

# The Effect of Individual Variables on the Income of Workers in the IT Area

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## Abstract

*This study analyzes the determinants of wage level of first-time workers in the information and telecommunication sector using individual variables on the personal level, and institutional level variables. The difference in the wage level among the first-time workers in the IT area is the result of individual factors as major/job compatibility, age, gender, and graduating from day/night school. Particularly, non-engineering majors, night school graduates face discrimination in their wage, and an integrated wage system urgently needs to be established to address the problem.*

**Keywords:** *worker in the IT area, determinants of income, individual variables, first-time workers*

## 1. Introduction

Studies that have examined the relationship between wages and performance have reported that motivation to work, productivity, and job satisfaction increases when wages and performance are linked [1, 2]. On the other hand, there are many studies that have criticized wages as determined by differential variables not related to labor productivity [3, 4, 5].

These studies claim that wages are determined by factors that are not related to individual productivity indicators, such as gender, age, length of service or employment, marital status, parental income, parental education, company location and number of its employees. Therefore, this study aims to improve the understanding of the determinants of wage level and to provide suggestions for career development of IT workers by identifying the individual factors that cause the difference of wage level among first-time workers in IT sector.

## 2. Theoretical background

As there is limited research on the wage of workers in the IT field, we want to deduce factors affecting wages suggested from previous studies that mainly deal with other occupations.

Individual characteristics that affect wages are education, major, age, marital status, years of service, years of experience, and employment type. First, there are studies concerned with the effect of education, and the effects of major and job suitability on wages [6]. These studies report the higher the education and the higher the match between one's major and job,

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the higher the salary. Second, there are studies that show a strong correlation between age, years of service, career years and wages [7, 8]. Although there are studies which report that the wage gap depends on individual productivity such as individual knowledge or skill level, it is generally reported that South Korea has a system that determines wages where the longer the tenure, the higher the wage.

The wage determinants which garner the most interest in previous studies is the wage gap based on gender and employment type, such as regular and irregular workers. Studies that have reported that men earn significantly more than women are generally accepted in academia. Given that the IT industry is a manufacturing industry, the gender wage gap between men and women is small because of the small difference in human capital between men and women [9].

In addition, studies report that regular workers receive more wages than non-regular workers, providing the biggest implications for the current industry [10, 11]. Since the IMF economic crisis, the number of irregular workers, which increased to 32.0% from 2015 and continues to rise, is being paid by unreasonable wage systems that are irrelevant to their productivity.

### 3. Research contents & methodology

#### 3.1. Research Subjects

This study utilized the data and materials from the ‘Graduate Occupation Mobility Survey (GOMS)’ conducted by the Korea Employment Information Service on September 1, 2014. The composition of the variables used for analysis and their descriptive statistics are shown in [Table 1].

**Table 1. Composition and Descriptive Statistics of the Variables used for Analysis**

Category	Characteristic	Variable	Index	N(%)	Monthly Income (10,000 won) M(SD)
Independent Variable	Individual Characteristic	Gender	Female (0)	573 (23.8)	169.25 (57.87)
			Male (1)	1832 (76.2)	178.71 (57.73)
		Age	Age (Years)	21.8 - 40.2 years	176.45 (57.97)
		Education	Polytechnic	781 (32.5)	161.74 (43.13)
			4 Year University Graduate (1)	1625 (67.5)	183.52 (62.67)
		Major	Non-Engineering	607	136.97

			(0)	(25.3)	(32.07)	
			Engineering (1)	1798 (74.7)	189.79 (58.68)	
		Day/Night School	Night (0)	231 (9.6)	174.16 (37.75)	
			Day (1)	2174 (90.4)	176.70 (59.71)	
	Company Characteristic	Occupation Type	Operations and Repair (0)	1024 (42.6)	162.79 (56.84)	
			Developers and Researchers(1)	1381 (57.4)	186.59 (56.71)	
		Company Type	Domestic Private Company(0)	2134 (88.7)	174.90 (53.02)	
			Other Organization(1)	272 (11.3)	188.67 (86.76)	
		Company Location	Seoul/Gyeonggi(0)	1894 (78.7)	173.00 (53.76)	
			Other Region(1)	511 (21.3)	189.25 (70.02)	
		Company Scale	1-99 people(0)	1516 (63.0)	178.74 (61.78)	
			100-1000 people(1)	889 (37.0)	172.55 (50.60)	
		Employment Type	Non-regular(0)	332 (13.8)	160.75 (78.24)	
			Regular(1)	2073 (86.2)	178.97 (53.61)	
Dependent Variable		Wage		Average Monthly Income (10,000 won)	2405 (100.0)	176.45 (57.97)

### 3.2. Analysis method

In order to analyze factors affecting wages among individual and company characteristics of first-time workers in IT industry, multiple regression analysis using a step input model was conducted. SPSS 13.0 for Windows was used for data analysis.

## 4. Analysis results

### 4.1. Correlation between variables

Before conducting a regression analysis to determine the influence of variables affecting wages, a correlation analysis was conducted to identify the problem of multicollinearity between the correlation of each of the variables and independent variables. As shown in [Table 2], the correlation between the independent variables was statistically significant, with all the correlation coefficients showing a relatively weak correlation with the absolute value of less than 0.4, thus multicollinearity was deemed not to be an issue.

**Table 2. Correlation between variables**

	Dependent Variable	Independent Variable				
	Wage	Day/Night	Major	Education	Gender	Age
Wage	1.000					
Day/Night	.013	1.000				
Major	.396***	-.048**	1.000			
Education	.176***	.133***	.031	1.000		
Gender	.070***	-.070***	.290** *	-.106**	1.000	
Age	.231***	-.406***	-.027	.183***	.403***	1.000

### 4.2. Results of multiple regression analysis

[Table 3] presents the results of the regression analysis of the factors affecting the wages of first-time workers in the IT sector, showing four of the five independent variables, excluding the education background, were included in the regression equation.

First, the coefficient of determination ( $R^2$ ), which is one way to measure the fit of the estimated regression line to the observed values from the sample data, is .296. In other words, the regression analysis reveals that 29.6% of the variance of the dependent variable of income is explained by independent variables. Next, the F value for the regression model of the independent variable was 111.64, which turn out to be significant. The tolerance values are all at least 0.1, and as the variance inflation factor (VIF) values are less than 10.0, it can be seen that multicollinearity is not present.

**Table 3. Results of multiple regression analysis of wage determinants**

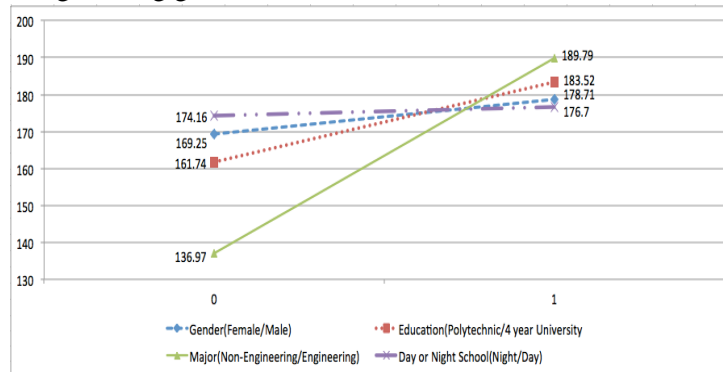
Coefficient		Dependent Variable (Average Monthly Income/10,000 won)				
		B	$\beta$	t	Tolerance	VIF
Constant		-109.718		-7.730***		
Individual	Major-Job Match	62.876	.471	24.888***	.820	1.220

Characteristic	Age	7.445	.362	15.947***	.571	1.750
	Gender	-27.594	-.203	-9.767***	.682	1.466
	Day/Night School	39.111	.199	10.002***	.745	1.343
R <sup>2</sup> = .296						
Adj. R <sup>2</sup> = .293						
F = 111.64***						
df = 9						
* p<.05 ** p<.01 *** p<.001						

### 4.3. Differences in wages based on individual characteristics

As a result of investigating the determinants of wages according to individual characteristics, major-job match, age, gender, and day/night college are significant when other variables are included in the regression equation. It was found that the average monthly average income is .471 of 10,000 won higher for workers in a job that matches their major when they are an engineering major than a non-engineering major. The average monthly wage increases by .362 10,000 won for each year of age, and graduates of a day college is .199 of 10,000 won higher than night school graduates.

On the other hand, although men earn more than women as shown in [Figure 1], the results of the regression analysis are negative (-), indicating that the average monthly wage of men is .203 of 10,000 won lower than the average monthly wage of women. The results of this study show that the influences of variables such as major-job match, age, and the type of college one graduates from is greater than that of gender. In particular, as shown in [Figure 1], the largest difference in average monthly income can be seen between non-engineering graduates and engineering graduates.



**Figure 1. Differences in Wages Based on Individual Characteristics (10,000 won)**

## 5. Conclusion

This study analyzes the wage levels and their determinants of first-time workers in IT sector. The difference in wage levels among the first-time workers in the IT sector was found to be a result of the individual characteristics of major-job match, age, gender, and graduating from day/night school. However, as these factors are generally unrelated to productivity and

fail to explain individual productivity, it suggests that wages in the IT industry are not reasonably determined.

However, in order to ensure an accurate comparison, it would be necessary to carry out a wage determination factor analysis study including productivity related variables in the future. In addition, the difference in perception of wage level affects motivation, job satisfaction, and employee retention of individual workers. Therefore, it is necessary to make efforts to determine reasonable wages in order to give recognition and acknowledge professionals with expertise, and to retain such professionals within an organization. Particularly, non-engineering major, night school graduates are paid differently, thus an integrated wage system to solve this problem urgently needs to be established.

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