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Estimation of a Logistic Regression Model to Determine the Effects of the Factors Associated with the Likelihood of Skilled Workers in the Garment Sector of Bangladesh

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ABSTRACT: *This study attempts to estimate the logistic regression model to find the factors associated with the likelihood of skilled workers in the garment sector of Bangladesh. The study is based on primary data. From the maximum likelihood estimates of the logistic model, it is found that the variables, years of education, years of experience, wage rate, grade, and working years at the present company have significant positive effects on the logit of the outcome variable Y, but the variable age of the companies has a significant negative effect. From the estimated odd ratios, it can be said that the male group is 3.0695 times more likely than the female group to be a skilled worker, which is significant at a 10% level; a group of rural workers is 10.3727 times more likely than the urban group in favour of skilled workers, which is significant at a 15% level; a group of workers have a training program degree is 38.5552 times more likely in favour of skilled workers, than a group of workers who have not, which is statistically significant at any significance level. The estimated results of squared correlation between Y and* $\hat{Y}$*, pseudo-*R^2*, Mcfadden's* R^2*, Maddala's* R^2*, and Count-*R^2 *support that the model fits the data very well. Based on the findings, different policies are formulated for the sustainable development of Bangladesh's garment sector.*

KEYWORDS: Logistic regression model, Primary data, Maximum likelihood method, pseudo-R^2, Fit very well.

JEL Classification: B23, C12, C13, C35, C52, C81, F13, J08, O19, O25,

INTRODUCTION

Background of the Study

The readymade garment industry is one of the most important manufacturing sectors which is working as a driving force in economic growth, creating several formal jobs for rural women and for reducing poverty by socio-economic development. The Bangladesh Garment Manufacturing Association (BGMEA) estimates that nearly 4764 export-oriented garment industries provide jobs for 4.23 million workers, the majority of whom are young women

workers. Chowdhury et al. (2005) conducted a study in which they addressed the challenges of unskilled labour with low productivity which results in increased per unit cost of production. Therefore, it can be said that the labour force is the integrated part of the development of the garment sector with higher productivity which results in a decrease in per unit cost of production as a result the economic growth will accelerate at a faster rate in Bangladesh. Therefore, it is very important and needed to develop different policies for the development of skilled workers in the garment sector of Bangladesh. For this study, all the workers are classified into two broad categories namely skilled workers and unskilled workers. It is known to us the productivity of skilled workers is higher than that of unskilled workers in all sectors including the garment sector of Bangladesh.

Therefore, to formulate different policies in favor of the skilled workers we have to identify which factors are associated with the likelihood of having the skilled worker in the garment sector of Bangladesh. That is why in this study we have considered 14 independent variables such as years of education of the workers (EDU), years of experience of the workers (YEXP), monthly wage rate WR) in thousand BDT of the workers, grade of the workers (GRD), working years in the present company (WY), gender (GEN), region (REG), whether workers having a training program degree (TPD), whether a company offers competitive remuneration for the employees (CRE), whether a company prefers having practical knowledge in industry management or having a management degree (PK) for recruiting skilled workers, whether a company provides adequate facilities to the employees (FAC), whether workers feel secured to the given environment of the companies (SEC), whether a company allows quick promotion (PRO) to the employees based on their performance and age (AGE) of the companies. These variables have been taken into account in this study to determine their impacts on the likelihood of being in favour of a skilled worker in the garment sector using a logistic regression analysis. Logistic regression analysis is one of the advanced-level econometric techniques which is used to measure the changes in outcome variables with the changes in independent variables when the outcome variable is categorical. For example, if we are interested to know how the operating cash flow to total liability predicts the odds of being bankrupt in the garment sector of Bangladesh then, the outcome variable is categorical and has two categories that a garment industry is bankrupt: yes or no. In such cases, the simple or multiple linear regression analysis is not an idle to use because the outcome variable is not continuous and the assumptions of a simple or multiple linear regression model are violated.

To deal with the categorial outcome variables the logistic regression model was developed as an alternative to simple or multiple linear regression equation model. The logistic regression model was originally developed and popularized primarily by **Joseph Berkson (1944)** and then became popular among researchers irrespective of any discipline especially since it is widely applicable among health researchers to deal with problems of medical science. Different types of logistic regression models such as binary logistic regression model, multinomial logistic regression model, or ordinal logistic regression model can be applied to deal with different problems irrespective of any discipline depending on the nature of the outcome variable. When the outcome variables have only two categories say infected by COVID-19 or not; smoker or non-smoker; car owner or not; apartment owner or not; drug addicted or not; member of a political party or not; bankrupt or not; male gender or female gender; urban or rural; having a university degree or not; having a disease or not etc. For the binary logistic regression model,

the outcome variable takes only two values 0 and 1. The multinomial logistic regression model can be applied to deal with the problems when the outcome variables have more than two categories which are not ordered for example high income, medium income, and low income; skilled, semi-skilled and unskilled; SSC passed, HSC passed and university graduate; Islam, Hindu and others; and Grade A, Grade B and Grade C; etc. In a multiple logistic regression model the outcome variable takes more than two values say 0, 1 and 2. If the outcome variable is ordered, for example. highly skilled, skilled, semi-skilled and unskilled; Grade A, Grade B, Grade C, Grade D, and Grade F; poor, fair, good, very good, and excellent, then the ordinal logistic regression model is used. The ordinal logistic regression model can be binary or multiple. In this section, the applications of the regression model based on outcome and predictor variables, are shown below in Table 1:

Table 1: Application of Regression Models based on Outcome and Predictor Variables

Outcome Variable	Predictor Variable	Application of Regression Model
Continuous	Continuous/Categorical	Linear or non-linear regression model
Categorical (Binary)	Continuous/Categorical	Binary logistic regression model
Categorical (Multiple)	Continuous/Categorical	Multinomial logistic regression model
Categorical (Ordered)	Continuous/Categorical	Ordinal logistic regression model

In this paper, the logistic regression model is presented in which the dependent variable is bounded, restricted to take on values {lower bound, upper bound}. A model in which the dependent variable has a lower bound which commonly takes the value zero and the upper bound can be derived from an ordinary regression model by mapping the dependent variable Y through a sigmoid or S-shaped function, which is approached asymptotically as the value of the independent variable(s), representing the systematic influences, increases is called the logistic model. In practice, a logistic model depends on finding a function that will map from the range of the systematic variable into the restricted interval of the response variable Y. In some cases, we are dealing with a discrete choice: the dependent variable Y may be restricted to a Boolean or binary choice, indicating that the dependent variable Y is a dichotomous variable which can take only the values of one for a particular course of action was present and zero if the action was not present. A model with a binary dependent variable may be obtained from an ordinary regression model by mapping the dependent variable Y through a step function representing a threshold mechanism. When Y falls short of the threshold value, the response of the mechanism is to generate a zero. When Y exceeds the threshold, and unit is delivered.

Thus, the model generates a predicted probability that an individual will choose to answer yes rather than no. In such a model, if the regression coefficient β_j (j = 1, 2,….,k) is greater than zero, it implies that individuals with high values of the explanatory variable X will be more likely to respond yes and the probability of choosing yes will be 1. And, if β_j (j = 1, 2,….,k) is smaller than zero, it indicates a decrease in the probability of Y. When β_j (j = 1, 2,….,k) is zero, it indicates that there is no relationship between the logit of Y and the predictors X's. For an easy interpretation of the coefficients of a binary logistic regression model, we also report

the odds ratio (OR) that can be obtained using the technique, $\text{Odds Ratio} = \text{Exp}(\beta_j)$. The interpretations of the logistic regression model are shown in Figure 1.

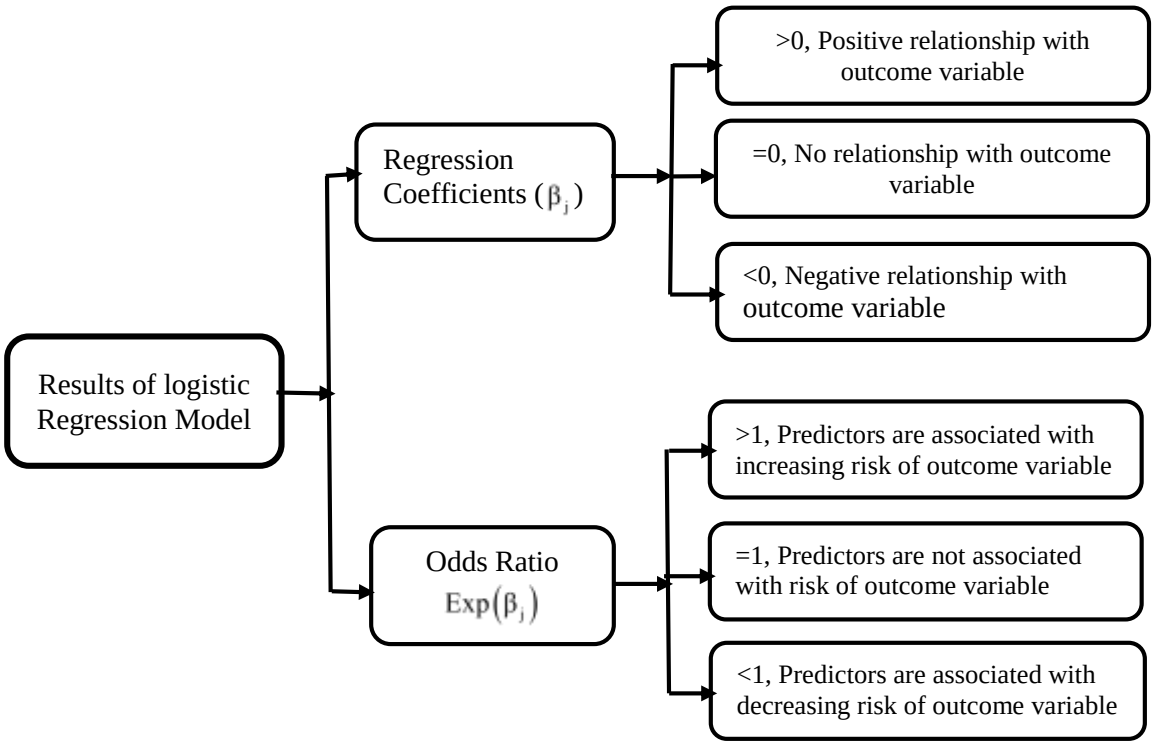

Figure 1: Interpretations of the Estimates of a Logistic Regression Model

Statistical significance of the regression coefficients of the logistic regression model can be tested using the z-test and the Wald test and overall model significance can be tested using the likelihood ratio test or pseudo-R^2 test which are discussed in the methodology part. Nowadays the estimation technique of the logistic regression model is available in almost every standard statistical software package such as R, Python, RATS, EViews, STATA, SPSS, and GAUSS etc. For this study, I used software packages RATS, EViews and STATA for empirical analyses.

Objectives of the Study

The main objective of this study is to estimate the logistic regression model to identify the factors that are associated with the outcome variable or with the risk of the outcome variable such as being a skilled worker in the garment sector of Bangladesh. Then the policies should be taken based on the estimated results of the logistic regression model to increase the productivity of the garment sector of Bangladesh for which the per unit production cost will be declined and profit will be maximum.

The Organizational Structure of the Study

The organizational structure of the paper is as follows:
Section II presents a literature review; Section III discusses data collection methodology, including the nature of sources, and problems that we have faced in collecting primary data; Section IV discusses econometric methodology for estimating logistic regression model and

results discussion; Section V presents an overall discussion and concludes with a summary of the main findings; and finally, Section VI discusses policy implications based on the findings.

LITERATURE REVIEW

The principal purpose of the literature review is to establish a sound theoretical background on the concept of the limited dependent variable model especially the logistic regression model and its application in predicting a business outcome. In doing so, to identify and evaluate different economic and socio-economic factors determining the risk of being a skilled worker in the garment sector of Bangladesh was kept in mind. Previously different authors have done different works based on limited dependent variable models especially based on the logistic regression model, and regression models, for example: Hoetker (2007) carried out a study on the use of logit and probit models in strategic management research: critical issues. This paper identified four critical issues in their uses: interpreting coefficients, modelling interactions between variables, comparing coefficients between groups (e.g., foreign and domestic firms), and measures of model fit based on a review of the methodological literature and the recent publications of empirical papers in three leading strategy journals. This study also presents implications for the conduct of research with logit and probit models, which should assist both authors and readers of strategic management research. Danacica et al. (2008) carried out a study on the risk of unemployment, a logistic regression approach to find out the influence of gender, age and educational level on the probability of being hired or re-hired for the 2002-2006 period, for a single county in Romania. This study found that the educational level positively influences the likelihood that an unemployed person will find a job. Garrouste et al. (2010) used a binary response model and investigated the relationship between education and long-term unemployment in EU countries showing that the probability of long-term unemployment decreases with the educational level.

Nunez et al. (2010) carried out a study on higher education and unemployment in Europe to examine the impact of higher education graduation and the field of study on unemployment in Europe using the secondary data from the "Labor Force Survey". Using an M-logit model, the authors analyzed the effect of education on short-term and long-term unemployment using variables say the marital status, gender, age, educational level and the field of study. Their results showed that a higher education diploma increases the odds of being employed in the short term and also leads to lower odds of being long-term unemployed. The authors also analyzed the changes in the probability of being unemployed by country and found that graduates of higher education in Belgium, Ireland and the UK have the lowest chances of being unemployed in the short term while graduates from Germany, Italy and Ireland have the lowest probability of being long-term unemployed. Considering the fields of study, the authors showed that most fields of study provide approximately the same probability of employment. Fields of study such as physics, chemistry, mathematics, statistics or informatics present the same probability of employment. The study fields that have the lowest unemployment probability are medicine, engineering and the sciences of education. Kim & Gu (2010) carried out a study on a logistic regression analysis for predicting bankruptcy in the hospitality industry in the USA. This study is based on the financial data of 16 U.S. hospitality firms that went bankrupt between 1999 and 2004 and 16 non-bankrupt matching firms. The estimated models imply that a hospitality firm is more likely to go bankrupt if it has lower operating cash flows

and higher total liabilities. The models suggest that a prudent sales growth strategy accompanied by tighter control of operating expenses and less debt financing can help enhance a firm's ability to meet its financial obligations and thereby reduce bankruptcy risk. Korkmaz (2012) carried out a study on the importance of logistic regression implementations in the Turkish livestock sector and logistic regression implementations. In this paper, the logistic regression analysis has been reviewed to define the relationship between the binary result variable and independent variables comprising both continuous and discrete variables. Shortly, the applicability of logistic regression in livestock has been researched. Bahovec et al. (2013) carried out a study to find out the effects of selected factors on the successful mastering of the curriculum of a quantitative course in professional studies at the University based on the logistic regression analysis. For this study data on various socio-demographic variables say gender, age condition, employed, lectures, exercise and scores on the exams on quantitative courses are collected from a random sample of students enrolled in the 2009/2010 academic year at The Center for Lifelong Learning and Adult Education, who took the exam in Statistics. This study found that only the variables exercise, math score and the grade on the exam in informatics are statistically significant predictors. As expected, regular attending to the lectures in Statistics significantly affects the increase of probability odds of success in mastering the course curriculum. In addition, the scores obtained in other quantitative courses significantly increase the probability odds of success in Statistics. Sakinc & Ugurlu (2013) conducted a study to investigate the factors affecting gender diversity in the boardroom using a logistic regression analysis which is based on the data of 40 listed firms in the Istanbul Stock Exchange (ISE) in the Corporate Governance Index (XKURY) in the year 2011.

This study found that the size of the board of directors and education has positive and foreign ownership and free float rate hurt gender diversity. Mohammadi et al. (2015) carried out a study on the application of the ordered logit model in investigating the factors affecting people's income in Tehran city. This study is based on primary data which was collected through a field survey, designing and running a questionnaire using a simple sampling method in 2013. In this study, income was evaluated as a function of education, age, age squared, gender, residence, occupation, wealth and private investment variables. This study found that an increase in the age (continuous variable), gender (for women), residence (for non-capital of the provinces), wealth (for those who had not inherited) and private investment (for those who had not invested) decreases the likelihood of the people to be placed at higher income levels, and increase in the age squared variable increases the likelihood of the people to be placed at higher levels of income.

In other words, people's income increases from a certain age onwards. In the case of education and occupation, an increase in the levels of these variables increases the likelihood of people being placed at higher income levels. This study also found that the calculated marginal effects are also by the theoretical expectations. Ramosacaj et al. (2015) carried out a study on the application of logistic regression in the study of students' performance levels at Vlora University. This study is based on the primary data which are collected from 240 freshmen of Vlora University on different variables such as gender, environment where they live, type of private or public school, school location, points taken in high school, and the mode of perception of the social environment. This study found that establishing teaching and research policies has a significant effect on increasing the level of quality, the level of female students'

performance is better than that of male students. This study concluded that the level of student performance is affected by high school results and outperforms those who have a higher valuation. Therefore, this study recommended paying specific attention to increasing the level of performance since high school. Continuous improvement of the socio-economic conditions of students, and the creation of non-stressful conditions are important contributing factors in increasing student performance. This study also found that the environment where they live is far from being appropriate for the research. Therefore, this study recommended that radical measures be taken to increase not only economic conditions but also standards for a research environment in the university.

Klieštik et al. (2015) conducted a study for the prediction of the financial health of a company using logit and probit models. This study is based on publicly available financial data to predict bankruptcy using the logit and probit models. This study found that the distribution function in the logit model contrary to the probit model has "flatter tails" (distribution has more observations appearing at the end of the distribution function). The distribution function of the probit model has a steeper slope. Both distribution functions are almost linear between P = 0.2 and P = 0.8. Parameter estimation in logit and probit models vary significantly. Bogdan et al. (2016) carried out a study on the estimation of a logit model to find out the influence of education level on unemployment in Romania using the secondary data that are published in the Population and Housing Census 2011. Besides the educational level, this study also used other socio-demographic variables like gender, marital status, and residential area. This study found that tertiary education has a greater impact on unemployment in Romania than in other EU countries. Alzen et al. (2018) carried out a study on a logistic regression model to investigate the relationship between the learning assistant model and failure rates in introductory STEM courses. For this study data are collected from administrative records at the University of Colorado Boulder. This study includes information for 32,071 unique students, 23,074 of whom took at least one of the following courses: Physics I/II, General Chemistry I/II, Calculus I/II (Math department), and/or Calculus I/II for Engineers (Applied Math department) with LA support. Student-level data includes information such as race/ethnicity, gender, first-generation status, and whether a student ever received financial aid. Additional variables include the number of credits upon enrollment, high school grade point average (GPA), and admissions test scores. This study found that exposure to LA support in any STEM gateway course is associated with a 63% reduction in odds of failure for males and a 55% reduction in odds of failure for females in subsequent STEM gateway courses. Chattopadhyay et al. (2018) carried out a study on binary logistic regression modelling in predicting channel behaviour towards instant coffee vending machines which is based on the primary data collected using a structural questionnaire. The main objective of this study was to find out the potential channel partners who would be interested in placing coffee vending machines for the brand Georgia at their retail premises.

The model was designed using the logistic regression method where three independent variables are footfall, refreshment availability, refreshment availability for tea/coffee and the dependent variable is the interest of the potential channel partner. This study found that footfall has a small influence in deciding whether the respondent is interested in becoming a channel partner or not but the other two factors may be considered as deciding factors in predicting the interest. Borucka (2019) carried out a study on the application of the logistic regression model

to study customer loyalty in an online store. The main objective of this study was to verify which of the customer's characteristics, and how, influence their decision to return to the store. The study was guided by the idea that retaining loyal customers is more valuable than acquiring new ones. It was carried out based on the data on recipients, collected by a small store offering herbal and healthy food products. The analysis covered customer loyalty, understood as making a repeat purchase, assessed in terms of attributes such as gender, age, place of residence (delivery location) and order value. From the estimated results of the logistic regression model, this study concluded that a repeat purchase is more likely when the client is a man. Greater loyalty was found among older people as well as those from smaller towns and villages. The impact of the order value also proved to be significant, as higher amounts favoured repeat purchases. Hermosilla et al. (2020) carried out a study on multinomial logistic regression to estimate and predict the perceptions of individuals and companies in the face of the COVID-19 pandemic in the Ñuble region, Chile, which is based on primary data of 313 citizens and 51 companies. This study found that economic uncertainty and pessimism have increased in the Ñuble Region. This study also found a high level of economic pessimism due to the health crisis. From the estimated results it is found that the majority of respondents had a very poor perception of the country's level of preparedness to face the pandemic (only 3.8% considered the country to be well prepared] and that their household income would continue to decrease (46.6%).

Therefore, this paper said that there is an economic pessimism situation in the country and the region in the upcoming 12 months. From the estimated results this paper highlighted a systematic concern for issues of employment, job security, and household debt. The variables of age and sex were significant when analyzing the vulnerability of certain groups, especially women and the elderly, to face the effects of the crisis and their role as citizens. At the business level, the focus was on economic policies that support its operational continuity and management capacity to face a changing scenario. Shah (2020) carried out a study on the binary logistic model to identify the factors associated with households with bank accounts in Nepal. This study is based on secondary data. This study found that mountain and hill people have fewer chances of not having bank accounts compared to Terai. Similarly, women-headed households have higher chances of having bank accounts compared to men-headed. The chance of having bank accounts in Province 2 is even worse than in Karnali and other provinces. People living in rural areas had less likelihood of having bank accounts. If any member of the household has gone out for foreign employment, those households who rear cattle, have higher chances of having bank accounts.

The odds of not having bank accounts gradually decreased with an increase in the size of agricultural land, wealth index, family size, and the number of members who completed secondary education. The author also commented that the goodness of fit of the model is poor. Strzelecka (2020) carried out a study on the application of logistic regression models to assess household financial decisions regarding debt which is based on the primary data of 1000 households in Central Pomerania (Poland). The study aimed to identify and evaluate socio-economic factors determining the debt of households in Central Pomeranzas using a logistic regression model. This study found that the socio-economic factors the economic education of the head of the household, the developmental phase of the household, and the socio-economic type of the household had a statistically significant positive impact on the likelihood of Central

Pomeranian households using external sources of financing (primarily loans). These factors increase the likelihood of households using external sources of financing. In turn, a statistically significant negative impact on the analyzed phenomenon had the household income diversification and the age of the household head. Keya et al. (2021) carried out a study to predict the performance of garment women working status in Bangladesh using a machine learning approach which is based on the primary data of 512 workers which are collected from different reputed garment factories. The authors have tried to find out the relation between their health status, their family earnings, their family members' information, their working time, how many years they work in this sector and how many times they want to work. This research work has observed that most of the female workers work in the finishing, swing, helping, and cleaner sectors. In this sector, they cannot get huge salaries implying that their income is limited, and the range of their salaries is very low. It has also been found that some women manage their whole family with their income. Besides they are feeling bored with the same work. This paper analyzed the women's working performance based on their previous activity and used some machine learning algorithms say Decision Tree Classifier (DTC), Logistic Regression (LR), Random Forest Classifier (RFC), and Stochastic Gradient Descent (SGD) and got the best result from Logistic Regression (LR) and it is 69%.

Research Gaps from Literature

According to the knowledge of the author still now no one has conducted any research to determine the effects of different factors on the likelihood of skilled workers in the garment sector of Bangladesh using the logistic regression model. That is why this study is conducted to fill the gap in the literature. We believe that this new study will add value to the review of the literature and attempt to fill the gap in the literature. By keeping this in mind, the present study is carried out to investigate the factors that affect the likelihood of being skilled workers in the garment sector of Bangladesh using modern econometric techniques such as the logistic regression model. We believe that the findings of this study will throw some light on the policy makers and for the scope of future research. Moreover, the study has used sophisticated econometric approaches to find out the linkage between the likelihood of being skilled workers in the garment sector of Bangladesh and its' determinants, mitigating the gap in the existing pieces of literature.

Data Collection: Nature and Source of Data

It is known to us that the success of any statistical and econometric analysis for any kind of research irrespective of any discipline ultimately depends on the availability of the appropriate data. It is therefore very important to discuss the nature, sources and limitations of the data that may be used for empirical analysis. In Bangladesh, it is a golden dear to obtain reliable and appropriate data for any kind of research work because the people of this society are not aware of the importance of the research. Thus, it is often difficult to obtain reliable data with the necessary information required for a particular analysis. In our study, the research team has faced a lot of difficulties in collecting data from the different factories. Most of the executives of the garment industry have denied providing any information regarding their factories and also about their workers. It was found that in most of the factories, the workers were very afraid to give their information in front of the executives of the factories. Despite these difficulties, we have tried our level best to collect the appropriate and reliable data from the workers of different factories. Therefore, it is very common that in some collected data, errors of

measurement arise from approximation and rounding off. Missing values are very common in questionaries' because, for their interest, they don't like to disclose information about some important variables say as their true salary, their monthly expenditure their education and experience level etc. Because of all these and many other problems, one should always keep in mind that the result(s) of the research may be affected by the quality of the data. Therefore, if in a given situation the researchers find that the results of the research are unsatisfactory the reason may be that they are not using the wrong model but rather than may be that the quality of the data used was poor. Some difficulties in finding suitable data are frequently encountered. The measurement of different variables says wages, income, expenditure etc. have many difficulties, because due to providing many wrong information. This study is based on primary data. For this study, the information on different variables is collected from 306 respondents from different factories under Chattogram, Dhaka, Gazipur and Narayanganj cities using the structured questionnaire. The stratified random sampling is used to select the factories from each city as a stratum and a part of the sample is drawn at random from different factories of each city and the sample observations are selected using simple random sampling. For this study the primary data on different variables say whether a worker is skilled or not (Y), grade of the workers (GRD), years of education of the workers (EDU), years of experience of the workers (YEXP), working years in the existing company (WY), gender of the workers (GEN), whether a worker is from rural or urban (REG) area, monthly wage rate of the workers (WR) in BDT, monthly living cost of the workers (COST) in BDT, about a category that a company prefer for recruitment (PK), whether a worker having any training program degree or not (TPD), expected level of education for recruitment of a skilled worker (EXED), whether a company offer competitive remuneration or not (CRE), whether a company provides adequate facilities for the employees or not (FAC), whether a worker feels secured or not in a given environment of the company (SEC), whether a company allows quick promotion of the employees based on performance or not (PRO) and the age of the garment industries (AGE) respectively.

Econometric Methodology

To detect the effects of different factors such as EDU, GRD, YEXP, WY, GEN, REG, WR, PK, TPD, CRE, FAC, SEC, PRO, and AGE on the likelihood of being skilled workers in the garment sector of Bangladesh, the logistic regression model is considered.

Estimation of the Logit Model

The logit model is an improvement on the linear probability model (LPM) and it is based on the cumulative distribution function (CDF) of a random variable. The logit model has the following logistic cumulative distribution function (CDF), and gives the following relationship:

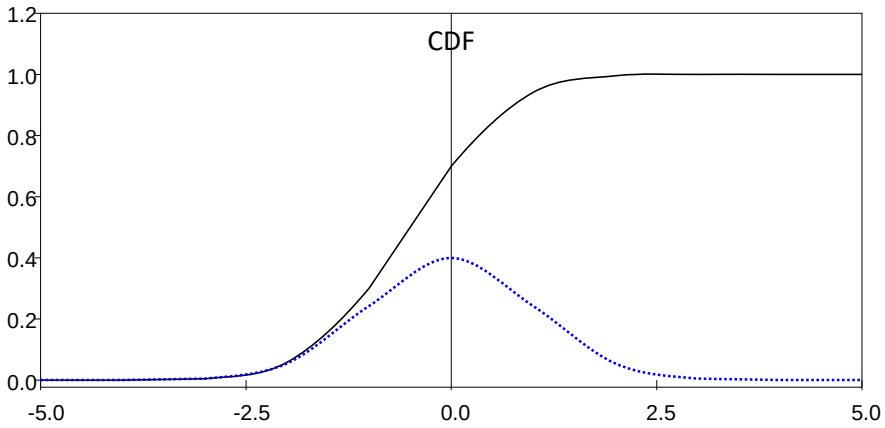

Figure 2: The Logistic Function $\frac{\exp(X)}{1+\exp(X)}$ and its Derivative.

Source: The primary data is collected using structured questionnaires from four big cities

The regression line given in Figure 3 is nonlinear, giving a more realistic description of the data with very little change in the probability at the extreme value that the explanatory variable can take. Let, P_i be the probability that the dependent variable Y_i takes the value of 1. Then, in the logit model, the probability P_i for a given value of the explanatory variable X can be expressed as

$$P_i = E(Y_i = 1|X) = \frac{1}{1+e^{-Z_i}} \quad (1)$$

where

$$Z_i = \beta_0 + \beta_1 EDU_i + \beta_2 YEXP_i + \beta_3 WR_i + \beta_4 GRD_i + \beta_5 WY_i + \beta_6 GEN_i + \beta_7 REG_i + \beta_8 TPD_i + \beta_9 CRE_i + \beta_{10} PK_i + \beta_{11} FAC_i + \beta_{12} SEC_i + \beta_{13} PRO_i + \beta_{14} AGE_i + \varepsilon_i \quad (2)$$

Here, the dependent variable Y is defined as

$$Y_i = \begin{cases} 1, \text{ if a worker is skilled} \\ 0, \text{ otherwise} \end{cases}$$

EDU_i indicates the years of education of the ith worker, $YEXP_i$ indicates the years of experience of the ith worker, WR_i indicates the monthly wage rate in thousand BDT of the ith worker, GRD_i indicates the grade level of the ith worker, WY_i indicates working years in the present company, GEN_i indicates the gender of the ith worker which is defined as:

$$GEN_i = \begin{cases} 1, \text{ if a worker is male} \\ 0, \text{ if a worker is female} \end{cases}$$

REG_i indicates the region from where the ITH worker came to work either in the rural or the urban area, which is defined as:

$$REG_i = \begin{cases} 1, \text{ if a worker is from rural} \\ 0, \text{ if a worker is from urban} \end{cases}$$

TPD_i indicates whether the ith worker has any training program degree or not which is defined as:

$$TPD_i = \begin{cases} 1, \text{ if a worker having training program degree} \\ 0, \text{ otherwise} \end{cases}$$

CRE_i indicates whether a company offers competitive remuneration for the ith worker which is defined as:

$$CRE_i = \begin{cases} 1, \text{ if the compnay offers competitive remuneration for the ith worker} \\ 0, \text{ otherwise} \end{cases}$$

PK_i indicates the category that a company prefers for recruiting the ith worker which is defined as:

$$PK_i = \begin{cases} 1, \text{ if the compnay prefers practical knowledge of industry management to recruit a worker} \\ 0, \text{ if the compnay prefers degree in industry managemet} \end{cases}$$

FAC_i indicates adequate facilities that a company provides for the workers which is defined as:

$$FAC_i = \begin{cases} 1, \text{ if a company provides adequate facilities for the ith worker} \\ 0, \text{ otherwsie} \end{cases}$$

SEC_i indicates whether the ith worker feels secure in the given environment of the company which is defined as:

$$SEC_i = \begin{cases} 1, \text{ if the ith worker feels secured} \\ 0, \text{ otherwsie} \end{cases}$$

PRO_i indicates whether a company allows quick promotion of the ith worker based on performance which is defined as:

$$PRO_i = \begin{cases} 1, \text{ if a compnay allows quick promotion of the ith worker based on performance} \\ 0, \text{ otherwsie} \end{cases}$$

AGE_i indicates age in years of the ith company, and ε_i is the random error term corresponding to the ith set of observations which is normally distributed with mean zero and variance σ_i^2, i.e., $\varepsilon_i \sim N\left[0, \sigma_i^2\right]$.

Equation (2) can also be written as

$$P_i = \frac{e^{Z_i}}{1+e^{Z_i}} \tag{3}$$

Equation (3) is known as the cumulative or logistic distribution function[1]. Equation (3) can be written as

[1] The logistic model has been used extensively in analyzing growth phenomena such as population, GNP, money supply, etc. For theoretical and practical details of logit and probit models, see J.S. Kramer, ***The Logit Model for Economics***, Edward

$$1-P_i = \frac{1}{1+e^{Z_i}} \quad (4)$$

Now, dividing equation (3) by (4), we have

$$\frac{p_i}{1-p_i} = e^{Z_i} \quad (5)$$

Thus, from equation (5), we see that the logit model can be expressed as the odds ratio, which simply indicates the probability of being a skilled worker in the garment factory relative to the probability that a worker will not be skilled.

Taking the natural log of the odds ratio (5), we have

$$\ln\left[\frac{p_i}{1-p_i}\right] = Z_i$$

$$L_i = \beta_0+\beta_1 EDU_i+\beta_2 YEXP_i+\beta_3 WR_i+\beta_4 GRD_i+\beta_5 WY_i+\beta_6 GEN_i+\beta_7 REG_i+\beta_8 TPD_i+ \beta_9 CRE_i+\beta_{10} PK_i+\beta_{11} FAC_i+\beta_{12} SEC_i+\beta_{13} PRO_i+\beta_{14} AGE_i+\varepsilon_i \quad (6)$$

where $L_i = \ln\left[\frac{p_i}{1-p_i}\right]$. Thus, we produce the logit of Y_i (L_i), or we can say that L_i as a linear function of the independent variables, but the probability P_i is not a linear function of the independent variables since, for the logit model, the log odds ratio is a linear function of the independent variables. Therefore, we can say that, in logit model, β_j measures the marginal effect of the independent variable X_j (j=1, 2,…..,k) on the log odds ratio while all other independent variables are constant. That is, a unit increase in X_j, leads to an increase of $100\beta_j$% in the odds ratio. L_i is called the logit and model (6) is called the logit model. To estimate the logit model (6), we need the information of the independent variables and L. The maximum likelihood method (ML) is applied to estimate the logit model (6).

Logistic Regression Model Evaluation

Investigating the Statistical Significance of Each of the Logistic Regression Coefficients.

To examine whether each of the independent variables is statistically significant separately or not, we set up the following null hypothesis against an appropriate alternative hypothesis:

$H_0: \beta_j = 0, \quad j = 0, 1, 2,.....,14$

$H_0: \beta_j \neq 0, \quad j = 0, 1, 2,.....,14$

Under the null hypothesis, the standard normal (z) test statistic is given by

Arnold Publishers, London 1991; and G. S. Maddala, ***Limited Dependent and Qualitative variables in Econometrics***, Cambridge University Press, New York, 1983.

$$z = \frac{\hat{\beta}_j}{SE[\hat{\beta}_j]} \sim N(0, 1) \quad (9)$$

where $\hat{\beta}_j$ (j = 0, 1,.....,14) indicates the value of the logistic regression coefficient of the jth independent variable (X_j). $SE[\hat{\beta}_j]$ indicates the standard error of $\hat{\beta}_j$ (j = 0, 1, 2,.....,14). If the value of z is statistically significant at α level of significance, it implies that the null hypothesis will be rejected indicating that the logistic regression coefficient is not equal to zero. Thus, it can be said that the independent variable X_j (j = 0, 1, 2,…,14) has a significant effect on predicting the value of the binary response variable y. If the value of z is not statistically significant at α level of significance, it implies that the independent X_j (j = 0, 1, 2,……,14) should be excluded from the logistic regression model because it has no significant effect on predicting the value of the binary response variable y.
We can also use the Wald test statistic to test the significance of each of the logistic regression coefficients.

Under the null hypothesis, the Wald test (WT) statistic is given by

$$WT = \left[\frac{\hat{\beta}_j}{SE[\hat{\beta}_j]}\right]^2 \sim \chi^2_{1d.f.}, \quad i = 0, 1, ……..,14 \quad (10)$$

If the value of WT is statistically significant at a α level of significance with 1 degree of freedom, it implies that the null hypothesis will be rejected indicating that the logistic regression coefficient is not equal to zero. Thus, it can be said that the independent variable X_j (j = 0, 1, 2,…,14) has a significant effect on predicting the value of the binary response variable y; otherwise, the null hypothesis will be accepted.

Table 2: The ML Estimates of the Logit Model with the z-Test and WT Results

Variable	Coeff.	Std Error	z	P>|z|	WT	d.f.	Sig. of WT	[95% Conf. Int.]	
								LL	UL
Constant	-10.452*	2.557	-4.087	0.000	16.708	1	0.000	-15.464	-5.439
EDU	0.170***	0.111	1.536	0.123	2.350	1	0.125	-0.047	0.386
YEXP	0.485*	0.189	2.565	0.010	6.585	1	0.010	0.114	0.855
WR	0.639*	0.141	4.544	0.000	20.538	1	0.000	0.363	0.914
GRD	-1.085*	0.245	-4.430	0.000	19.612	1	0.000	-1.565	0-.605
WY	0.458**	0.270	1.694	0.090	2.877	1	0.090	-0.072	0.988
GEN	1.122**	0.625	1.794	0.073	3.223	1	0.073	-0.104	2.347
REG	2.339***	1.561	1.499	0.134	2.245	1	0.134	-0.720	5.398
TPD	3.652*	0.989	3.693	0.000	13.635	1	0.000	1.714	5.591
CRE	-0.014	0.894	-0.016	0.988	0.002	1	0.988	-1.766	1.738
PK	2.649***	1.676	1.580	0.114	2.498	1	0.114	-0.636	5.934
FAC	0.982	1.324	0.742	0.458	0.550	1	0.458	-1.614	3.578
SEC	-0.987	1.433	-0.689	0.491	0.474	1	0.491	-3.794	1.821
PRO	0.299	1.306	0.229	0.819	0.052	1	0.819	-2.261	2.859
AGE	-0.123*	0.045	-2.751	0.006	7.471	1	0.006	-0.211	-0.036

The ML estimates of the logistic regression equation (6) including the z-test and WT values are obtained using the software package STATA and the results are given in Table 2.

*: indicates significant at 5% or 1% level, **: indicates significant at 10% level and ***: indicates significant at 15% level.
LL: indicates a lower limit, and UL: indicates an upper limit.
Source: Primary data is collected using structured questionnaires from four big cities. Own calculations

Interpretations Using the Estimated Coefficients:

Constant: The intercept= -10.452 which corresponds to the log odds of the probability of being a skilled worker in the garment sector of Bangladesh when all the independent variables are zero.

Education (EDU): The estimated coefficient of the variable EDU is 0.170. This means that for increasing an additional year of education, the logit (log odds) of being in favour of a skilled worker will increase by 0.170 holding all other independent variables constant. From the z-test and WT results, it can be said that the coefficient of 0.170 is statistically significant at a 15% significance level. Since bigger logits correspond to bigger probabilities it can be said that more educated workers are more likely to be skilled workers in the garment sector of Bangladesh keeping all other independent variables constant. The 95% confidence interval estimate for the population parameter of the variable EDU is [-0.0469, 0.3864]. The predicted probability of this outcome is 0.5423.

Experience Level (YEXP): The estimated coefficient of the variable YEXP is 0.485. This means that for increasing every additional year of experience, we expect a 0.485 increase in the logit (log-odds) of the dependent variable y, holding all other independent variables constant. It is also found that the relationship between years of experience and the logit of y is statistically significant at any significance level. From the estimated coefficient it can be said that more experienced workers are more likely to be skilled workers. The 95% confidence interval estimate for the population parameter of the variable YEXP is [0.1144, 0.8549]. The predicted probability of the outcome is 0.6188.

Wage Rate (WR): The estimated coefficient of the variable WR is 0.639. This means that for increasing one thousand BDT of wage rate we may expect a 0.639 increase in the logit (log odds) of the dependent variable y, keeping all other independent variables constant. It is also found that the relationship between the monthly wage rate of the employees and the logit of y is statistically significant at a 5% significance level. From the estimated coefficient it can be said that the workers having higher wage rates are more likely to be skilled workers. The 95% confidence interval estimate for the population parameter of the variable WR is [0.3632, 0.9140]. The predicted probability of the outcome is 0.6479.

Grade of the Workers (GRD): The estimated coefficient of the variable GRD is -1.085 which implies that for per unit increasing the grade of the worker, we may expect a 1.085 decrease in

the logit (log-odds) of the dependent variable y, keeping all other independent variables constant. It is also found that the relationship between the grade of the employees and the logit of y is statistically significant at any significance level. From the estimated coefficient it can be said that the low-grade workers are relatively less likely to be skilled workers in the garment sector of Bangladesh. The 95% confidence interval estimate for the parameter of the variable GRD is [-1.5647, -0.6048]. The predicted probability of this outcome is 0.2526.

Working Years in the Present Company (WY): The estimated coefficient of the variable **WY** is 0.458 which implies that for increasing an additional working year in the present company the logit (log odds) of the variable y will increase by 0.458, keeping all other independent variables constant. It is also found that the relationship between working years and the logit of y is statistically significant at a 10% significance level. From the estimated coefficient it can be said that the workers with more working years in the present company are more likely to be skilled workers in the garment sector of Bangladesh. The 95% confidence interval estimate for the population parameter of the variable **WY** is [-0.0720, 0.9879]. The predicted probability of this outcome is 0.6125.

Gender (GEN): The estimated coefficient of the variable GEN is 1.122 which implies that the expected difference of logit(y) between a man and a woman worker with the same experience is 1.1215. It implies that the male workers being more likely to be skilled than the women workers in the garment sector of Bangladesh. The reason is that an increase of 1 in the indicator variable **GEN** brings you from 1 (man) to 0 (woman) and results in a positive expected change (1.1215) in the logit of y. The relationship between GEN and logit(y) is also found to be statistically significant at a 10% significance level. The 95% confidence interval for the parameter of the variable GEN is [-0.1036, 2.3467]. The predicted probability of the outcome is 0.7543.

Region (REG): The estimated coefficient of the variable REG is 2.339 which implies that the expected difference of logit(y) between a rural and urban worker is 2.339. It implies that rural workers are more likely to be skilled than the urban workers. The reason is that an increase of 1 in the indicator variable **REG** brings us from 1 (rural) to 0 (urban) and the result is a positive expected change is 2.339 in logit of y. The relationship between REG and logit(y) is also found to be statistically significant at a 15% significance level. The 95% confidence interval estimate for the parameter of the variable REG is [-0.7201, 5.3984]. The predicted probability of the outcome is 0.9121.

Having a Training Program Degree (TPD): The estimated coefficient of the variable TPD is 3.652 which implies that the expected difference of logit(y) between a worker having a training program degree and a worker having no training program degree is 3.652. Thus, it can be said workers who have a training program degree are more likely to be skilled than those who have no training program degree. The reason is that an increase of 1 in the indicator variable **TAD** brings us from 1 (having a training program degree) to 0 (having no training program degree) and results in a positive expected change is 3.652 in the logit of y. It is also found that the relationship between TPD and logit(y) is statistically significant at any significance level. The 95% confidence interval estimate for the parameter of the variable TPD is [1.7136, 5.5906]. The predicted probability of the outcome is 0.9747.

Competitive Remuneration (CRE): The estimated coefficient of the variable CRE is -0.014 which implies that the expected difference of logit(y) between a group of workers whose companies offer competitive remuneration and a group of workers whose companies do not offer competitive remuneration is -0.014. Thus, it can be said that workers whose companies offer competitive remuneration are less likely to be skilled than those workers whose companies not offer competitive remuneration. The reason is that an increase of 1 in the indicator variable **CRE** brings us from 1 (if his/her company offering competitive remuneration) to 0 (if not offering competitive remuneration) and the result is a negative expected change (-0.014) in the logit of y. It is also found that the relationship between CRE and logit(y) is not statistically significant at all. The 95% confidence interval estimate for the parameter of the variable CRE is [-1.7657, 1.7379]. The predicted probability of the outcome is 0.4965.

Having Practical Knowledge of Industry Management (PK): The estimated coefficient of the variable PK is 2.649 which implies that the expected difference of logit(y) between a worker whose company prefers having practical knowledge in industry management for recruiting and a worker whose company does not prefer having a degree in industry management is 2.6487. This implies that a group of workers having practical knowledge of industry management is more likely to be skilled than a group of workers having a degree in industry management. The reason is that an increase of 1 in the indicator variable **PK** brings us from 1 (if his/her company prefers having practical knowledge in industry management for recruitment) to 0 (if prefers having a degree in industry management) and results in a positive expected change (2.649) in the logit of y. It is also found that the relationship between PK and logit(y) is statistically significant at a 15% significance level. The 95% confidence interval estimate for the parameter of the variable PK is [-0.6367, 5.9342]. The predicted probability of the outcome is 0.9339.

Provide Adequate Facilities (FAC): The estimated coefficient of the variable FAC is 0.982 which implies that the expected difference of logit(y) between a worker whose company provides adequate facilities and a worker whose company does not provide adequate facilities is 0.982. Thus, it can be said that workers of those companies who provide adequate facilities are more likely to be skilled than those workers whose companies do not provide adequate facilities. The reason is that an increase of 1 in the indicator variable **FAC** brings us from 1 (if his/her company provides adequate facilities) to 0 (if does not provide adequate facilities) and the result is a positive expected change (0.982) in logit of y. It is also found that the relationship between FAC and logit(y) is not statistically significant at all. The 95% confidence interval estimate for the parameter of the variable FAC is [-1.6136, 3.5780]. The predicted probability of the outcome is 0.7275.

Feeling Secure Environment (SEC): The estimated coefficient of the variable **SEC** is -0.987 which implies that the expected difference of logit(y) between a worker who feels secure in the given environment provided by his/her company and a worker who does not feel secure at the given environment providing by his/her company is -0.987, with the workers who feel secure at the given environment are less likely to be skilled than those who do not feel secure. The reason is that an increase of 1 in the indicator variable **SEC** brings us from 1 (if a worker feels

secure in the given environment provided by the company) to 0 (if a worker does not feel secure in the given environment provided by the company) and the result is a negative expected change (-0.987) in the logit of y. It is also found that the relationship between **SEC** and logit(y) is not statistically significant at all. The 95% confidence interval estimate for the parameter of the variable **FAC** is [-3.7944, 1.8207]. The predicted probability of the outcome is 0.2715.

Allow Quick Promotion (PRO): The estimated coefficient of the variable **PRO** is 0.299 which implies that the expected difference of logit(y) between a worker whose company allows quick promotion based on performance and a worker whose company does not allow is 0.299, with the workers of those companies that allow quick promotion based on performance are more likely to be skilled than those workers whose companies do not allow quick promotion. The reason is that an increase of 1 in the indicator variable **PRO** brings us from 1 (if his/her company allows quick promotion based on performance) to 0 (if does not allow quick promotion based on performance) and the result is a positive expected change (0.299) in the logit of y. It is also found that the relationship between PRO and logit(y) is not statistically significant at all. The 95% confidence interval for the parameter of the variable PRO is [-2.2610, 2.8591]. The predicted probability of the outcome is 0.5742.

AGE of the Companies (AGE): The estimated coefficient of the variable **AGE** is -0.123. This means that for increasing an additional year of age of the company, the logit (log odds) of the variable y will decrease by 0.123 keeping all other independent variables constant. From the z-test and WT results, it can be said that the relationship between AGE and the logit of y is statistically significant at any significance level. Since negative logits correspond to smaller probabilities it can be said that for higher age the companies are less likely to be skilled workers in the garment sector of Bangladesh. The 95% confidence interval estimate for the population parameter of the variable **AGE** is [-0.2112, -0.0355]. The predicted probability of the outcome is 0.4692.
Also, the ML estimates of the logit model with the estimated odds ratios, including z-test results are given in Table 3.

Table 3: The ML Estimates of the Logit Model with Estimated Odds Ratio

Variable	Odds Ratio	Std Error	z	P>|z|	[95% Conf. Interval]	
					Lowe Limit	Upper Limit
EDU	1.1850	0.1310	1.5355	0.1247	0.9542	1.4717
YEXP	1.6236	0.3067	2.5653	0.0103	1.1212	2.3511
WR	1.8938	0.2661	4.5443	0.0000	1.4379	2.4943
GRD	0.3380	0.0828	-4.4297	0.0000	0.2092	0.5461
WY	1.5808	0.4274	1.6936	0.0903	0.9305	2.6855
GEN	3.0695	1.9188	1.7942	0.0728	0.9015	10.4512
REG	10.3727	16.1905	1.4986	0.1340	0.4867	221.0617
TPD	38.5552	38.1323	3.6926	0.0002	5.5491	267.884
CRE	0.9862	0.8814	-0.0155	0.9876	0.1711	5.6852
PK	14.1362	23.6959	1.5801	0.1141	0.5290	377.7192
FAC	2.6702	3.5365	0.7416	0.4583	0.1992	35.8006
SEC	0.3728	0.5340	-0.6889	0.4909	0.0225	6.1769
PRO	1.3486	1.7615	0.2290	0.8189	0.1043	17.4453
AGE	0.8840	0.0396	-2.7507	0.0059	0.8096	0.9652

*: indicates significant at 5% or 1% level, **: indicates significant at 10% level and ***: indicates significant at 15% level.

Interpretations Using the Estimated Odds Ratio:

Education (EDU): The odds ratio of being in support to be a skilled worker is predicted to grow by about 1.19 for each additional year of education keeping all other independent variables constant. It also implies that we may expect to see about a 19% increase in the odds of being a skilled worker in the garment sector of Bangladesh, for a one-unit increase in years of education, keeping all other independent variables constant. So, if two workers differ by 2 years of education, the worker with more education has predicted odds of being supported to be a skilled worker is 1.19^2 or 1.42 times larger than the worker with less education. If two workers differ by 10 years of education, the odds ratio that the worker with more education is in support of being a skilled worker is 1.19^{10} or 5.50 times larger than the worker with less education. From the estimated results it can be said that the higher-educated workers have 18.5% more odds than the less-educated workers. Since the odds ratio of the variable EDU is greater than 1, it positively affects the likelihood of skilled workers in the garment sector of Bangladesh. It is also found that the effect of EDU on the odds ratio of skilled workers is significant at a 15% significance level. From the 95% confidence interval estimate of the odds ratio of the variable EDU, it can be said that we can expect an increase between -4.58% and 47.17% in the odds of a skilled worker for higher educated workers compared to the less educated workers.

Experience Level (YEXP): From the estimated odds ratio of the variable YEXP, it can be said that the odds ratio of being a skilled worker in the garment sector of Bangladesh will grow by 1.62 for each additional year of experience of the workers, keeping all other independent variables constant. It also implies that we may expect to see about a 62% increase in the odds of being a skilled worker in the garment sector of Bangladesh, for a one-unit increase in years

of experience, keeping all other independent variables constant. Since the odds ratio of the variable YEXP is greater than 1 it has a positive effect on the likelihood of the skilled workers in the garment sector of Bangladesh. It is also found that the relationship between years of experience and the likelihood of skilled workers is significant at a 5% significance level. From the confidence interval estimate of the odds ratio of the variable YEXP, it can be said that we can expect an increase between 12.12% and 135.11% in the odds of being a skilled worker for more experienced workers compared to less experienced workers.

Wage Rate (WR): From the estimated results, it can be said that the odds ratio of being a skilled worker in the garment sector of Bangladesh is predicted to grow about 1.89 for each additional unit of monthly salary of the workers, keeping all other independent variables constant. It also implies that we may expect to see about an 89% increase in the odds of being a skilled worker in the garment sector of Bangladesh, for a one-unit increase in the monthly wage rate of the workers, keeping all other independent variables constant. Since the odds ratio of the variable WR is greater than 1, it positively affects the likelihood of skilled workers in the garment sector of Bangladesh. It is also found that the relationship between WR and the odds ratio is statistically significant at any significance level. From the 95% confidence interval estimate of the odds ratio of the variable WR, it can be said that we may expect an increase between 43.79% and 149.43% in the odds of a skilled worker for a higher wage rate compared to the lower wage rate of the workers.

Grade of the Workers (GRD): From the estimated results, it can be said that the odds ratio of being a skilled worker in the garment sector of Bangladesh is predicted to grow about 0.338 for each additional unit of grade of the workers, keeping all other independent variables constant. It can also be said that we may expect to see about a 66.2% reduction in the odds of being a skilled worker in the garment sector of Bangladesh, for one grade-less worker, keeping all other independent variables constant. Since the odds ratio of the variable GRD is smaller than 1 it has a negative effect on the likelihood of the skilled workers in the garment sector of Bangladesh. It is also found that the relationship between GRD and the odds ratio of skilled workers is statistically significant at any significance level. From the 95% confidence interval estimate of the odds ratio of the variable GRD, it can be said that we can expect a decrease between -79.08% and -45.39% in the odds of a skilled worker for a lower grade compared to the higher grade of the workers.

Working Years in the Present Company (WY): It is found that the odds ratio of being a skilled worker in the garment sector of Bangladesh will grow about 1.58 for each additional working year in the present company, keeping all other independent variables constant. It also implies that we may expect to see about a 58% increase in the odds of being a skilled worker in the garment sector of Bangladesh, for a one-unit increase in a working year in the present company, keeping all other independent variables constant. Since the odds ratio of the variable WY is greater than 1, it positively affects the likelihood of the skilled workers in the garment sector of Bangladesh. The relationship between WY and the odds ratio of skilled workers is also found to be statistically significant at a 10% significance level. From the 95% confidence interval estimate of the odds ratio of the variable WY, it can be said that we can expect an

increase between -6.95% and 168.55% in the odds of a skilled worker for more working years compared to less working years in the present company of the workers.

Gender (GEN): It is found that the male group is 3.0695 times more likely than the female group to be skilled workers in the garment sector of Bangladesh. We can also say that males have 206.95% higher odds of being skilled workers in the garment sector of Bangladesh than females, keeping all other independent variables constant. Since the odds ratio of the variable GEN is greater than 1, it positively affects the likelihood of the skilled workers in the garment sector of Bangladesh. The relationship between GEN and the odds ratio of skilled workers is also found to be statistically significant at a 10% significance level. From the 95% confidence interval estimate of the odds ratio of the variable GEN, it can be said that we can expect an increase between -9.85% and 945.12% in the odds of a skilled worker for the male group compared to the female group.

Region (REG): It is found that a group of workers from rural areas is 10.3727 times more likely to be skilled workers than a group of workers from urban areas. It can be said that rural workers have 937.27% higher odds of being skilled workers in the garment sector of Bangladesh than urban workers, keeping all other independent variables constant. Since the odds ratio of the variable REG is greater than 1, it positively affects the likelihood of skilled workers in the garment sector of Bangladesh. The relationship between REG and the odds ratio of skilled workers is also found to be statistically significant at a 15% significance level. From the 95% confidence interval estimate of the odds ratio of the variable REG, it can be said that we can expect an increase between -51.33% and 22006.17% in the odds of a skilled worker for the rural group compared to the urban group.

Having a Training Program Degree (TPD): It is found that a group of workers having a training program degree is 38.5552 times more likely to be skilled workers than a group of workers who have no training program degree. It implies that workers having a training program degree have 3755.52% higher odds of being skilled workers than those workers who have no training program degree. Since the odds ratio of the variable TPD is greater than 1, it positively affects the likelihood of skilled workers in the garment sector of Bangladesh. It is also found that the relationship between TPD and the odds ratio of skilled workers is statistically significant at any significance level. From the 95% confidence interval estimate of the odds ratio of the variable TPD, it can be said that we can expect an increase between 454.91% and 26688.4% in the odds of a skilled worker for a group of workers having a training program degree compared to the group of workers having no any training program degree.

Competitive Remuneration (CRE): No significant evidence is found between the workers whose companies offer competitive remuneration and their odds ratio of skilled workers.

Having Practical Knowledge of Industry Management (PK): It is found that a group of workers whose companies prefer having practical knowledge of industry management for recruitment is 14.1362 times more likely to be skilled workers than a group of workers whose companies prefer having a degree in industry management. It can be said that workers having practical knowledge of industry management have 1313.62% higher odds of skilled workers than those workers who have no practical knowledge of industry management. Since the odds

ratio of the variable PK is greater than 1, it positively affects the likelihood of skilled workers in the garment sector of Bangladesh. The relationship between PK and the odds ratio of skilled workers is also found to be statistically significant at a 15% significance level. From the 95% confidence interval estimate of the odds ratio of the variable PK, it can be said that we can expect an increase between -47.10 and 37671.92% in the odds of a skilled worker for a group of workers whose companies prefer having practical knowledge of industry management for recruitment compared to the group of workers whose companies prefer having a degree industry management for recruitment

Provide Adequate Facilities (FAC): It is found that the odds ratio of being a skilled worker does not significantly depend on a group of workers whose companies provide adequate facilities.

Feeling Secure Environment (SEC): It is found that the odds ratio of being a skilled worker does not significantly depend on a group of workers who feel secure in the given environment of their companies.

Allow Quick Promotion (PRO): It is found that the odds ratio of being a skilled worker does not significantly depend on a group of workers whose companies allow quick promotion based on their performance.

AGE of the Companies (AGE): From the estimated results, it is found that the odds ratio of being a skilled worker will grow about 0.884 for each additional year of age of the companies, keeping all other independent variables constant. It also implies that we may expect to see about an 11.6% reduction in the odds of being a skilled worker in the garment sector of Bangladesh, for a one-unit increase in year of age of the companies, keeping all other independent variables constant. Since the odds ratio of the variable AGE is smaller than 1 it has a negative effect on the likelihood of being skilled workers in the garment sector of Bangladesh. It is also found that the relationship between AGE and the odds ratio of skilled workers is statistically significant at any significance level. From the 95% confidence interval estimate of the odds ratio of the variable AGE, it can be said that we can expect a decrease between -19.04% and -3.18% in the odds ratio of a skilled worker for higher-aged companies compared to the less-aged company

Investigating the Goodness of Fit of the Logistic Regression Model as a Whole

To investigate the goodness of fit of the logistic regression equation as a whole in this section the LR test is discussed below:

Likelihood ratio Test:

Here, the null hypothesis to be tested is

$H_0: \beta_1 = \beta_2 = ... = \beta_k = 0$

Against the alternative hypothesis

H_1: At least one of them is not zero.

Under the null hypothesis, the likelihood ratio test statistic (LR) is given by

$$LR = 2(\log L_{UR} - \log L_R) \sim \chi^2_k \quad (11)$$

where $\log L_{UR}$ is the log-likelihood value for the unrestricted model and $\log L_R$ is the log-likelihood value for the restricted model; or, under the null hypothesis, k is the number of restrictions.

If the value of LR is statistically significant at α level of significance with k degree of freedom, it implies that the null hypothesis will be rejected, which states that all the logistic regression coefficients are not equal to zero. Thus, it can be said that some of the independent variables have significant effects on predicting the value of the binary response variable y otherwise the null hypothesis will be accepted.

Measures Based on Likelihood Functions or Log-Likelihood Functions:

Also, to investigate the goodness of fit of the logistic regression equation as a whole, the squared correlation between Y and $\hat{Y}$, pseudo-R^2, Mcfadden's R^2, Maddala's R^2 and Count-R^2 are used which are given below.

Let us define L_{UR} is the maximum of the likelihood function when maximized with respect to all the parameters and L_R as the maximum of the likelihood function under the restriction $\beta_1 = \beta_2 = ...= \beta_k = 0$. Then, we have

$$R^2 = 1 - \left[\frac{L_R}{L_{UR}}\right]^{2/n} \quad (12)$$

We can use the analogous measure for the logit model as well. We know that, for the binary dependent variable model, the likelihood function $L(y|x;\beta) = \prod_{i=1}^{n}\left[F(x_i'\beta)\right]^{y_i}\left[1-F(x_i'\beta)\right]^{1-y_i}$ attains an absolute maximum of 1. This means that

$$L_R \le L_{UR} \le 1$$

$$\Rightarrow L_R \le \frac{L_R}{L_{UR}} \le 1$$

$$\Rightarrow \left[L_R\right]^{2/n} \le \left[\frac{L_R}{L_{UR}}\right]^{2/n} \le 1$$

$$\Rightarrow \left[L_R\right]^{2/n} \le 1 - R^2 \le 1$$

$$\Rightarrow 0 \le R^2 \le 1 - \left[L_R\right]^{2/n}$$

$$\Rightarrow 0 \le \frac{\left[L_{UR}\right]^{2/n} - \left[L_R\right]^{2/n}}{\left[1-\left[L_R\right]^{2/n}\right]\left[L_{UR}\right]^{2/n}} \le 1 \quad (13)$$

Hence, Cragg and Uhler (1970) have suggested a pseudo-R^2 which lies between 0 and 1 and is given by

$$\text{Pseudo-}R^2 = \frac{\left[L_{UR}\right]^{2/n} - \left[L_R\right]^{2/n}}{\left[1 - \left[L_R\right]^{2/n}\right]\left[L_{UR}\right]^{2/n}} \tag{14}$$

Another most popular pseudo-R^2 measure is a function of the log-likelihoods, and it is called the McFadden pseudo-R^2 as given by

$$\text{McFadden pseudo-}R^2 = 1 - \frac{\ln\left[L_{UR}\right]}{\ln\left[L_R\right]} \tag{15}$$

However, this measure does not correspond to any R^2 measure in the linear regression model. If the slope parameters are all 0, McFadden's-R^2 is 0. But it is never 1; it will always be less than 1. This index can also be adjusted to penalize the number of predictors (k+1) in the model

$$\text{McFadden-}R^2 = 1 - \frac{\ln\left[L_{UR}\right] - (k+1)}{\ln\left[L_R\right]} \tag{16}$$

Maddala (1983) developed another pseudo-R^2, that can be applied to any model estimated by the maximum likelihood method. This popular and widely used measure is expressed as

$$\text{Maddala-}R^2 = 1 - \left[\frac{L_R}{L_{UR}}\right]^{2/n} \tag{17}$$

where L_R is the likelihood function under the null hypothesis in which only the intercept term will be included in the model and L_{UR} is the likelihood function for the full model, n is the sample size. We know the likelihood ratio test statistic is given by:

$$\lambda = -2\ln\frac{L_R}{L_{UR}}$$

$$\frac{L_R}{L_{UR}} = e^{-\frac{\lambda}{2}} \tag{17}$$

Now, putting the value $\frac{L_R}{L_{UR}}$ in terms of likelihood ratio test statistic we have

$$\text{Maddala-}R^2 = 1 - e^{-\lambda/n} \tag{18}$$

Maddala proved that Maddala-R^2 has an upper bound of $1-[L_R]^{2/n}$ and, thus, suggested a normed measure based on a general principle of Cragg and Uhler (1970) and is given in equation (5.43)

$\text{Count} - R^2$

Finally, we can measure the goodness of fit in the case of binary dependent variable models in terms of the proportion of correct prediction. This proportion is also called the Count-R^2. The count does not approach goodness of fit in a way comparable to any OLS approach. It transforms the continuous predicted probabilities into a binary variable on the same scale as the outcome variable (0-1) and then assesses the predictions as correct or incorrect. Count R-Square treats any record with a predicted probability of 0.5 or greater as having a predicted outcome of 1 and any record with a predicted probability less than 0.5 as having a predicted

outcome of 0. Then, the predicted 1s that match actual 1s and predicted 0s that match actual 0s are tallied. This is the number of records correctly predicted, given this cutoff point of 0.5. The R-square is the correct count divided by the total count. Let us now define the predicted value $\hat{y}_i^*$ which is also a binary variable such that:

$$\hat{y}_i^* = \begin{cases} 1, \text{ if } \hat{y}_i > 0.5 \\ 0, \text{ if } \hat{y}_i < 0.5 \end{cases}$$

Now the count-R^2 is given by:

$$\text{Count-}R^2 = \frac{\text{Number of Correct Predictions}}{\text{Total Number of Observations}} \quad (19)$$

The estimated values of these measures are given in Table 3.

Table 3: Goodness of Fit of the Logistic Regression Model as a Whole

Test	Value	df	Sig.
LR Test	300.4696	14	0.0000
Different R^2 Measures	Value		
Squared correlation between Y and β_j	0.9103		
Pseudo-R^2	0.8446		
Mcfadden's R^2	0.7660		
Maddala's R^2	0.6254		
Count-R^2	0.9804		

Source: Primary data is collected using structured questionnaires from four big cities. Own calculations

The LR test result supports that the null hypothesis H_0: $\beta_1=\beta_2=.....=\beta_{14}=0$ will be rejected at any significance level implying that there is a significant association between different independent variables and the likelihood of the skilled workers. The estimated results of the squared correlation between Y and $\hat{Y}$, pseudo-R^2, Mcfadden's R^2, Maddala's R^2, and Count-R^2 support that the model fits the data very well.

The probabilities are predicted corresponding to the estimated logit of the considered logistic regression model. The estimated logit and the corresponding predicted probabilities are shown below in Figure 3.

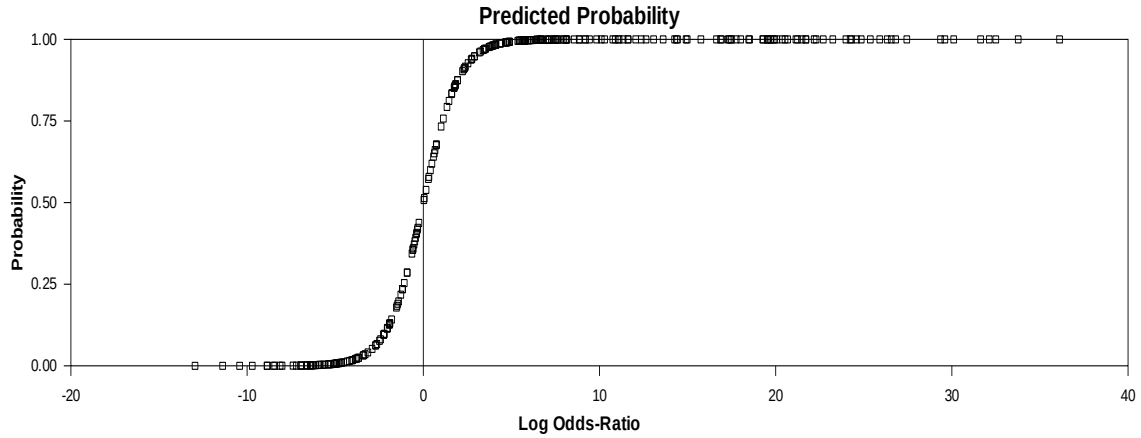

Figure 3: Predicted Probabilities of the Logit Model
Source: Primary data is collected using structured questionnaires from four big cities

The predicted probabilities imply that the distribution function in the logit model is almost linear between p=0.20 and p=0.80. Figure 3 indicates that the model fits the data very well.

Marginal Effect of the Logit Model

Let us now define the logistic regression model of the type:

$$\text{Prob}(Y_i=1|X) = \frac{\exp(\beta_0+\beta_1 X_{1i}+....+\beta_j X_{ji}+.....+\beta_k X_{ki})}{1+\exp(\beta_0+\beta_1 X_{1i}+....+\beta_j X_{ji}+.....+\beta_k X_{ki})} \quad (20)$$

In most of the applications, the primary goal is to explain the effect of the jth independent variable X_j (j=1, 2, ,3,……,14) on the response probability $\text{Prob}\{Y_i=1|X\}$. The change in probability for a unit increase in X_j can be obtained by taking the partial derivative of equation (20), with respect to X_j. The partial derivative of equation (5.48), with respect to X_j (j = 1, 2, 3,…..,k) we have,

$$\frac{\delta \text{Prob}(Y_i=1|X)}{\delta X_{ji}} = \beta_j \frac{\exp(\beta_0+\beta_1 X_{1i}+....+\beta_j X_{ji}+.....+\beta_k X_{ki})\beta_j}{\left[1+\exp(\beta_0+\beta_1 X_{1i}+....+\beta_j X_{ji}+.....+\beta_k X_{ki})\right]^2}$$

$$= \beta_j \text{Prob}(Y_i=1|X)\left[1-\text{Prob}(Y_i=1|X)\right]$$

$$= \beta_j P_i\left[1-P_i\right] \quad (5.49)$$

Thus, one unit increase in X_j leads to an increase of $\hat{\beta}_j \hat{P}_i\left[1-\hat{P}_i\right]$ in the response probability. The estimated average marginal effects of different variables on the probability of being a skilled worker in the garment sector of Bangladesh are given in Table 4.

Table 4: Average Marginal Effects of Different Variables on the Likelihood of Y

Variable	dy/dx	Std Error	z	P>|z|	[95% Conf. Interval]	
					Lower Limit	Upper Limit
EDU	0.0077***	0.0049	1.55	0.120	-0.0020	0.0174
YEXP	0.0220*	0.0079	2.78	0.006	0.0065	0.0375
WR	0.0290*	0.0046	6.33	0.000	0.0110	0.0379
GRD	-0.0492*	0.0084	-5.86	0.000	-0.0657	-0.0327
WY	0.0208**	0.0119	1.75	0.081	-0.0026	0.0441
GEN	0.0509**	0.0273	1.87	0.062	-0.0026	0.1043
REG	0.1061***	0.0690	1.54	0.124	-0.0291	0.2413
TPD	0.1657*	0.0393	4.23	0.000	0.0890	0.2424
CRE	-0.0006	0.0405	-0.02	0.988	-0.0801	0.0788
PK	0.1201**	0.0739	1.63	0.100	-0.0247	0.2650
FAC	0.0446	0.0510	0.74	0.458	-0.0730	0.1621
SEC	-0.0447	0.0648	-0.69	0.490	-0.1719	0.0823
PRO	0.0136	0.0592	0.23	0.819	-0.1024	0.1296
AGE	-0.0056*	0.0019	-2.97	0.003	-0.0093	-0.0019

*: indicates significant at 5% or 1% level, **: indicates significant at 10% level and ***: indicates significant at 15% level.

Source: Primary data is collected using structured questionnaires from four big cities. Own calculations

The marginal effects imply that on average, an additional year of schooling is associated with a 0.77% change in the probability of having a skilled worker which is statistically significant at a 15% level of significance; for an additional year of experience, there is a 2.20% change in the probability of having a skilled worker which is statistically significant at any significance level; for every additional unit of monthly salary there is a 2.9% increase in probability in favour of skilled worker which is statistically significant at any significance level; for increasing a lower grade we may expect 4.92% decrease in the probability of having a skilled worker which is also statistically significant at any significance level; for an additional working year in the present company we may expect 2.08% increase in the probability of having a skilled worker which is also statistically significant at 10% level of significance. The marginal effects also imply that the male group has a 5.09% higher probability of having a skilled worker compared to the female group which is statistically significant at a 10% level of significance; while the rural group has 10.61% higher probability to be skilled workers compared to the urban group which is statistically significant at 15% level of significance. From the estimated results of the marginal effects, it can be said that the workers having a training program degree have 16.57% increase in probability in favor of the skilled worker compare to those having no training program degree, while a workers' group whose companies offering completive remuneration has 0.006% decrease in probability of having a skilled worker compared to those whose companies are not offering competitive remuneration; a group of workers whose

companies prefer having practical knowledge in industry management for recruitment has 12.01% higher probability in favor of a skilled worker compared to those whose companies prefer having degree in industry management which is statistically significant at 10% significance level; a group of workers whose companies are providing adequate facilities to the employees has 4.46% higher probability to be skilled workers compared to the workers whose companies do not provide, which is not statistically significant at all; a group of workers who feel secured in the given environment by their companies has a 4.47% lower probability of having a skilled worker relative to those who do not feel secured which is also not statistically significant at all; and a group of workers whose companies allow quick promotion based on performance has 1.36% higher probability in favor of skilled worker compared to the workers whose companies do no allow, which is also not statistically significant at all. The estimated results show that for an additional year of age of the companies, we may expect a 0.56% decrease in the probability to be skilled workers which is also statistically significant at any significance level.

OVERALL DISCUSSION AND CONCLUSIONS

The ready-made garments (RMG) sector of Bangladesh is one of the most important sectors and plays important roles in economic growth, foreign exchange earnings, creating job opportunities, poverty reduction through social-economic development, development of the rural sector and especially for women empowerment. Despite these successes, this sector is facing several challenges for sustainable development. The main problem of this sector, is that the production function is decreasing return to scale [Hossain and Alam 2023] which implies that the productivity of the labour force is quite low, which is happened due to the existence of a large number of unskilled workers in the garment sector of Bangladesh, as a result per unit production cost is higher relative to other countries. That is why, policies should be formulated to create skilled workers in the garment sector of Bangladesh. Therefore, in this study, the principal purpose has been made to estimate the logistic regression model to find out the important factors that are associated with the likelihood of skilled workers in the garment sector of Bangladesh. This study is based on primary data and the information is collected from 306 respondents from different factories under Chattogram, Dhaka, Gazipur and Narayanganj using the structured questionnaire. The stratified random sampling is used to select the factories from each city as a stratum and a part of the sample is drawn at random from different factories of each city and then a simple random sampling technique is applied to select the sample observations. The information on different variables say whether a worker is skilled or not (Y), years of education (EDU), years of experience (YEXP), working years at the present company (WY), grade of the workers, (GRD), monthly wage rate (WR), the monthly cost of living (COST), gender (GEN), region (REG) of the workers, a category that the company prefer for recruiting (PK), whether workers having a training program degree or not (TPD), whether companies offer competitive remuneration or not (CRE), whether companies provide adequate facilities to the employees or not, whether the workers feel secure to the given environment of the companies (SEC), whether companies allow quick promotion to the employee based on their performance (PRO) and the age of the companies (AGE). Here the response variable Y is a categorical variable which has two categories say a worker is skilled or not. The variable Y takes 1 if a worker is skilled and zero if not. For this study some independent variables are continuous and some are categorical. From the maximum likelihood estimates of the logistic

regression model [see Table 2], it is found that the variables, EDU, YEXP, WR, GRD and WY have significant positive effects on the logit (log odds) of the skilled workers. Still, the variable age (AGE) of the companies has a significant negative effect. It is found that the male group is 3.0695 times more likely than the female group to be a skilled worker and the relationship between GEN and the likelihood of skilled workers is statistically significant at a 10% significance level; a group of rural workers has 10.3727 times more likely to be skilled workers than a group of the urban workers and the relationship between REG and the likelihood of skilled workers is statistically significant at a 15% significance level. It is also found that a group of workers with a training program degree is 38.5552 times more likely to be skilled workers than those who have no training program degree and the relationship between TPD and likelihood of skilled workers is statistically significant at any significance level. It is found that a group of workers whose companies prefer having practical knowledge of industry management for recruiting is 14.1362 times more likely to be skilled workers than a group of workers whose companies prefer having a degree in industry management and the relationship between PK and the likelihood of skilled workers is statistically significant at 15% significance level. It is found that the likelihood of being skilled workers does not significantly depend on providing adequate facilities, feeling secure in the given environment of their companies and allowing quick promotion based on their performance. The estimated marginal effects [Table 4] imply that on average, an additional year of schooling is associated with a 0.77% increase in the probability of being skilled workers which are statistically significant at a 15% level of significance; for an additional year of experience, there is a 2.20% increase in the probability to be skilled workers which are statistically significant at any significance level; for every additional unit of monthly salary there is a 2.9% increase in probability in favour of skilled worker which is statistically significant at any significance level; for an adding unit of lower grade we may expect 4.92% decrease in the probability to be skilled workers which are also statistically significant at any significance level; for an additional working year in the present company, we may expect 2.08% increase in the probability of being a skilled worker which is also statistically significant at 10% significance level. The marginal effects also imply that the male group has a 5.09% higher probability to be skilled workers compared to the female group which is statistically significant at a 10% level; a group of rural workers has a 10.61% higher probability of being skilled workers compared urban group of workers, which is statistically significant at 15% level of significance; workers having a training program degree have 16.57% increase in probability in favor of a skilled worker compare to those having no training program degree; workers have 0.006% decrease in probability to be skilled whose companies offering competitive remuneration compared to those whose companies do no; workers having practical knowledge in industry management have 12.01% higher probability in favor of a skilled worker compared to those who have degree in industry management which is statistically significant at 10% significance level, workers getting adequate facilities have 4.46% higher probability to be skilled workers compared to those who are not getting, which is not statistically significant at all, a group of workers who feel secure in the given environment by their companies has a 4.47% lower probability of being a skilled worker relative to those who do not feel secure which is also not statistically significant at all, and a group of workers whose companies allow quick promotion based on performance has a 1.36% higher probability in favor of being a skilled worker compared to those whose companies do no, which is not statistically significant at all. The estimated results show that for an additional year of age of the companies, we may expect a 0.56% decrease in the probability of being skilled workers

which is also statistically significant at any significance level. From the graph of the predicted probabilities [Figure 3] of the logistic regression model, it can be said that the distribution function in the logit model is almost linear between p=0.20 and p=0.80. The estimated results of the squared correlation between Y and $\hat{Y}$, pseudo-R^2, Mcfadden's R^2, Maddala's R^2 and Count-R^2 [Table 3], support that the model fits the data very well.

Policy Implications

From the findings, the following policies should be implemented to increase the number of skilled workers, for the sustainable development of the garment sector as well as for the national economy:

[1]: From the maximum likelihood estimates of the logistic regression model it is found that the variables, years of education (EDU), years of experience (YEXP), wage rate (WR), and working years at the existing company (WY) have significant positive effects on the logit of skilled workers. Therefore, to increase skilled workers in the garment sector of Bangladesh emphasizes should be given to education, experience, wage rate, grade and also working years at the present company. As a result, the productivity of the labour force will be increased. In the near future, this sector will run under increasing return to scale.

[2]: It is found that the low-grade workers are highly associated with the reduction of odds to be skilled workers in the garment sector. The existence of a large number of workers in this sector is working as a barrier to increase productivity, as a result per unit production cost is higher relative to other Asian countries. Therefore, the government and other stakeholders especially the owners have to formulate policies high quality workers with handsome salaries. As a result, the productivity of this sector will be increased at a faster rate which may play an important role in reducing per-unit production cost. Thus, the development of this sector will be sustainable.

[3]: Since the variable age of the companies has a significant negative effect on the logit of skilled workers which implies that the skilled workers move from the old-aged companies to the new or young-aged companies for a handsome salary. Therefore, middle-aged and old-aged companies have to offer handsome salaries to keep the skilled workers otherwise their productivity will decline due to a large number of unskilled workers, as a result per unit production cost of middle-aged or old-aged companies will be increased.

[4]: It is found that the male workers are 3.0695 times more likely to be skilled workers than the female workers and the relationship between them is statistically significant at a 10% significance level. Therefore, importance should be given to recruiting more male workers rather than female workers to increase the productivity of the labour force in the garment sector.

[5]: It is found that workers having a training program degree are 38.5552 times more likely to be skilled than the workers who have no training program degree and the relationship between them is statistically significant at any significance level. Therefore, it is very important to provide different training programs to the employees to create skilled workers for which the productivity of the labour force will increase and the per unit production cost will decline relative to other countries. Therefore, this sector needs to increase the budget for different

training programs to train the workers. The government including important stakeholders have to develop different technical institutions to train up the workers for this sector which may play an important role in shifting the production function from decreasing to increasing return to scale.

[6]: It is found that workers having practical knowledge of industry management are 14.1362 times more likely to be skilled workers than those workers whose companies having a degree in industry management and the relationship between PK and the logit of skilled workers is statistically significant at 15% significance level. Therefore, the government and other stakeholders have to formulate different policy frameworks to provide the workers in the garment sector with practical knowledge of industrial management for which the productivity of the labour force will be increased.

[7]: Since educated and experienced workers are significantly associated with the logit of skilled workers. Therefore, emphasis should be given to recruiting highly educated and experienced workers in this sector. As a result, the literate and experienced workers can grow his/her expertise in their respective fields/sections which may play a significant role in increasing the productivity of this sector for which the per unit production cost will reduce. As a result, the development of this sector will increase at a faster rate and will be sustainable. This sector can also compete globally with its rivals.

[8]: It is found that the wage rate is significantly associated with an increase in the odds of skilled workers. That is why policy should be formulated in this regard. It can be said, that the average wage rate of the workers in this sector is 18927 BDT [171.44$] which is very poor relative to other Asian countries. Based on this salary structure it is impossible to fulfill their daily needs in the present situation. That is why, the workers of this sector will not be encouraged to put in hard work or to give 100% effort to produce goods. As a result, the productivity of the labour force is very low [Hossain and Alam 2023] in this sector. Therefore, the government and other stakeholders have to take necessary steps to reform the salary structure for the workers of the garment sector of Bangladesh. Otherwise, the workers may raise their voices to increase the salary in the street which may cause the turmoil situation in the garment sector of Bangladesh. The government of Bangladesh can also develop a rationing system for the betterment of the garment workers with the help of important stakeholders.

[9]: It is found that on average the monthly cost of living of the workers of this sector is 16342 BDT (148.03$) which is quite lower relative to other Asian countries. It indicates that their standard of living is very poor in the society. They are not capable of fulfilling their daily needs at the present price hiking situation. They are suffering from a lack of nutrition as a result they are affected by different mental and health-related problems like high blood pressure, mental stress, obesity, heart disease, diabetes, stroke, and illness etc. Therefore, they are not capable of giving 100% effort or putting hard work into producing garment products. That is why, their productivity is very low in the garment sector of Bangladesh [Hossain and Alam 2023]. That is why, still now the production function of the garment sector of Bangladesh is running under decreasing return to scale [Hossain and Alam 2023]. Hence, it is very important to increase their salary structure for which their standard of living will be increased and they can put their hard work into producing goods as a result the production function will be in increasing return

to scale for which the per unit production cost will decline. As a result, the development of the garment sector of Bangladesh will increase at a faster rate and the development will be sustainable.

[10]: It is found that during the last 10 years, very few numbers of garment factories are developed which is not a good sign for the sustainable development of the garment sector as well as for the national economy. Therefore, the government have to find out the causes of not in establishing factories in recent years and have to resolve the problems for which the businessmen will be encouraged to develop garment factories which may play a significant role in the economic growth of Bangladesh including socio-economic development.

[11]: Emphasis should be given to increasing the number of literate male workers relative to female workers to increase the productivity of the labour force in the garment sector of Bangladesh.

[12]: The government including other stakeholders have to develop policy frameworks for which the urban workers will be encouraged to give their services in the garment sector of Bangladesh as a result the productivity of this sector will be increased at a faster rate.

[13]: The government should develop different academic and technical institutions to provide quality employees for the garment sector in Bangladesh.

[14]: The government including other stakeholders have to develop different policies for which all the garment factories will provide adequate facilities to the employees. As a result, the productivity of the labour force will increase and per unit production cost will be declined.

[15]: The government and the other stakeholders of the garment sector have to develop policies for which 100% of workers feel secure in the given environment by their companies as a result all the workers can put 100% effort into producing the garment products for which their productivity will be increased and per unit production cost will be declined.

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