firms within the industrial pool are show in the Appendix.

To ensure a more homogeneous sample, a target population was drawn from the full-time African American employees of these companies. The sample population surveyed was 228. From this group, 72 males and 132 females responded, while 24 did not respond. Three respondents were omitted for invalid responses to critical questions.

Measures were made of critical job satisfaction factors. The dependent variable in this study is job satisfaction. The independent variables are: opportunity for advancement, satisfaction with salary, gender, satisfaction with access to training, ability to manage stress, job challenges, and the relationship of performance to advancement.

Table 1: Survey Questionnaire to African American IT Professional

1. Are you satisfied with your opportunity for advancement on your job?
   1= Very Dissatisfied; 2=Somewhat Dissatisfied; 3= Neither Satisfied; 4= Somewhat Satisfied; 5= Very Satisfied
2. Are you satisfied with your salary as an IT specialist?
   1= Very Dissatisfied; 2=Somewhat Dissatisfied; 3= Neither Satisfied; 4= Somewhat Satisfied; 5= Very Satisfied
3. Are you satisfied with your Job as an African American IT specialist?
   1= Very Dissatisfied; 2=Somewhat Dissatisfied; 3= Neither Satisfied; 4= Somewhat Satisfied; 5= Very Satisfied
4. Are you satisfied with your access for your continuous education and training on IT?
   1= Very Dissatisfied; 2=Somewhat Dissatisfied; 3= Neither Satisfied; 4= Somewhat Satisfied; 5= Very Satisfied
5. Are you satisfied with your ability to manage IT related stress?
   1= Very Dissatisfied; 2=Somewhat Dissatisfied; 3= Neither Satisfied; 4= Somewhat Satisfied; 5= Very Satisfied
6. Are you satisfied with the challenged on your job assignments?
   1= Very Dissatisfied; 2=Somewhat Dissatisfied; 3= Neither Satisfied; 4= Somewhat Satisfied; 5= Very Satisfied
7. Are you satisfaction with the connection between your pay and your job performance?
   1= Very Dissatisfied; 2=Somewhat Dissatisfied; 3= Neither Satisfied; 4= Somewhat Satisfied; 5= Very Satisfied
8. Gender: Male = 0 Female = 1

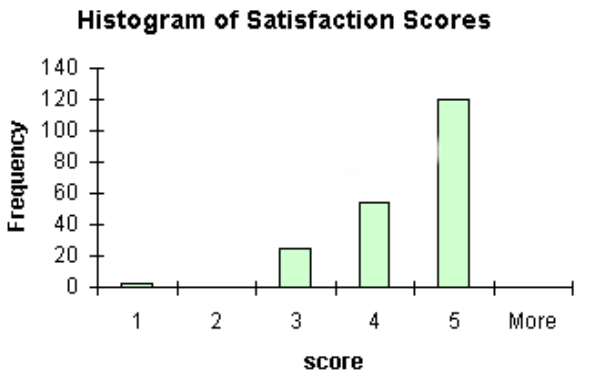
DATA ANALYSIS, RESULTS, AND DISCUSSION

A correlation analysis was performed to access the bivariate relationships between dependent variables and the independent variables and among the independent variables themselves, as well as to assess the potential multi-colinearity among the variables. The first step of the analysis is to show some descriptive statistics from the data. Descriptive statistics for all eight variables are given in Appendix B at the end of this paper. The primary data item in this study is 'Job Satisfaction'. The possible responses for the variable ranged from (1 = very dissatisfied) to (5 = very satisfied). Statistics and frequency distribution of this variable is shown in Table 2.

Table 2: Statistics and Frequency Distribution of Job Satisfaction

Job Satisfaction

Mean	4.4428
Standard Error	0.0503
Median	5
Standard Dev.	0.7094
Count	201



Note that 199 workers responded with a score of 3 (neutral) or higher and 2 workers responded with a score of 1 (very dissatisfied). The two very dissatisfied workers were analyzed separately from the 199 workers who were not dissatisfied with their jobs as African-American IT Professionals.

Next the data were analyzed for factors associated with job satisfaction. A simple regression analysis was performed with job satisfaction as the dependent variable. The proposed model for job satisfaction is:

$$\text{Job Satisfaction} = b_0 + b_1X_1 + b_2X_2 + b_3X_3 + b_4X_4 + b_5X_5 + b_6X_6 + b_7X_7, \quad (1)$$

where the 'independent' variables are:

X_1 = Opportunity for Advancement
X_2 = Satisfaction with Salary
X_3 = Gender
X_4 = Satisfaction with access to training
X_5 = Ability to manage stress
X_6 = Challenges
X_7 = Performance

The null hypothesis was that no significant relationships existed between the dependent variable – job satisfaction, and any of the independent variables. The analysis produces coefficient values and related statistics to measure the relationships between the changes in the dependent variable and changes in the independent variables. Of particular importance is the t-statistic values associated with the regression coefficients. T-statistic values in the range of 2.0 or more indicate possible significant relationships between the dependent variable and the independent candidate variables. The results of the regression analysis are shown in Table 3

.

Table 3: Summary Output of Regression Analysis

SUMMARY OUTPUT -- for All Respondents

Regression Statistics	
Multiple R	0.27
R Square	0.07
Adjusted R Square	0.04
Standard Error	0.70
Observations	199.00

ANOVA

	df	*SS*	*MS*	*F*	*Signif.*
Regression	7.00	7.32	1.05	2.16	**0.04**
Residual	191.00	92.33	0.48		
Total	198.00	99.65			

	Coefficients	*Std. Err.*	*t Stat*	*P-value*
Intercept	3.07	0.57	5.36	0.00
Advance	0.09	0.05	1.74	0.08
Salary	**0.14**	**0.05**	**2.67**	**0.01**
Gender	-0.06	0.11	-0.53	0.59
Training	0.05	0.05	0.92	0.36
Stress	-0.02	0.05	-0.31	0.76
Challenge	0.04	0.04	1.01	0.32
Perform	0.05	0.05	1.06	0.29

It can be seen from the results in Table 3 that the overall model is significant at the 5 % level. The F-statistic of 2.16 is greater than the critical F value of 2.01. With a ratio as high as 2.16, there is only a probability of .04 that no valid predictive model is present. Of the six independent candidate variables, only one (X_2 = satisfaction with Salary) has a coefficient with a t-statistic greater than the critical value of 1.96. The probability of finding a t-statistic with a value as high as 2.67 would be less than 0.01 if the variable X_2 was independent of the variable 'Job Satisfaction'. The variable with the next highest positive t-statistic value is X_1 (satisfaction with opportunities for advancement). The t-statistic value for X_1 is 1.74. This is less than the critical value of 1.96 that is required for 5 % level of significance.

The relationship between gender and job satisfaction can be evaluated by splitting the dataset into two subsets according to the gender. A simple t-test shows that the difference in job satisfaction between males and females is not significant at the 5 % level of significance. Table 4 shows that the mean level of satisfaction for females (4.42) is slightly lower than the mean level of satisfaction for males (4.58). The t-statistic for the difference (1.49) is less than the critical t-value of 1.97.

Table 4: t-Test: Two-Sample (Assuming Equal Variances)

	Males	Females
Mean	**4.58**	**4.42**
Variance	0.44	0.53
Observations	71	128
Hypothesized Mean Difference	**0.00**	
t Statistic	**1.49**	
t Critical two-tail	**1.97**	

The fact that the actual t-statistic for the difference is less than the critical value means that the data set does not provide sufficient evidence to reject the null hypothesis (of no difference in job satisfaction between males and females). The data in this data set do not show a significant difference in job satisfaction between males and females. This finding does not tell us whether there are separate, significant models for job satisfaction for males and females.

Multiple Regression Analysis for Male and Female Datasets

To determine if there are separate, significant models for job satisfaction for males and females, we ran a multiple regression analysis for each subset of data. Our null hypothesis was no significant relationships exist between job satisfaction and other variables for either gender. The results of our regression model for female IT workers are summarized in Table 5.

For females, the F ratio of 3.573 is much higher than 2.091, the critical value for a valid model. The probability of a ratio this high is only .003 when there is no valid predictive model. It shows that one variable (Salary) makes a very significant contribution (t-statistic = 4.208) to predicting job satisfaction for females.

Table 6 shows the regression analysis for males. For males, the F ratio of 0.495 is much lower than 2.17, the critical value for a valid model. With an F ratio of 0.495, there is still an 81 % chance that no valid predictive model exists. Table 6 shows the overall lack of significance for the regression model for African American males. None of the candidate predictor variables had a t-statistic close to the 1.96 required for a significant predictive contribution. A closer analysis of data for African American males revealed an interesting result.

Table 5: Results of Multiple Regression for Females

SUMMARY OUTPUT -- for African American Females

Regression Statistics	
Multiple R	0.388
R Square	0.151
Observations	128

ANOVA

	df	*SS*	*MS*	*F*	*Signif. F*
Regression	6	13.508	2.251	3.573	**0.003**
Residual	121	76.235	0.630		
Total	127	89.742			

	Coef.	*Std. Err.*	*t Stat*	*P-value*
Intercept	2.573	0.758	3.396	0.001
Advance	0.092	0.078	1.177	0.241
Salary	**0.267**	**0.063**	**4.208**	**0.000**
Training	0.051	0.067	0.761	0.448
Stress	-0.023	0.078	-0.302	0.763
Advance	0.052	0.048	1.092	0.277
Perform	0.000	0.065	0.006	0.995

Table 6: Regression Values for Males

SUMMARY OUTPUT -- for African American Males

Regression Statistics	
Multiple R	0.21
R Square	0.04
Observations	71

ANOVA

	df	*SS*	*MS*	*F*	*Signif. F*
Regression	6	1.37	0.23	0.495	0.810
Residual	64	29.54	0.46		
Total	70	31.84			

Most African American IT workers were satisfied with their jobs and satisfied with their salaries. A subset of Male African American IT workers responded that they were satisfied with their jobs but not particularly satisfied with their salaries, contradicting the model that associates job satisfaction with salary satisfaction. This subset of males was analyzed separately and the results are shown in Table 7.

.

Table 7: Summary for African American Males Not Satisfied with Salary

SUMMARY OUTPUT -- FOR AF. AMER. MALES NOT SATISFIED WITH SALARY

Regression Statistics	
Multiple R	0.83
R Square	0.70
Adjusted R Sq	0.51
Observations	14

ANOVA

	df	*SS*	*MS*	*F*	*Signif. F*
Regression	5	5.18	1.04	3.68	**0.05**
Residual	8	2.25	0.28		
Total	13	7.43			

	Coef.	*Std. Err.*	*t Stat*	*P-value*
Intercept	-3.31	2.30	-1.44	0.19
Advance	**0.75**	**0.30**	**2.48**	**0.04**
Training	0.57	0.26	2.16	0.06
Stress	0.22	0.21	1.08	0.31
Challenge	-0.02	0.19	-0.10	0.92
Perform	0.39	0.22	1.78	0.11

Table 7 shows that for male African American IT workers who were not particularly satisfied with their salaries, an associative model exists to help explain their job satisfaction. The F ratio of 3.68 is equal to the value required for .05 level of significance. One of the independent variables (Opportunity for Advancement) has t statistic high enough to be significant at the .05 level. This would indicate that among male African American IT workers who are not satisfied with salary, job satisfaction can be associated with opportunity for advancement.

INTERVIEWS WITH WORKERS

The authors conducted interviews to supplement the data from obtained from surveys. Interviews were held with five female African American IT workers and fifteen male African American IT workers.

One male African American IT worker, who worked for a large service company and was dissatisfied with his salary, said **"** *I have the opportunity for advancement because the career ladder is wide open".* A female African American IT worker from a petrochemical company said *"I can't go any higher in the organization, there is a glass ceiling at this place, but I can't make this same money anywhere else, so I will probably stay where I am".* Another female African American IT worker at an insurance company said "*I am getting good pay and opportunities for training that will help me in my career. There is a bad market for programmers now. I'll stay here as long as that keeps up".* A male at an energy company said "*Being black hasn't hurt me at my company. I get paid as well as white programmers and have at least as good a chance for advancement as they do*".

The results of the face to face interviews were similar to the results from the survey except for one noticeable exception. African American IT workers who work at universities were, in general, not satisfied with their salaries. This is inconsistent with the survey results where female African American IT workers were usually satisfied with salary and male African American IT workers were often satisfied with salary. It is consistent with the authors' experiences that IT workers at universities are usually dissatisfied with salary independent of race and gender.

The comments of non-university African American IT workers who were interviewed seem to substantiate the results of the survey. Female workers seem satisfied with salary and male workers looked at a combination of salary and other factors for their job satisfaction.

CONCLUSION

This study shows that while African American IT professionals (both male and female) report a high level of job satisfaction, there are differences between males and females in the underlying causes of job satisfaction. The salary is the primary factor associated with job satisfaction for African American females. Causes of job satisfaction for African American male IT professionals seem to be slightly more complicated and in aggregate they were not explained by a simple analysis of the factors used in our survey. Results show that African American males who were satisfied with their salaries were also satisfied with their jobs. Some African American males, who were not satisfied with their salaries, were still satisfied with their jobs. The statistical association between job satisfaction and opportunity for advancement helps to explain job satisfaction for this subset of African American males, who were not satisfied with their salaries.

REFERENCES

[1] Alter, A.E. and Severin, M. "Moving beyond the Racial ravine," *Computerworld*, Volume 34, Number 5, January 2000, p.49.

[2] Brown L., "Girls Missing Out on High-Tech Careers," *Worklife Report*, Volume 12, Number 2000, p.12

[3] Bruner, R. "Minority Gains Essential to U.S. Technology Future," *Electronic News*, Volume 46, Number 30, July 2000, pp. 10-14.

[4] Bruno, C. "Diversity Disconnect," *Network World,* Volume 14, Number 40, October 1997, pp. 1, 93, 96, 98, and 100.

[5] Caruso, A. "High-Tech Careers," *Career World,* Volume 25, Number 7, April-May 1997, pp. 6-11.

[6] *Computerworld*, http://www.computerworld.com/careertopics/careers, April 2002.

[7] DiBenedetto, V. "El Paso Community College Women in Technology End of the Year Report, 1998-1999 (ED 435 429)," El Paso Community College, El Paso, Texas, TX, 1999.

[8] Friedman, M. "Women Take to Internet While Avoiding IT," *Computing Canada,* Volume 26, Number 18, September 2000, p. 9.

[9] Harrington, S.G. "The Factors Affecting the career Choices of African Americans and Three Career Counseling Suggestions (ED 438 487).," Paper presented at the Annual Meeting of the Mid-South Educational Research Association, New Orleans, LA, November 4-6, 1998.

[10] New, E., and Wells-Glover, L. " Mentors for Undergraduates in Technical Disciplines," *Journal of College Student Retention,* Volume 1, Number 4, 1999, pp. 311-321.

[11] Quilling, J.I. "Gender, Technology, and Leadership Development," *Journal of Family and Consumer Sciences,* Volume 91, Number 3, 1999, pp. 70-75.

[12] Radcliff, D. "Champions of Women in Technology," *Computerworld,* Volume 33, Number 3, January 1999, pp. 46-48.

[13] Smith, L.B. "The Socualization of Females with Regard to a Technology-Related Career," *A Middle School Computer Technologies Journal,* Volume 3, Number 2, Summer 2000, http://www.ncsu.edu/meridian/sum2000/career/index.html

[14] Wolff, M.F. 'S&E Degrees to Women Up, But Down Nationally." *Research Technology Management,* Volume 42, Number 6, November – December 1999, pp. 7-8

AUTHOR BIOGRAPHIES

Emmanuel U. Opara is an Assistant Professor of Management Information Systems at Prairie - View A&M University, Prairie View Texas. His specialty includes but is not limited to the following: Enterprise Resource Planning [ERP], EAI, SAP, Supply Chain Management [SCM], Customer Relationship Management [CRM], E-Business and Electronic Commerce, eXtensible Markup Language [XML], Macromedia Studio MX [Building Interactive Animation and Web Design, etc]. He received his PhD from Golden Gate University in San Francisco, California. Before joining Prairie View A&M University, he worked at Chevron Corporation in the capacities of Finance and Systems specialist, where his duties included systems quality control, systems analysis, programming, etc. Dr Opara has published several papers in both National and International Journals.

Mohammad A. Rob is an Assistant Professor of Management Information Systems at the University of Houston-Clear Lake (UHCL) in Houston, Texas. He teaches courses on systems analysis and design, electronic commerce, active server pages, project management, and data warehouse. He received his Ph.D. from the University of Alabama, Tuscaloosa, Alabama. Before joining UHCL, he worked in several IT companies, where his activities spanned in areas of systems design, client-server programming, web-database development, and software quality control. He has received several grants from agencies such as National Science Foundation and NASA Johnson Space Center. He has published 24 papers in national and international journals. During the summers of 1994, 1995, and 2002, Dr. Rob worked as a Summer Faculty Fellow in two NASA centers.

Vance Etnyre is an Associate Professor of Management Information Systems at the University of Houston-Clear Lake (UHCL) in Houston, Texas. He teaches courses in computer programming. Dr. Etnyre received his MBA and Ph.D. from the University of Illinois. Before joining the MIS department, Dr. Etnyre taught statistics, quantitative methods, and environmental economics at UHCL. Dr. Etnyre has served as a consultant to Johnson Space Center, several aerospace contractors, petrochemical companies, and law firms. He has published 14 papers in national and international journals.

APPENDIX: FIRMS SELECTED FOR SURVEY

1. USAA – San Antonio, Texas;
2. Baxter International Inc. – Illinois;
3. Capital One Financial Corporation – Falls Church, Virginia;
4. Electronic Data Systems Corp. (EDS) – Plano, Texas;
5. OCLC Online Computing Library Center Inc. – Dublin, Ohio;
6. Comark Inc. – Bloomingdale, Illinois;
7. Accelio Corporation – Plano, Texas.