

# Investigation of Job satisfaction, Organizational commitment and Factors of continuing work life for Nano-convergence employees

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## Abstract

In this paper, we analyzed the relationship between employment stability, wage level, welfare system, working condition, job satisfaction and organizational commitment in order to find out ways to develop and competitiveness of the nano-convergence industries. Through this study, we conducted the possibility of deriving organizational commitment by job satisfaction which is given through employment stability, wage level, welfare system, and working condition for continuing their work life. In order to find relationships between each concepts, we used a multiple regression analysis with job satisfaction and commitment as dependent variable and employment stability, wage level, welfare system, and working condition as independent variables. Through this study, it was expected to increase the organizational commitment through the job satisfaction of the employees if a changing method of employees management is centered on some tasks suggested for the sound working condition and efficient utilization policies.

▶ Keyword: Organizational Commitment, Job Satisfaction, Employment stability, Wage Level, Welfare System, Working Condition

## I. Introduction

The government is trying to develop strategies and to break the crisis of the domestic manufacturing industry for upgrading existing industries such as Nano Technology, IT (Information Technology), BT (Bio Technology), and ET (Environment Technology) [1]. Especially, nano-convergence industry is attracting attention as a major industry in the fourth industrial revolution.

The government emphasized that the nano-convergence industry has grown from 6.6% to 9% of total manufacturing sales over the past five years and is a representative convergence industry. And that means it will continue to support the nano-convergence industry [1-2].

Employment status in the nano-convergence industry is also increasing year by year in Table 1. From contextual

point of view, employees in the nano-convergence industry experience mismatches between their needs and various environmental demands in the course of their duties which cause various stresses for them. Moreover, in the complicated job organization, many problems lead to the difficulty of job performance [1-2].

If those stresses are not adequately resolved, they will feel frustrated or helpless. In particular, recent changes in the fourth industrial revolution have brought a drastic change to the related workers, which has not only worsened their job conditions, increased their workload, but also caused complaints. In general, job stress has been known to be a major factor in reducing job satisfaction and weakening commitment to the organization

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Table 1. Nano-convergence industry workers by industry (5 years)

Employment Status	2010	2011	2012	2013	2014	Annual Average of Growth Rate
Nano Material	8,039	9,056	8,557	14,852	12,106	10.8
Nano Electronic	108,923	115,869	123,855	127,301	125,128	3.5
Nano Bio	1,107	1,180	1,383	1,929	2,780	25.9
Nano Device and Nano Equipment	4,118	4,562	4,461	6,065	6,048	10.1
Total of Nano-convergence Industry	122,187	130,667	138,256	150,147	146,602	4.6
Manufacturing Total	2,636,177	2,694,782	2,753,684	2,813,743	2,904,914	2.5

ion. In some cases, serious job stress results in the decision to move away from the current organization to another [3]. Therefore, recent studies on the stress from job are increasing. However, most of the studies have focused on the effects of job stress on job satisfaction and organizational commitment, as well as on the relationship between job stress and turnover intention.

Researches on the effects of job stress factors on job satisfaction, organizational commitment, and turnover intention using the structural equation model for nano-convergence workers are insufficient.

Also, unlike other manufacturing industries, employees of nano-industry workers required precise and R&D works, and were expected that the risk of stress and working condition will be higher. In addition, the nano-convergence industries have the characteristics of being associated with various industrial fields under the existing industrial structure, also it have been mainly known that is characterized by the smallness centered on small and medium-sized enterprises [4].

With this in mind, this study intends to find ways to develop and compete of the nano-convergence industry. In detail, this study is to induce organizational commitment by providing employment satisfaction, stable working life conditions and welfare satisfaction. Specifically, we present the relationship between measuring tools consisted of questionnaires, such as organizational commitment, job satisfaction, working conditions and welfare satisfaction, in 200 employees of nano-convergence companies by correlation and regression analysis.

Through this research, it was expected to find a relationship between organizational commitment and job satisfaction of the nano-convergence employees which is given some concepts such as employment stability, wage level, welfare system, and working condition.

## II. Preliminaries

Job security, suggested by Chant (1958), is defined the probability that an individual will keep her or his job [5]. At the point of employment stability, It means that the employment is stable regardless of which worker is employed [5]. Working conditions is known as the working circumstances and all existing environment influencing labor in the workplace, including job hours, physical aspects, legal rights and responsibilities [7]. Also, job satisfaction is known two most common definitions as: First, the pleasurable emotional state resulting from the appraisal of one's job as accomplishing [8]. Second, the extent to which people satisfaction or dissatisfaction their jobs [9].

Organizational commitment is the psychological attachment that an employee has with their organization. It is known that it plays a important role in ascertaining the bond that the employee shares with the organization [10].

Based on this definition, conceptual and empirical studies on various aspects of job stress, such as job stress theory and model, predecessor and outcome variables, and job stress coping strategies, have been actively conducted

[3,11]. In addition, the concept of job burnout has emerged as a type of job stress, and many studies have been conducted on the concept of job burnout and predecessor and outcome variables which affect to the job burnout [12-14]. In Korea, researches on job stress have been actively conducted.

According to the results of a literature search on domestic journals before this study 'The effect of job stress on job involvement and organizational attachment' is the first study on the job stress [15]. After that study, researches on job stress in organization have been carried out for 30 years [16-19]. Although there is a considerable increase in the number of domestic studies on job stress [20-22], there are insufficient researches

Table 2. Operational definition of variables and composition of questionnaire

Measurement Variable	No. of items	Operational Definition	Scale
Employment Stability	7	the stability that one has in his/her has or desires in job or occupation	Likert 5-point
Wage Level	1	monthly average wage level	ordinal
Working Condition	5	Subjective conditions in which an individual or staff works, including but not limited to such things as amenities, physical environment, stress and noise levels	Likert 5-point
Welfare System	4	Fair to all employees, receive equal treatment with others, compliance with labor-related laws and regulations	Likert 5-point
Job Satisfaction	5	The positive emotional state obtained from the job environment according to the level of individual attitude, value, belief	Likert 5-point
Organizational Commitment	20	Strength of the felling of responsibility that an employee has towards the mission of the organization	Likert 5-point
Demographic Characteristics	4	gender, age, hire type, tenure(year), education	nominal/ordinal

on the study of nano-convergence workers and the future direction. At this point, it is necessary to study the trends and limitations of job stress for nano-convergence practitioners and to suggest future research directions.

### III. Research Method

#### 1. Research Model

In this study, we collect and analyze data from questionnaires of 200 workers working in the production and R & D of nano-related manufacturers in one metropolit -an area.

The research model to achieve the purpose of this study is shown in <Fig. 1>. In this study, research hypothesis are as follows.

- Hypothesis 1: The employment stability factor have positive association for the job satisfaction.
- Hypothesis 2: The wage level have positive association for the job satisfaction.
- Hypothesis 3: The working condition have positive association for the job satisfaction.
- Hypothesis 4: The welfare system have positive association for the job satisfaction.
- Hypothesis 5: A positive association between the job satisfaction and the organizational commitment is existed.

#### 2. Survey Design and Statistical Analysis

The questionnaires used in this study were reconstructed according to the direction of this study based on the previous studies [23-30].

In detail, the employment stability was 7 items

suggested by Kim et al [18]. The working condition was consisted of 5 items which described the satisfaction of working environment.

The wage level present 1 items, and the welfare system was 4 items which is reflected self-development, welfare system, cultural leisure and health care. Job satisfaction is defined as a positive emotional state experienced according to attitude, value, belief, and demand related to job, and consisted of 5 items. The organizational commitment is 20 items centered on emotional commitment, and normative commitment suggested by Meyer and Allen (1991). All measure tools are rated on 5-point Likert scale. Table 2. shows the operational definition and measurement of variables presented in this study. All statistical analysis was used SPSS 25.0, and statistical significance was considered for *p*-value under 0.05. The statistical analysis technique is as follows: First, demographic characteristics were presented in order to identify the characteristics of respondents. Second, confirmatory factor analysis and reliability analysis were conducted for the validity and reliability analysis of the measurement tools. In addition, Pearson correlation coefficient was demonstrated to understand the correlation between variables. Third, multiple regression analysis was conducted to verify the research hypothesis.



Fig. 1. Research Model

### IV. Results

The questionnaires for this study were conducted on 200 workers working in the production and R&D functions of nano-related manufacturers in the metropolitan area. After the purpose of this study was explained to the manager of the company, the questionnaire was distributed to the workers, and the completed questionnaire was collected. As Table 2. shows, regarding the proportion of employees' gender, 78.5% of participants were males and 22.5% were females. The mean age was 37.2 years, and 49.2% of workers were 30-39 years and 35.4% were 20-29 years. Regular hire type was specified 179 (89.5%) of the total 200 participants, 1-3 year of tenure were classified the highest as 109 (54.5%).

#### 1. Factor Analysis and Reliability Analysis

For the validity of the questionnaire items applied to the empirical analysis, confirmatory factor analysis was presented in Table 4. In order to evaluate the goodness of fit test, chi-squared test result is  $\chi^2=35.14(p\text{-value}<0.001)$ , the value of RMSEA (root mean square error of approximation) is 0.014, NNFI (normed fit index) is 0.945, IFI (incremental fit index) is 0.948, and CFI (comparative fit index) is 0.937, therefore we concluded that the validity of this model was appropriate. Scaling is the process of developing systematic laws and meaningful units of measure and quantifying observations that have been measured on the basis of experiences.

Table 3. Demographic Characteristics in this study (N=200)

Variable	Frequency	Percent(%)
Gender	Male	157 78.5%
	Female	43 22.5%
Age (Mean:37.2)	20-29	71 35.4%
	30-39	99 49.2%
	40-49	24 11.6%
	50-	6 3.8%
Hire Type	Regular	179 89.5%
	Irregular	21 10.5%
Tenure(year)	1year	14 7.0%
	1-3 year	109 54.5%
	3-5 year	44 22.0%
	5 year-	33 16.5%

Table 4. Goodness of fit for confirmatory factor analysis

$\chi^2$ (p-value)	Index of goodness of fit			
	RMSEA	NNFI	IFI	CFI
35.14 (p<0.001)	0.014	0.945	0.948	0.937

The purpose of this scaling is to assign numbers so that the majority of people with the same attributes or attitudes have the same score. The Thurstone, Likert and Guttman scale have been developed and among which the Likert scale is most widely used [31-33].

Reliability refers to the accuracy associated with measuring an object consistently with some degree of stability. Cronbach's alpha was widely used to evaluate the reliability. Cronbach's alpha measures the correlation between measured items or the correlation between observed and true scores and is expressed as a value between 0 and 1. Usually, a value of 0.5 or more is considered reliable [34-38].

In this study, it was judged that Cronbach's alpha value is more than 0.6. Table 5 shows the result of the analysis of the reliability of measurement variables and items. These results show appropriate validity and reliability of all factors in this study.

#### 2. Correlation Analysis

We analyzed the relevance significance of employment stability, wage level, welfare system and working conditions. In order to assess the strength and direction of the relationships among the variables of employment stability, wage level, welfare system, working condition, job satisfaction and organizational commitment, correlation analysis was present in Table 6. In a matrix of correlations, welfare system and working conditions are highly correlated. Other than this, the significance levels of relationship with other variables were low.

Table 5. Reliability Analysis Result

Measurement Variable	Cronbach's alpha
Employment Stability	0.8516
Wage Level	0.8277
Welfare System	0.8778
Working Condition	0.6801
Job Satisfaction	0.7491
Organizational Commitment	0.7884

Table 6. Correlation analysis for variables<sup>†</sup>

	ES	WL	WS	WC	JS	OC
ES	1.00					
WL	0.13	1.00				
WS	0.12	0.22	1.00			
WC	0.01	0.18	0.27*	1.00		
JS	0.12	0.03	0.40*	0.55*	1.00	
OC	0.20	0.03	0.07	0.14	0.34*	1.00

<sup>†</sup>ES: Employment Stability, WL: Wage Level, WS: Welfare System, WC: Working Condition, JS: Job Satisfaction, OC: Organizational Commitment

\**p*-value<0.001

The variables with high correlation with job satisfaction were welfare system and working condition, and variable with high correlation with organizational commitment was job satisfaction.

### 3. Regression Analysis

For the purpose of verification of research hypothesis, we conducted multiple regression analysis to examine effects of factors such as employment stability, wage level, welfare system and working conditions. The results of regression analysis are shown in Table 7. The independent variables were considered employment stability, wage level, welfare system and working conditions, and the job satisfaction was selected as the dependent variable. The adjusted  $R^2$  was 42.80% and *F*-statistic was 14.65. This implies that the regression model is statistically significant (*p*-value<0.001). The positive effect of job satisfaction on welfare system and working condition was statistically significant (*p*-value<0.001). This means that the higher the welfare system and working conditions, the higher the job satisfaction. In addition, employment instability and wage level showed positive effects on job satisfaction and statistically significant. The greater the instability of employment was related with the lower the job satisfaction. Wage level was analyzed to have a positive effect on job performance. In addition, working condition was the highest regression coefficient (beta=0.4913), that means working condition was the most influential factor for job satisfaction among the four variables. In order to diagnose multicollinearity, each VIF(variance inflation factor)s of variables were confirmed to be less than 10, and there was no problem of multicollinearity.

Table 7. Regression Results for Job Satisfaction<sup>†</sup>

Variables	B <sup>‡</sup>	Beta <sup>*</sup>	t	<i>p</i> -value
Intercept	1.7888		4.1183	<0.001
ES	0.1665	0.2444	2.7046	0.008
WL	0.2116	0.2326	2.5065	0.015
WS	0.2882	0.3492	3.6950	0.004
WC	0.5791	0.4913	5.2972	<0.001

adj  $R^2$ =0.4280, *F*=14.65(*p*-value<0.001), VIF=3.45

<sup>†</sup>ES: Employment Stability, WL: Wage Level, WS: Welfare System, WC: Working Condition

<sup>‡</sup>B: Unstandardized Regression Coefficient

\*Beta: Standardized Regression Coefficient

In order to examine the effect of job satisfaction on organizational commitment, job satisfaction was selected as independent variable and regression analysis was conducted by selecting organizational commitment as dependent variable (Table 6). The regression analysis result was 0.1024 adjusted  $R^2$ , and the *F*-value indicating the significance of model was 9.3306, which was statistically significant at *p*-value<0.001 level. The regression coefficient confirmed that job satisfaction was a positive effect (B=0.3568) on commitment, and statistically significant (*p*-value=0.003).

In addition, Baron and Kenny's 3-step regression analysis is presented in Table 9. in order to confirm the mediating effect of job satisfaction on the relationship between employment stability, wage level, welfare system and working condition.

The effects of employment stability, wage level, welfare system and working condition on job satisfaction (step 1) were statistically significant. The effect of independent variables on organizational commitment (step 2) was also positive regression coefficients, which was statistically significant (*p*-value<0.001).

Table 8. Regression Results for Organizational Commitment<sup>†</sup>

Variables	B <sup>‡</sup>	Beta <sup>*</sup>	t	<i>p</i> -value
Intercept	1.9521		4.5356	<0.001
JS	0.3568	0.3387	3.0546	0.003

$R^2$ =0.1024, *F*=9.33(*p*-value<0.003)

<sup>†</sup>JS: Job Satisfaction

<sup>‡</sup>B: Unstandardized Regression Coefficient

\*Beta: Standardized Regression Coefficient

Table 9. Mediating effect of institutional adjustment between flow on learning and university dropout

step	variation <sup>†</sup>	$\beta \pm SE$	$R^2$	F*
1	ES	0.1655±0.0616*	22.56%	14.65*
	WL → JS	0.2116±0.0844*		
	WS	0.2882±0.0780*		
	WC	0.5791±0.1093*		
2	ES	0.2342±0.0425*	19.63%	9.29*
	WL → OC	0.1993±0.0602*		
	WS	0.2442±0.0331*		
	WC	0.4812±0.0724*		
3	JS → OC	0.2432±0.0925*	28.75%	18.28*
	ES	0.2133±0.0812*		
	WL → OC	0.1870±0.0329*		
	WS	0.2112±0.0662*		
	WC	0.3996±0.0788*		

<sup>†</sup>ES: Employment Stability, WL: Wage Level, WS: Welfare System, WC: Working Condition, JS: Job Satisfaction, OC: Organizational Commitment

\*p-value<0.01

In entering all variables with independent variable and mediating effect (step 3), all variables were statistically significant and the influence of organizational commitment on job satisfaction was reduced in step 3 rather than step 2. Therefore, it was concluded that job satisfaction partially mediated the effects of organizational commitment.

## V. Conclusions

Nanotechnology is converging in other industrial fields. However many recent studies are focused oblyon the technological innovation capacity to manufacture related nano-related products, and there are few studies related to nano-convergence employees. With this in mind, we have summarized previous researches to induce organizational commitment through job satisfaction of nano-convergence industrial workers, and based on this, we searched some tasks to find ways to overcome the recent global economic crisis.

The trends of the factors, such as employment stability, wage level, welfare system, and working condition, affecting job satisfaction and organizational commitment was confirmed through correlation analysis. Also, we conducted multiple regression analysis to examine effects of factors. As results, All hypothesis were accepted. In addition, hypothesis 5 in this study was accepted that the higher the job satisfaction, the higher the commitment to the organization. In addition, the mediation effect of job satisfaction was confirmed by

using testing mediation with regression analysis suggested by Baron and Kenny.

The present research offered an opportunity to uncover a following. First, the results of the study on the employment security show that the employment instability affects the job satisfaction negatively. Therefore, the organization should try to stabilize the employment. Next, looking at the results of the wage level study, it is found that the wage level does not affect job satisfaction. However, when the level of compensation of workers is compared with their job duties, if they think it is reasonable then their job satisfaction may be high. Therefore, it is necessary to examine the calculation of the wage by the result of the evaluation of the job itself, away from the structure of the current wage.

Second, in terms of working conditions, it has been shown that equal treatment for workers in the current workplace, the same working environment, and compliance with all laws and regulations related to work affects job satisfaction. It is therefore necessary to demonstrate that, on an administrative level, workers are treating workers fairly so that they do not perceive such injustices.

Third, in order to establish an efficient working culture, it is expected that the change of the management method for the workers based on the research result can increase the commitment to the organization through the job satisfaction of the worker.

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