Are female workers more productive than male workers? An empirical study in Bangladesh

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ABSTRACT
Job satisfaction is one of the most heavily researched employee attitudes over the last 50 years. Pleasing employees by appealing to their intrinsic and extrinsic needs is essential for obtaining maximum contribution of employees towards organisational objectives. To investigate gender differences on job satisfaction and are female workers are more productive than male worker, we have distributed 450 questionnaires among the respondents, 256 were returned, which shows a response rate of 56.7%. Data analysis tests were carried out by using statistical package for social sciences (SPSS) 20.0 version for Windows. Multivariate logistic regression analysis was used to find answers for the research questions. The findings of the Logit models indicate that female were significantly more satisfied than men and female workers performance is better than male worker.

Key Words. Gender, job satisfaction, performance.

INTRODUCTION
Job satisfaction is one of the most heavily researched employee attitudes over the last 50 years (Rayton, 2006). Locke (1976, p. 1300) defined it as “a pleasurable or positive emotional state resulting from an appraisal of one’s job or job experiences”. It is an effective response to specific aspects of the job and plays a role in enhancing employee commitment to an organisation. Studies have shown that employee absenteeism, turnover and other behaviours are related to a person’s satisfaction with his or her job and the organisation (Vroom, 1964).

Several theories have been used by researchers to explain the concept of job satisfaction. These theories fall in two groups, namely process and content theories. Content theories attempt to identify the factors which contribute to job satisfaction and job dissatisfaction. These theories include Maslow’s hierarchy of needs (1954), Herzberg’s ‘two factor theory’ (1959) and McGregor’s ‘Theory X and Y’ (1960). On the other hand, process theories attempt to describe the interaction among variables in their relationship to job satisfaction. These theories include equity theory, expectancy theory and goal setting theory among others.

Studies have shown that job satisfaction is a multidimensional construct consisting of intrinsic job satisfaction and extrinsic job satisfaction (Volkwein and Zhou, 2003). Intrinsic aspects of the job comprise ‘motivators’ or ‘job content’ factors such as feelings of accomplishment, recognition, autonomy, achievement, advancement among others. Extrinsic aspects of the job, often referred to as ‘hygiene’ factors are job context factors which include pay, security, physical working conditions, company policies and administration, supervision, hours of work, union relations with management among others. Herzberg found that hygiene factors were mainly disruptions in the external work context while motivators dealt with internal states of the mind (Smerek and Peterson, 2007). Most studies have found that job satisfaction is influenced by an array of personal and job characteristics such as age, gender, tenure, autonomy, teamwork, relationships with co-workers and supervisors, job variety, satisfaction with pay, training among others (Volkwein and Parmley, 2000; Volkwein and Zhou, 2003; Lambert, 2004). Stressful work conditions were found to negatively affect employees’ job satisfaction (Volkwein and Zhou, 2003; Fisher, 2001).

Gender has also received a great deal of attention in job satisfaction studies, but again the research is inconclusive. In 1997, Thompson and McNamara reviewed all job satisfaction studies
published in the Educational Administration Quarterly over the past six years and showed no significant difference between male and female satisfaction levels. Other studies that have shown no significant difference between gender and job satisfaction levels include Barbash (1976). Smith, et al., (1998) arrived at similar insignificant findings until they compared the gender of the employee to the gender of the employer. They found that women were more significantly more satisfied than men in small companies with female supervision, while males were significantly more satisfied in larger companies with male supervisors. Studies suggesting that gender does affect job satisfaction are available, and data can be found to suggest that either men are more satisfied (Weaver, 1977) or that women are generally more satisfied (Kramen-Kahn & Hansen, 1998).

So, this study focused on, first gender differences on job satisfaction and secondly, are female workers are more productive than male workers?

METHODOLOGY
The purpose of this study was to determine the factors that contribute to job satisfaction among the workers 256 of Bangladesh.

In conducting the review of literature, the researcher found there have not been enough studies in Bangladesh related to gender differences and performance. There have been few studies conducted throughout the nation related to retention, attrition, and health.
A quantitative method study was conducted to gain an understanding of factors related job to satisfaction among industrial workers of Bangladesh. Questionnaires were conducted to find out a broader understanding of the contributing female and male performance on workplace.

Of the 450 questionnaires distributed among the respondents, 256 were returned, which shows a response rate of 56.7%. The sample was applied to represent the population and underlying structure because of examining the reliable correlations and prediction power of factors (Hair et al., 2006; Tabachnick and Fidell, 2007). According to Comery and Lee (1992), a sample size of 50 - 100 is treated as poor, 200 as fair, 300 as good and 500 as very good and 1000 is treated as excellent. Thus, this study covered a fair sample and provided a substantive representation of the total population garments industries.

Data analysis tests were carried out by using statistical package for social sciences (SPSS) 20.0 version for Windows.

EMPIRICAL FINDINGS AND ANALYSIS OF THE LOGIT MODEL
Following relevant literature (Field, 2006; Hosmer and Lemeshow, 2000), three steps were implemented in reporting the results of a logistic or Logit model, namely (1) fitting an initial or “unsophisticated” model, (2) estimating a more sophisticated or adjusted model, and lastly (3) evaluating the predicted probabilities of the Logit model. The literature (Hosmer and Lemeshow, 2000; Begg and Lagakos, 1990) also reveals that there are two types of models presented in estimating a logistic regression model – rudimentary and adjusted. A rudimentary, initial or simple model looks at how a single independent affects regression outcomes and ignores potential covariates.

The literature (Hosmer and Lemeshow, 2000; Hauck et al., 1991) indicates that it always best practice to start with a simpler model and then move gradually to an adjusted model. This method is known in the literature as a step-wise regression procedure. In addition, the practice of omitting covariates leads to biased estimates of the logistic parameters and decreases the precision of effect estimates (Gail et al., 1984; Lagakos and Schoenfeld, 1984).
For the purpose of including explanatory variables in the Logit model, the above significant variables are of interest in this thesis because they tell us whether or not the performance scores differ for male and female workers. The column of real interest contains the significance values of these F-ratios (Table 1). For these data, it appeared that all test statistics were highly significant, with p values being less than 0.01 (1%). From this initial result, it can be concluded that the performance scores, which were perceived by the workers, do indeed differ among different workers’ characteristics and the corresponding company policy. However, this effect needs to be broken down for further examination using the Logit model.

A detailed examination of Table 1 indicates that the Wilk’s lambda (Λ) is (0.85). Other MANOVA statistics such as Pillai's Trace, Hotelling's Trace and Roy's Largest Root were not discussed due to practical considerations and similar measures (Tabachnick and Fidell, 2007; Field, 2006; Hosmer and Lemeshow, 2000).

Following the relevant literature (Tabachnick and Fidell, 2007), Wilk’s lambda (Λ) is a number between 0 and 1. A small Λ value (close to 0) means that the groups (less productive and more productive workers) are very well separated by the above independent variables such as income, workers’ age, job enrichment policy and others. Apparently, although these groups (based on their performance) could be divided significantly by these competing variables (because of highly significant Λ and p values less than 0.001), Λ was found to be 0.370, which is not relatively close to 0. However, the literature (Field, 2006) reveals that the independent variables are significantly valid as separators, regardless of the Λ value not being close to 0, with the significance level of α being less than 0.01 (the last column in Table 1).

Table 1  Multivariate Tests

<table>
<thead>
<tr>
<th>Effect</th>
<th>Value</th>
<th>F</th>
<th>Hypothesis df</th>
<th>Error df</th>
<th>Si g.</th>
<th>Partial Eta Squared</th>
<th>Noncent. Parame</th>
<th>Observed Power b</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept</td>
<td>.996</td>
<td>1760.2</td>
<td>71a</td>
<td>34.000</td>
<td>216.00</td>
<td>.000</td>
<td>.996</td>
<td>59849.203</td>
</tr>
<tr>
<td>Wilks' Lambda</td>
<td>.004</td>
<td>1760.2</td>
<td>71a</td>
<td>34.000</td>
<td>216.00</td>
<td>.000</td>
<td>.996</td>
<td>59849.203</td>
</tr>
<tr>
<td>Hotelling's Trace</td>
<td>277.0</td>
<td>1760.2</td>
<td>71a</td>
<td>34.000</td>
<td>216.00</td>
<td>.000</td>
<td>.996</td>
<td>59849.203</td>
</tr>
<tr>
<td>Roy's Largest Root</td>
<td>277.0</td>
<td>1760.2</td>
<td>71a</td>
<td>34.000</td>
<td>216.00</td>
<td>.000</td>
<td>.996</td>
<td>59849.203</td>
</tr>
<tr>
<td>Performance</td>
<td>.158</td>
<td>3.650</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>.360</td>
<td>744.699</td>
</tr>
<tr>
<td>Wilks' Lambda</td>
<td>.035</td>
<td>4.823</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>.429</td>
<td>966.966</td>
</tr>
<tr>
<td>Hotelling's Trace</td>
<td>6.598</td>
<td>6.932</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>.524</td>
<td>1414.064</td>
</tr>
<tr>
<td>Roy's Largest Root</td>
<td>4.470</td>
<td>29.058</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>.817</td>
<td>987.957</td>
</tr>
</tbody>
</table>
A forward stepwise regression procedure was employed to examine the significance of the competing explanatory variables into the Logit model, such as company’s reward policy, the company’s workers’ age, the company’s promotional policy, workers’ income, the company’s job enrichment policy, however, some of the findings were not significant and had wrong sign. It appeared that only workers’ gender (X_1) and age (X_2) jointly together were strong predictors of the workers’ perceived performance scores (Y). Several attempts were made to include the possible interaction effects of X_1X_2 and other competing explanatory variables (such as the company’s promotional policy, workers’ income and the company’s job related policy), however, the results were not significant and not presented in the main report. Apart from the insignificance of the interaction effects, the independent variables (X_1 and X_2) were highly significant at α less than 1% (p values < 0.01, see column “Sig.” of Table1).

Overall results from the Logit model are presented in Table 2. The results reveal that the variables X_1 and X_2 (workers’ gender and age) are significant predictors of the result with p < 0.05, which is indicated by the “Sig.” column in Table 2.

In “Variables in the Equation” in Table 2, the “B” column represents the estimated log odds ratio. The “Sig.” column represents the p-value for testing whether age is significantly associated with the level of a worker’s perceived performance, whilst the “EXP(B)” column represents the odds ratio. As mentioned earlier, several attempts were made to include a possible interacting variable (a joint impact of the variables of age and income, age and integration policy etc); however, the results were not significant and therefore not reported. The Logit regression model can be rewritten in simple and multiple regressions (in either additive or multiplicative form). Based on Table 2)

Table 3 revealed that the estimation of the Logit model terminated by using a MLE method at iteration number 4, because parameter estimates changed by less than 0.001. Under “Model Summary”, it can be seen that the -2 log likelihood statistic is 153.771. This statistic measures how robustly the model predicts the decisions since the smaller the statistic, the better the model is. Adding the age variable reduced the -2 log likelihood statistic by 153.771 – 130.066 = 23.705.

In addition, the value of Cox and Snell R^2 (as a measure of the explanatory power of a regression model) has increased from 48% to 52%. R^2 here can also be defined as the proportion of variability in a data set that is accounted for by the model, so that the bigger R^2 (close to 100%), the more robust the model. For example, R^2 equal to 99% indicates that about 99% variability of the dependent variable is explained by the model, whilst the remaining 1% (100%-99%) variability is explained by random error or other variables outside the model. However, in a logistic regression context, the literature (Menard, 1995; Kleinbaum, 1994) also indicates that R^2 statistics do not quite measure the goodness of fit of the model, but instead show how useful the explanatory variables are in predicting the response variable or, as it can be referred to, measures of effect size. For example, the value of 0.61, or 61%, indicates that the logistic model is useful in predicting the productivity score perceived by the workers.

As indicated by Table 3 below (Model Summary), the Cox and Snell R^2 were found to be 53% for the second model, while the Nagelkerke R^2 was estimated to be 74%. This Model Summary shows measures of how well the logistic regression fits the data. These measures are useful when comparing

Table: 2 Variables in the Equation

<table>
<thead>
<tr>
<th></th>
<th>B</th>
<th>S.E.</th>
<th>Wald</th>
<th>df</th>
<th>Sig.</th>
<th>Exp(B)</th>
<th>95% C.I.for EXP(B)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Lower</td>
<td>Upper</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Step 1^a</td>
<td>AGE(1)</td>
<td>-1.330</td>
<td>.325</td>
<td>16.781</td>
<td>.000</td>
<td>.265</td>
<td>.140</td>
</tr>
<tr>
<td>Constant</td>
<td>1.933</td>
<td>.228</td>
<td>71.797</td>
<td>1</td>
<td>.000</td>
<td>6.909</td>
<td></td>
</tr>
</tbody>
</table>

a. Variable(s) entered on step 1: AGE.
several different, competing logistic regression models. The coefficient here can be interpreted in the same way as $R^2$ in an ordinary regression. Hence, in this case, the model is considered relatively good, since the independent variables (the variables of productivity and age) explain about 53% to 74% variation of the variation in the dependent variable.

The table Hosmer and Lemeshow test provides a formal test for determining whether the predicted probabilities for a covariate match the observed probabilities. A large p-value indicates a good match (column “Sig.”), whereas a small p-value indicates the opposite, indicates to look for some alternative logistic models to describe the relationship between this covariate and the outcome variable. Table 4 indicates that the p-values are relatively large 0.254, therefore, indicating support for the predicted and observed probabilities.

HL test, a further contingency table (Table 5) for the HL test can produce more details. This test divides the data up into ten groups, which are defined by increasing the order of estimated probability. The first group corresponds to those subjects who have the lowest predicted probability.

The findings of the Logit models indicate that increasing age decreases the log odds of being better performance. In addition, being female workers are increases the log odds of being better performance relative to those being male workers.

A classification table (Table 6) is useful for logistic regression models which involve diagnostic testing. The classification table displays the agreement between predicted (vertical column) and actual results (horizontal row), and basically indicates that the incorrect answer is never predicted. This would be the same as the intercept-only model, without independent variables, where the

<table>
<thead>
<tr>
<th>Step</th>
<th>-2 Log likelihood</th>
<th>Cox &amp; Snell R Square</th>
<th>Nagelkerke R Square</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>153.771</td>
<td>.480</td>
<td>.671</td>
</tr>
<tr>
<td>2</td>
<td>130.066</td>
<td>.526</td>
<td>.736</td>
</tr>
</tbody>
</table>

a. Estimation terminated at iteration number 5 because parameter estimates changed by less than .001.

b. Estimation terminated at iteration number 6 because parameter estimates changed by less than .001.

<table>
<thead>
<tr>
<th>Step</th>
<th>Chi-square</th>
<th>df</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>.83</td>
<td>1</td>
<td>.12</td>
</tr>
<tr>
<td>2</td>
<td>1.301</td>
<td>2</td>
<td>.254</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Demography = Male</th>
<th>Demography = Female</th>
</tr>
</thead>
<tbody>
<tr>
<td>Observed</td>
<td>Expected</td>
</tr>
<tr>
<td>Step 1</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>29</td>
</tr>
<tr>
<td>2</td>
<td>22</td>
</tr>
</tbody>
</table>

The findings of the Logit models indicate that increasing age decreases the log odds of being better performance. In addition, being female workers are increases the log odds of being better performance relative to those being male workers.
probability of a correct answer is equal to \( \frac{\text{the number of correct answers}}{\text{the total number of answers}} \), which in this case is 0.80 or 80%.

\[
\begin{array}{|c|c|c|}
\hline
\text{Predicted} & \text{Demography} & \text{Percentage Correct} \\
\hline
\text{Male} & 0 & 51 & 0 \\
\text{Female} & 0 & 205 & 100.0 \\
\hline
\text{Overall Percentage} & & 80.1 \\
\hline
\end{array}
\]

The cut value is .500

The findings of the Logit models indicate that female workers performance is better than male worker.

CONCLUSION

This study was conducted in Bangladesh where it was proposed that employees of organisations could be more satisfied and perform better on the basis of psychological and financial needs.

This study reveals that female were significantly more satisfied than men workers. For the purpose of including explanatory variables in the Logit model, the above significant variables are of interest in this study because they would tell us whether or not the performance scores differ for male and female workers. This logit analysis shows measures of how well the logistic regression fits the data. The findings of the Logit models indicated that female workers performance is better than male worker.

Despite the promising results, some limitations of the study should be noted that could be addressed in future research. Examining employees’ job satisfaction only in garment might limit generalisability. It is possible that people who seek employment in other sectors might react differently. Thus, these predictor variables of the theoretical framework should be tested in other organisations in the same culture which may present confounding effect in those organisations. Thus, more tests are necessary to strengthen its generalisability.

REFERENCES


