

# **Effects of information culture and job satisfaction on the organizational innovation – a study of different leadership styles as a moderator**

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## **Abstract**

Organizational innovation plays a very important role in the process of Taiwan's economic miracle. In order to survive, the business organizations have to continually make drastic innovations in today's business environment. This study aimed to explore the impacts from information culture and employee satisfaction on the organizational innovation; as well as the interferences between leadership style and different cultures and employee satisfaction. A questionnaire survey was applied to domestic workers and semi-structured interviews to 5 field directors in technology, financial, manufacturing, service and other industries was also performed. Through descriptive statistics, factor analysis, regression analysis, single-variable variance analysis (ANOVA), our conclusions are: there is an impact on organizational innovation from information culture and job satisfaction; on the other hand, the compassion from different leadership style and institutional regulations play as moderating variables that interfere with the information cultural and job satisfaction. It eventually affects the organizational innovation.

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## 1 Introduction

Darwin's rule of Natural Selection tells that, all species must constantly evolve in order to survive. It also applies to enterprises evolution, too. They must constantly innovate. Innovation should include two phases, namely, "technical innovation" and "management innovation". (Damanpour, 1991).

They are interdependent and interfere with each other causing synergy effects on organizational performance. When companies conduct innovation, it happens often that the innovation process are affected by the organization leadership style and the information culture. The information culture is a result due to technological advances which further develops new ways of information transmission forming an emerging IT culture. It is no doubt that the information technology is intensive applied anytime and anywhere presently. This results in the information rapid spread, improvement of communication flows, knowledge advances, sharing of the best procedures and stimulation of innovation (Curry & tancich, 2000). We can learn from all of these that information culture is important to the capability of enterprises innovation.

In addition to the information culture, the organization's staff is also an important factor of organizational innovation. In order to survive from current challenges in a highly competitive and diversified industry with success, the staff's performance plays a key factor (Karatepe & Sokmen, 2006). Through the efforts of dedicated staffs, business can thrive (Dai, 2007). Productive staffs are thought to be the most important corporate assets (Karatepe et al., 2006). The formation of the enterprise characteristic culture also depends on them. Most of the organizational innovation depends on the application of an organization's leadership style (Gau, 2006). In various human activities and group interactions running in the community, leadership has been a very important role. It influences people's behavior to each other at any time (Wu Wenying, 2004).

Our research is motivated to study how information culture influences an organization in actual behavior of innovation and if the organizational innovation will create firm's higher performance when employees have good job satisfactions, and how the previous two factors operate in different leadership styles. The purpose of this study is to explore:

- 1.1 Information and cultural impact of organizational innovation.
- 1.2 The employee's job satisfaction affects organizational innovation.
- 1.3 The interference of leadership style with information culture and impact on employee satisfaction.

## **2 Literature Review**

Modern social activities change rapidly. All businesses have to keep running innovation process in response to the pressures and challenges from the competitors around. Innovation is to generate new ideas. It does have to be a totally brand new thing from scratch. It may be just a little new features or ideas being added to the original improving functionalities or creating convenience . An innovation doesn't have to be originated from scratch. A little useful change to the old is also good example of innovation. A remodeled product, a simplified process, and different strategic management are all called innovation (Robbins, 2001). Innovation is defined as a change that leverages and functions better than before.

Quite a lot of innovation types were proposed such as the product or service innovation; production process innovation; organizational Innovation; and personnel innovation (Knight, 1967; Chacke, 1988). It was also pointed out that innovation should include "technical innovation" and "management innovation" two levels (Damanpour, 1991). Strategy innovation was added to the list in (Wu, 1998). We focused this research by following the views of Damanpour. We therefore separated organizational innovation into technological innovation and managerial innovation. Investigation was done to measure the relationships between organizational innovation and IT cultural and job satisfaction.

### **2.1 Study of the significant influence on organizational innovation from IT culture**

As the progress of modern science and technology, the culture of an organization has changed in response to environmental changes. This is called the information culture. This information culture can be obtained from sharing knowledge, exchanging processes and evaluating and synthesizing knowledge (Anon, 1996). Leidner (1999) suggested that there are four information sharing types among staff members. The first type will share information automatically, the second type do not share everything at all, the third type shares information without restrictions, and the fourth type shares information selectively. It is well known that the attitude with which staff shares information will affect the speed of information transmission.

Marchand (2000) investigated the impact on the enterprise from the workers, technology, and management behaviors. He, then, proposes a new way of categorization as the enterprise IT guideline that information technology facilities, information management regulations, and information application behaviors are the three dimensions in evaluating the effectiveness of information application and its outcome. Adrienne Curry and Caroline Moore ( 2003) pointed out that the information culture is generated as the result of applying technology in the organization. The goal of this culture, through use of information system (IS) and

information technology (IT) with data management, is to achieve the operational and strategic objectives of the organization. They also suggested seven conceptual phases to evaluate the information culture. They are communication, cross-division participation, information value, management of information system, internal environment, information management, and professionalism. Based on the theories from the above literatures, we make the following assumptions:

- H1: IT culture has a significant impact on organizational innovation.
- H1-1: IT culture has a significant impact on technological innovation in the organizational innovation.
- H1-2: IT culture has a significant impact on management innovation in the organizational innovation.

## **2.2 Study of the impact on the organizational innovation form job satisfaction**

Employee job satisfaction is defined as the extent of the sense which every employee feels about their working environment. The job satisfaction level and involvement positively affects on employee's performance results. Chi (2008). It is also pointed out that employee job satisfaction affects the team innovative activities (Nerka, McGrath & MacMillam, 1996). Innovation capability was found significantly related to the individual job expectation and job training (Mumford, 2000).

There are two types of method for measuring job satisfaction (Xiu, 1981). They are integrated and itemized. Integrated measurement measures the satisfaction of entire organization; the itemized measurement measures the satisfaction of pre-defined items. There are four often used measure scales of job satisfaction level and they are: 1. The Hoppock Scale by Hoppock. It was compiled in 1935 and later Ren Sheng Sun (Ren Sheng Sun, 1981) and Hsieh (Hsieh Pai Leang, 1995) modify to four measure scales; 2. Minnesota Satisfaction Questionnaire (MSQ). This scale was developed in 1967 by Weiss, Davis, England & Lofquist. it use five-point Likert scale and has two formats, long-form and short-form. The former is divided into three sub-scale, results in a total of 20 subjects; the latter is divided into 20 sub-scale, results in a total of 100 subjects ( Lin be Kuan, 2007); 3. Job Description Index (JDI). This scale was announced by Smith, Kendall & Hulin in 1969 with five novel dimensions to measure; 4. Job satisfaction survey scale (JSS). This scale was compiled in 1985 by Spector. It uses nine dimensions to measure.

Our research adopted MSQ as the most domestic researchers applied (JJ Lee, 2004; Lin will be wide, 2007; You Min Yi, 2003; Yeh Shih-ming, 2003). The job satisfaction in this article is defined as the subjective emotional awareness reaction to the employee work-related objective factors. Referring to the scale of job

satisfaction used by Feng Junyi (1997), Hu Meilin (2001), Chen Wuzheng (2002) and Lai Qianhui (2003), job satisfaction will be divided into intrinsic satisfaction and extrinsic satisfaction two main components. From the above literatures, we concluded the following assumptions,

H2: Job satisfaction has a significant impact on organizational innovation.

H2-1: Job satisfaction has a significant impact on technological innovation in the organizational innovation.

H2-2: Job satisfaction has a significant impact on management innovation in the organizational innovation.

### **2.3 Study of the impact on the organizational innovation from different leaderships**

Leadership is defined as the interactive process that drives a group of people or an organization towards the goal (Xiu, 1990). It plays an important role in an organization. Leadership not only maintains the regular internal processes of an organization to fit the external environment but also leads the way for all employees towards the business goal. (Sun et al, 2003). Effective leadership determines the fate of the organization. It is as important as the guideline. (Liao, 2007). It is supposed that leadership can reach the goal by inspiring the confidence of employees (Dubrin, 2001).

There are other definitions of leadership. Chen (Chen, 2009) thought a leadership is the process during which a leader, by all means considering both accomplishing the mission and caring about the followers, get all involved together moving towards the goal and reach the goal. After reviewing the literatures of leadership, "consideration" and "initiating structure" are the two most profound concepts in leadership behavior. They deeply affect the current research of leadership. Therefore, this research adopted these two elements as the base of the investigation of how leadership style influences the information culture and job satisfaction.

#### **2.3.1 The relation between leadership style and information culture**

Curry & Moore (Curry & Moore, 2003) pointed out that the operation of information cultural relied on the leadership. Based on their concepts of the information cultural structure, we see the leadership style affects the impact on the organizational innovation from information cultural. Since the involvement of leadership style in the impact on the organizational innovation from information cultural, we made the following assumptions:

H-3: The information culture has a moderating effect on organizational innovation and this effect depends on the leadership styles,

- H3-1: Under a high initiating structure and high consideration leadership style, the information culture significantly impacts on the technological innovation of an organizational innovation.
- H3-2: Under a high initiating structure and high consideration leadership style, the information culture significantly impacts on the management innovation of an organizational innovation.
- H3-3: Under a high initiating structure and low consideration leadership style, the information culture significantly impacts on the technological innovation of an organizational innovation.
- H3-4: Under a high initiating structure and low consideration leadership style, the information culture significantly impacts on the management innovation of an organizational innovation.
- H3-5: Under a low initiating structure and high consideration leadership style, the information culture significantly impacts on the technological innovation of an organizational innovation.
- H3-6: Under a low initiating structure and high consideration leadership style, the information culture significantly impacts on the management innovation of an organizational innovation.
- H3-7: Under a low initiating structure and low consideration leadership style, the information culture significantly impacts on the technological innovation of an organizational innovation.

### **2.3.2 The relation between Leadership style and job satisfaction**

The leadership style intervention in the information culture impact on the organizational innovation is understood. It also interferes with the job satisfaction impact on the organizational innovation. A research on how the job satisfaction affects sales performance has shown that the employee's job satisfaction was significantly affected by the leadership style (Lin, 2007).

It is also pointed out that the compassion and system factors of a leadership style has a moderating effect on the recognized working values, attitudes, dedication and organizational commitment (Xu, 2010). In order to explore how different leadership styles affect the influence from job satisfaction to organizational innovation. According to the literature learned, we made the following assumptions:

- H4: Under different leadership style, the job satisfaction has a moderating effect on organizational innovation.
- H4-1: Under high initiating structure and high consideration leadership style, job satisfaction has a significant impact on technological innovation of organizational innovation.
- H4-2: Under high initiating structure and high consideration leadership style, job satisfaction has a significant impact on management innovation of organizational innovation.
- H4-3: Under high initiating structure and low consideration leadership style, job

satisfaction has a significant impact on technological innovation of organizational innovation.

H4-4: Under high initiating structure and low consideration leadership style, job satisfaction has a significant impact on management innovation of organizational innovation.

H4-5: Under low initiating structure and high consideration leadership style, job satisfaction has a significant impact on technological innovation of organizational innovation.

H4-6: Under low initiating structure and high consideration leadership style, job satisfaction has a significant impact on management innovation of organizational innovation.

H4-7: Under low initiating structure and low consideration leadership style, job satisfaction has a significant impact on technological innovation of organizational innovation.

H4-8: Under low initiating structure and low consideration leadership style, job satisfaction has a significant impact on management innovation of organizational innovation.

### 3 Research Methods

We obtained a research framework for the impact of IT culture and employee satisfaction on organizational innovation under different leadership styles from the collection of literature mentioned above. The framework is presented in Figure 1.

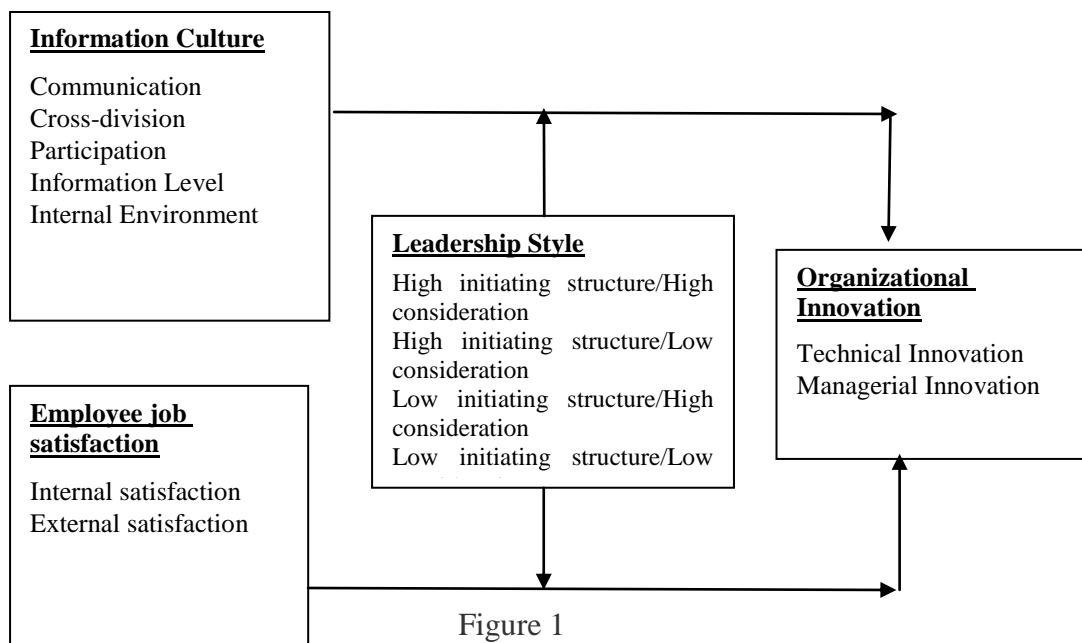


Figure 1

## **3.2 The structure with four dimensions of the operational variables are defined as follows**

### **3.2.1 Leadership Style**

In this study, analysis is for the four types of leadership style developed by Ohio State University and they are:

#### **3.2.1.1 High consideration and high system**

This type of leader emphasizes on achieving organizational goals and also concerns about the subordinates' needs.

#### **3.2.1.2 Low consideration and high system**

This type of leader cares about the achievement of performance and pays a little attention to the subordinates' feelings.

#### **3.2.1.3 High consideration and low system**

This type of leader plays the role of coach and gives the subordinates a sense of accomplishment by allowing them participation in decision-making.

#### **3.2.1.4 Low compassionate and low system**

This type of leader cares about neither the working goals nor the subordinates' needs.

### **3.2.2 Information cultural**

This study adopted Curry & Moore's (2003) point of view that suggests information culture should include the following five elements:

#### **3.2.2.1 Communication**

It is divided into vertical and horizontal communication System. The vertical communication establishes in a two-way interaction and feedback mechanism between leaders and subordinates in the organization; the horizontal communication is for the internal communication between colleagues of similar level. Communication is transferring ideas and reaching mutual understanding for the same targets.

#### **3.2.2.2 Cross-sector participation**

Employees of various departments within the organization participate in activities, exchange information and ideas through designated channels and complete a mission together.



### **3.2.2.3 Information level**

It refers to the information availability of a sound managed data system. The organization must have clear regulation policies, guideline and procedure instructions of the information system and all users are familiar with them.

### **3.2.2.4 Internal environment**

An environment that helps information cultural development and it is suitable for achieving organizational goals.

### **3.2.2.5 Specialization**

Sometimes the organizational goals would be in conflict with employee's personal professional goal. Sub-culture specialization will have an impact on organizational culture.

### **3.2.3 Job Satisfaction**

It is the subjective emotional response the staff has towards work-related perception.

### **3.2.4 Organizational Innovation**

This study adopted Damanpour's view point that innovation should include the followings:

#### **3.2.4.1 Technological Innovation**

It refers to the organization's innovative operations of IT equipments and maintenance of them.

#### **3.2.4.2 The management of innovation**

It refers to the organization's innovation on the organization, planning, personnel, leadership, control and services.

The following assumptions were concluded from defined research framework.

## **3.3 Subjects and Tools**

This study used questionnaire and semi-structured interviews with the domestic director of various fields. The fields were, the technology, financial, manufacturing, general service and other industries. We also carried out convenient sampling survey to employees. The information collected from questionnaires were separated into basic data, leadership style, information culture, job satisfaction as well as organizational innovation. The scholar-ready scales

were applied to the variables in analysis. The scale of leadership style was the five-point Likert scale of "Leadership Behavior Description Questionnaire"; referred as LBDQ, developed by Stogdill (Stogdill, 1963) of Ohio State University; the scale of information culture was the seven-point Likert scale by Curry & Moore (Curry & Moore, 2003); the Job Satisfaction scale was referred to that developed by Feng Junyi (Feng, 1997), Hu Meilin (Hu Meilin, 2001), and Chen Wuzheng (Chen, 2002); and the organizational innovation scale used Cai's five-point Likert scale (Tsai, 2007).

## 4 Results

Data analysis has five parts. The first part is measuring the reliability and validity of the questionnaires; the second part is factor analysis; the third part is conducted to explore the magnitude of correlation among leadership styles, organizational innovation, information culture and individual innovative dimensions by using Pearson correlation analysis; the fourth part is the single factor analysis of variance to verify the assumptions; the fifth part is the regression analysis of the causal relationship between variables.

### 4.1 Descriptive statistical analysis

Descriptive statistics analysis was conducted for the returned questionnaires. Descriptive variables, including gender, respective working industry, and associated percentage indicated the overall structure of the sample for us to understand. Among them, we had male with 70.5% and females with 29.5%. As for the working industry, the financial sector accounted for 33.9%, the services sector with 31.3%, followed by 20.5% of the others, the manufacturing sector had 14.3%.

Distribution of age of employees involving in this research was that respondents between 30 and 40 years of age accounted for 39.3%, under 30 years of age accounted for 27.7%, 40-50 years of age accounted for 25.9%, older than 50 years of age accounted for 7.1%. Size of respondent's company is taken as a variable. Company with 30 employees or less accounted for 33.0%, followed by company size of more than 1,000 accounted for 30.4%, company with 500-1000 accounted for 10.7%.

Results of basic statistical analysis to the questionnaire items in four described dimensions showed all answers to those asked questions had the average within the range 3.642 ~ 4.008 and standard deviation in 0.644 ~ 0.915. found Ming-Lung (2002), All questions of this study with answer average more than 3 shows that they are in good condition.

## 4.2 The validity of the questionnaire and factor analysis

There are three types of validity, namely, content validity, criterion-related validity, the construct validity. (Zhou Wenxian, 2002). All measures, scales, and items of this study are based on the theoretical basis and references that were commonly used by researchers having publications on journals or related literatures. This is an evidence of content validity.

As for the construct validity, we followed Kerkinger's point of view (Kerkinger, 1973) and used Pearson correlation analysis to test total scores and scores of related items verifying the construct validity. The study to the questionnaire by measuring four dimensions of individual items gave correlation coefficients above significant level ( $r = 0.734$ ,  $p < 0.001$ ), indicating a very high construct validity. In addition, to identify potential structural scale through the factor analysis (Wu, Ming-Lung, 2003), we adopted the conditions of selection factors set by Zhang (Zhang Shaoxun, 2003), namely, the factor loading of a question fit in a specific factor must be greater than 0.50. The factor loadings of this research were greater than 0.6. We applied the principal component analysis with the greatest variation method (Varimax) and rotation to extract an eigenvalue that is greater than 1. The statement of questions of all dimensions are given as the followings:

### 4.2.1 Leadership style

The "Leadership Behavior Description Questionnaire" (referred LBDQ) (Stogdill, 1963) was used as leadership style scale in this study. It has a total of 16 items. We extracted two factors and named "1, system (11 questions)" and "2, compassion (5 questions)" based on the literature of variables. The analysis results indicated that  $KMO = 0.840$ , Bartlett's = 838.611 reaching significant ( $p < 0.001$ ), and cumulative explained variance was 59.21%.

### 4.2.2 Information Culture

Scale of information culture in this study adopted the scale proposed by Curry & Moore (Curry & Moore, 2003). It is a seven-point Likert scale and covers communication, information level, professional, internal environment, and cross-sectoral participation five dimensions. A total of 17 questions remained in the questionnaire after deleting B4, and four factors was extracted from the factor analysis. The results gave  $KMO = 0.854$  and Bartlett's = 1290.166 of significant, cumulative explained variance was 71.1%.

### 4.2.3 Job Satisfaction

Job Satisfaction Scale is referred to that suggested by Feng at el (Feng Junyi, 1997; Hu Meilin, 2001; Chen Wuzheng, 2002). For this dimension, there are

totally 16 questions with five-point Likert scale. We extracted two factors and deleted C1, C8, C13, C14. Both the first and the second factors had 6 items for each intrinsic and extrinsic satisfaction. Through factor analysis, the results gave  $KMO = 0.855$ , and Bartlett's = 1032.66 of significant, cumulative explained variance was 54.28%.

#### **4.2.4 Organizational Innovation**

Organizational Innovation scale used what developed by Cai (Tsai, 1997). It included fields of planning, organization, personnel, leadership, control and service. We also referred to Wu's (Wu, 2001) "The correlation between organizational innovation and business characteristics, human capital, and industry environment". There were totally 19 items, adopting five-point Likert scales.

The results of factor analysis came out with two factors extracted and D1 was deleted. There were 10 items remained for in factor 1 called technological innovation and factor 2, named as management innovation, had 8 items. The results for the KMO are 0.910, Bartlett's = 1956.830 of significant, cumulative explained variance was 65.03%.

### **4.3 Reliability Analysis**

In this study, Cronbach's  $\alpha$  coefficient works as a measure of reliability indicator to assess internal consistency of the project. We can integrate reliability with Wu's suggestion (Wu Tung Hsiung, 1985) of a range with  $\alpha > .70$ . The analysis results showed that all Cronbach's  $\alpha$  were between 0.7012 to 0.9701. We concluded from this study that our research had a high degree of credibility.

### **4.4 Single-factor analysis of variance**

We first investigated if the basic data, industry or business category of the questioned, has impact on organizational innovation. The analysis is like the following:

#### **4.4.1. Impact of the industry, or business, on organizational innovation**

Results of our analysis gave that  $P=0.376$ ,  $F=1.068$ , and  $\alpha > 0.05$ . The industry or business doesn't have significant impact on organizational innovation.

#### **4.4.2. Impact of the firm size on organizational innovation**

Results of our analysis gave that  $P=0.00$ ,  $F=4.741$ , and  $\alpha < 0.05$ . The company size had a significant impact on organizational innovation. The further analysis of

Scheffe post hoc comparison. analysis showed that the impact of the company with 1000 or more employees would be more significant than that of a company with the size of 500-1000.

## **4.5 Regression Analysis**

In this study, a regression analysis was done for the impact of information culture and job satisfaction on the organizational innovation. The analysis had two stages. The first stage was simple regression test between variables; then, the second test proceeded multiple regression analysis to determine the causal relationship if the first results came out within reasonable limits. The analysis was performed as follows:

### **4.5.1 Information culture impact on the technology innovation and management innovation**

It can be learned from Table 5, under condition of the significant level  $\alpha = .05$ , the F value of variables of M1 (simple regression) of both technical innovation and management innovation are linearly dependent. We then detected multiple regressions (M2) of technological and management innovation. We obtained the F-value of 27.060 and 27.133 the ability to explain of 50.3% and 50.4%; respectively. This regression had good explanation ability.

Furthermore, the regression was done to the variables of information culture. The variables include, communication, information level, internal environment , cross-sectoral participation .

Regarding technical innovations, look at the standardized coefficient  $\beta$  of two variables, communication and internal environment. They are 0.135 and 0.100, respectively. They are less than significant level. On the other hand, for management innovation, standardized coefficient  $\beta$  of variables of communication and of another cross-sectoral participation are  $-5.155E-02$  and  $9.781E-02$ , respectively. Both are below significant level. It worth our attention that parameter communication and internal environment had made to the significant level in simple regression test, however, they were fail to make significant level in the multiple regression. The reason for this is that they had corelation with other variables. The joined complex bag reduced the SSE's contribution margin.

Our conclusion is that information culture parameters communication and internal environment has shown signs of significant impact in simple regression analysis, so the information culture has a positive technological effect on organizational innovation. Therefore, H1-1 and H1-2 are supported.

Table 5: Multiple regression analysis results of information culture impacts on technical and management innovations of organizational innovation

Dependent variable	Technical innovation				Management innovation			
	M1		M2		M1		M2	
Independent variables	F-value	$\beta$	T value	Sig.	F-value	$\beta$	T value	Sig.
Communication	39.291***	0.135	1.533	0.128**	20.372***	-5.155E-02	-4.67	0.641
Information level	58.775***	0.310	4.465	0.000***	69.169***	0.433	4.960	0.000***
Internal environment	55.716***	0.100	1.014	0.313	68.742***	0.423	3.402	0.001***
Cross-sectoral participation	56.034***	0.250	2.562	.012**	34.804***	9.781	9.79 E-02	0.427
Constant		0.681	2.362	.02**		0.243	0.670	0.504
F-value			27.060				27.133	
P-value			0.000***				0.000***	
R squared			0.503				0.504	

Note: \*\*\* P < 0.01, \*\* P < 0.05, \* P < 0.1

#### 4.5.2 Job satisfaction impact on technology innovation and management innovation

We learned from Table 6 that, simple regression (M1) and the F value of the variables are having linear dependency. The multiple regression (M2) resulted F value of significance of technological innovation and management innovation to be F = 58.504, and F = 85.197, respectively. They both reached significant levels.

The ability to explain ( $R^2$ ) of technological innovation was 50% and that of management innovation was 61%. The overall results of this regression test had ability to explain. We then applied the regression on parameters including intrinsic and intrinsic satisfaction. The standardized coefficient  $\beta$  of technology innovation intrinsic satisfaction is -6.770E-02, less than significant level. Both the intrinsic and extrinsic satisfaction of management innovation reach up to significant levels.

Therefore, with the significant level of  $\alpha = .05$ , the job satisfaction has positively and significantly affect technology innovation and management innovation of organizational innovation, based on the above statements, we obtained empirical support for H2-1 and H2-2.

Table 6: Multiple regression analysis results of job satisfaction impacts on technical and management innovations of organizational innovation

Dependent variable	Technical innovation				Management innovation			
	M1	M2			M1	M2		
Independent variables	F-value	$\beta$	T value	Sig.	F-value	$\beta$	T value	Sig.
Intrinsic satisfaction	24.918***	-6.770E-02	-.770	.443	16.801***	-0.292	-2.931	0.004***
Extrinsic satisfaction	116.847***	0.732	8.676	0.000***	151.362***	1.103	11.549	0.000***
Constant		1.204	4.436	0.000***		0.636	2.066	0.41**
F value				58.504				85.197
P value				0.000***				.000***
R squared				0.509				.610

Note: \*\*\* P <0.01, \*\* P <0.05, \* P <0.1

#### 4.5.3 Under different leadership styles, the information culture has a moderating effect on organizational innovation

(1). Under the high structure, high consideration leadership style, the regression analysis results of information culture impact on technological innovation and management innovation are presented in Table 7.1. It indicated that the F value of them with 14.671 and 15.172, respectively. Both reached level of significance. The regression model has explanatory power (R<sup>2</sup>) of 65.4% and 66.2%, respectively. The variables of information culture have a linear relationship with technology innovation and management innovation and positive impact on it. We conducted regression tests on the applied forecast variables of information culture. For communication, we had the standardization coefficient  $\beta = -0.003$  for technical innovation and  $\beta = -0.168$  for management innovation. Both did not reach significant level. For the internal environment, the standardized coefficients of technological innovation  $\beta = 0.043$ , less than significant level; and, respectively. and information level of management innovation  $\beta = 0.098$ , less than significant level. As for the communication and internal environment reached significant level in simple regression and failed in the multiple regression, our explanation is, as have mentioned earlier, that with other variables joined the complex back to the scale-like conditions of multiple regression, its marginal contribution to further reduce SSE is not large. We saw communication and internal environment of information culture presented significant impact in simple regression analysis. Therefore, with the significant level  $\alpha = .05$  and high structure,

high consideration leadership style, the information culture has a significant effect positively impact on the technological innovation and management innovation. Therefore, H3-1 and H3-2 obtain empirical support for the establishment.

(2). Under the high structure, low consideration leadership style, the regression analysis results of information culture impact on technological innovation and management innovation are presented in Table 7.2. It indicated that the F value of them with 4.92 and 4.681, respectively. Both reached level of significance. The regression model has explanatory power (R<sup>2</sup>) of 56.8% 4 and 55.5%, respectively. The variables of information culture has a linear relationship with technology innovation and management innovation and positive impact on it. Therefore, both H3-3 and H3-4 obtained empirical support for the establishment.

(3). Under the low structure, high consideration leadership style, the regression analysis results of information culture impact on technological innovation and management innovation are presented in Table 7.3. It indicated that the F value of technological innovation was 2.394 and did not reach the level of significance. The explanatory power (R<sup>2</sup>) was 57.8%. In other words, the variables of information culture, communication, information level, the internal environment, cross-sectoral participation did not have a linear relationship with technology innovation and H3-5 did not obtain empirical support for the establishment. On the other hand, F value of management innovation was 7.012 and reached the level of significance. It also had explanatory power (R<sup>2</sup>) of 80% having the overall linear relationship with a positive effect on test results. Therefore, H3-6 obtained empirical support for the establishment.

(4). Under the low structure, low consideration leadership style, the regression analysis results of information culture impact on technological innovation and management innovation are presented in Table 7.4. It indicated that the F value of technological innovation was 3.104 and reached the level of significance. The explanatory power (R<sup>2</sup>) was 51.2%. In other words, the variables of information culture have a linear relationship with technology innovation and H3-7 obtained empirical support for the establishment. On the other hand, F value of management innovation was 2.030 and did not reach the level of significance. It had explanatory power (R<sup>2</sup>) of 43.4% not having the overall linear relationship with a positive effect on test results. Therefore, H3-8 did not obtain empirical support for the establishment.



Table 7.1: The regression analysis results of the information culture impact on technological and management innovations under high structure, high consideration leadership style

Dependent variable Independent variables	Technical innovation				Management innovation			
	M1		M2		M1		M2	
	F value	$\beta$	T value	Sig.	F value	$\beta$	T value	Sig.
Communication	14.307***	-.003	-.01	.988	11.796***	-.168	-1.06	.296
Information level	15.914***	.291	2.40	.022*	8.046***	.098	.816	.421
Internal environment	22.172***	.043	.23	.818	32.779***	.331	1.82	.078
Cross-sectoral participation	46.912***	.610	3.76	.001*	53.146***	.605	3.77	.000*
F-value				14.671				15.172
P-value				.000***				.000***
R <sup>2</sup>				.654				.662

Table 7.2: The regression analysis results of the information culture impact on technological and management innovations under high structure, low consideration leadership style

Dependent variable Independent variables	Technical innovation				Management innovation			
	M1		M2		M1		M2	
	F-value	$\beta$	T value	Sig.	F-value	$\beta$	T value	Sig.
Communication	1.458	.085	.424	.678	0.261	-.007	-.034	.973
Information level	15.342***	.579	3.209	.006	18.727***	.667	3.645	.002
Internal environment	0.250	-.096	-.522	.609	0.000	-.160	-.859	.404
Cross-sectoral participation	6.559**	.316	1.499	.155	2.959	.213	.996	.335
F-value				4.92				4.681
P-value				.010**				.012***
R <sup>2</sup>				.568				.555

Table 7.3: The regression analysis results of the information culture impact on technological and management innovations under low structure, high consideration leadership style

Dependent variable Independent variables	Technical innovation				Management innovation			
	M1		M2		M1		M2	
	F-value	$\beta$	T value	Sig.	F-value	$\beta$	T value	Sig.
Communication	.110	.120	.263	.800	1.799	-.570	-1.819	.112
Information level	11.283**	.732	2.253	.059	21.335***	.894	4.000	.005
Internal environment	2.353	-.025	-.059	.955	3.712*	-.332	-1.146	.289
Cross-sectoral participation	1.532	.117	.267	.797	.568	.283	.939	.379
F-value	2.394				7.012			
P-value	.148				.014**			
R <sup>2</sup>	.578				.800			

Table 7.4: The regression analysis results of the information culture impact on technological and management innovations under low structure, low consideration leadership style

Dependent variable Independent variables	Technical innovation				Management innovation			
	M1		M2		M1		M2	
	F-value	$\beta$	T value	Sig.	F-value	$\beta$	T value	Sig.
Communication	3.646*	.076	.458	.650	.486	-.063	-.362	.719
Information level	5.784**	.228	1.422	.164	3.271	.147	.873	.389
Internal environment	7.084**	.085	.413	.682	7.475***	.420	1.946	.060
Cross-sectoral participation	8.922***	.281	1.399	.171	1.897	-.075	-.356	.724
F-value	3.104				2.030			
P-value	.028**				.112			
R <sup>2</sup>	.512				.434			

#### **4.5.4 Under different leadership styles, the job satisfaction has a moderating effect on organizational innovation**

(1). Under the high structure, high consideration leadership style, the regression analysis results of job satisfaction impact on technological innovation and management innovation are presented in Table 8.1. With the significant level  $\alpha = .05$ , it indicated that the F value of technological innovation and management innovation were 28.796 and 49.745, respectively. The explanatory power (R<sup>2</sup>) were 63.6% and 75.1%, respectively. Both reached the level of significance. The further tests on the variables of job satisfaction, intrinsic and extrinsic satisfactions, showed the linear relationship and positive effect with technology innovation and management innovation. Therefore, H4-1 and H4-2 both obtained empirical support for the establishment.

(2). Under the high structure, low consideration leadership style, the regression analysis results of job satisfaction impact on technological innovation and management innovation are presented in Table 8.2. With the significant level  $\alpha = .05$ , it indicated that the F value of technological innovation and management innovation were 9.881 and 12.353, respectively. The explanatory power (R<sup>2</sup>) were 53.8% and 59.2%, respectively. Both reached the level of significance. The further tests on the variables of job satisfaction, intrinsic and extrinsic satisfactions, showed the linear relationship and positive effect with technology innovation and management innovation. Therefore, H4-3 and H4-4 both obtained empirical support for the establishment.

(3). Under the low structure, high consideration leadership style, the regression analysis results of job satisfaction impact on technological innovation and management innovation are presented in Table 8.3. With the significant level  $\alpha = .05$ , it indicated that the F value of technological innovation and management innovation were 15.644 and 15.726, respectively. The explanatory power (R<sup>2</sup>) were 77.7% and 77.8%, respectively. Both reached the level of significance. The further tests on the variables of job satisfaction, intrinsic and extrinsic satisfactions, showed the linear relationship and positive effect with technology innovation and management innovation. Therefore, H4-5 and H4-6 both obtained empirical support for the establishment.

(4). Under the low structure, low consideration leadership style, the regression analysis results of job satisfaction impact on technological innovation and management innovation are presented in Table 8.4. With the significant level  $\alpha = .05$ , it indicated that the F value of technological innovation and management innovation were 5.094 and 4.564, respectively. The explanatory power (R<sup>2</sup>) were 46.5% and 44.5%, respectively. Both reached the level of significance. The further tests on the variables of job satisfaction, intrinsic and extrinsic satisfactions, showed the linear relationship and positive effect with technology innovation and management innovation.

Therefore, H4-7 and H4-8 both obtained empirical support for the establishment. In Table 8, the regression analysis results of the job satisfaction

impact on technological and management innovations under different leadership styles.

Table 8.1: The regression analysis results of the job satisfaction impact on technological and management innovations under high structure, high consideration leadership style

Dependent variable Independent variable	Technical innovation			Management innovation		
	$\beta$	T-value	Sig.	$\beta$	T-value	Sig.
Internal satisfaction	-.46	-3.170	.003***	-.48	-4.059	.000***
Extrinsic satisfaction	1.04	7.177	.000***	1.12	9.394	.000***
F-value			28.796			49.745
P-value			.000***			.000***
R <sup>2</sup>			.636			.751

Table 8.2: The regression analysis results of the job satisfaction impact on technological and management innovations under high structure, low consideration leadership style

Dependent variable Independent variable	Technical innovation			Management innovation		
	Standard( $\beta$ )	T-value	Sig.	Standard( $\beta$ )	T-value	Sig..
Internal satisfaction	-.631	-2.767	.013	-.367	-1.715	.10
Extrinsic satisfaction	1.010	4.427	.000	.976	4.558	.000***
F-value			9.881			12.353
P-value			.000***			.000***
R <sup>2</sup>			.538			.592

Table 8.3: The regression analysis results of the job satisfaction impact on technological and management innovations under low structure, high consideration leadership style

Dependent variable Independent variable	Technical innovation			Management innovation		
	Standard( $\beta$ )	T-value	Sig.	Standard( $\beta$ )	T-value	Sig.
Internal satisfaction	.406	2.159	.059	-.246	-1.309	.223
Extrinsic satisfaction	.590	3.136	.012	.992	5.286	.001***
F-value			15.644			15.726
P-value			.000***			.000***
R <sup>2</sup>			.777			.778

Table 8.4: The regression analysis results of the job satisfaction impact on technological and management innovations under low structure, low consideration leadership style

Dependent variable Independent variable	Technical innovation			Management innovation		
	Standard( $\beta$ )	T-value	Sig.	Standard( $\beta$ )	T-value	Sig.
Internal satisfaction	.022	.121	.904	-.096	-.529	.600
Extrinsic satisfaction	.451	2.503	.017	.495	2.713	.010**
F-value			5.094			4.564
P-value			.011**			.017***
R <sup>2</sup>			.465			.445

## 5 Conclusion and Suggestions

This study aims to explore the impact of organizational innovation factors, such as leadership styles, information culture and job satisfactions. Among them, leadership style is treated as a moderator. By referencing to the literatures and theories, we established four assumptions and conducted empirical research analysis. The procedures are described as the following:

### 5.1 Information of Culture on Organizational Innovation

Results show that the impact of information culture on organizational innovation is significant. When the organization's information cultural development elevates, the organizational innovation capabilities will show a positive growth accordingly.

Through an access to five executive officers, such as Mr. H, an international banking manager currently leading a group in the stage implementing the structural transformation of their information system, Mr. W, a manager of the P construction company, Mr. Y, an IT manager of T company, Mr. L, manager of S International Hotel, Mr. C, manager of R chain restaurant five managers, we concluded that the impact of information culture on organizational innovation comes from two parts, 1.customer side and Staff side. The customer side innovation considers to provide a full range of services to customers, to make transactions faster, to facilitate the technological operation, and to help customers making decisions with global information services. With all of the above, the customers will appreciate the organization's professional, convenient and quick information services. These customer appreciation will be returned back to the employee and group performance level; 2. The staff side innovation considers to eliminate cumbersome operating system, to reduce operating process errors, to increase information knowledge, to save staff with time and reduce customer complaints. At the beginning of new era of information culture, it is commonly seen that employees often misunderstand and protest against the new organizational information policies and they do not cooperate with the person in charge. It is because there is impact during the information culture transformation. At early stage, employees are still thinking in a way following old culture. They have difficulty with the operation of the new information system and complain often. As long as the change on the information systems can really help the staff and improve their routine work, the value and the convenience from the organizational innovation will be appreciated by staff and they will be satisfied with the new culture when staff members become familiar with the new information system. (0307-2-C). The first two numbers stand for interview month, the third and fourth numbers stand for interview dates, the fifth number stands for interview section, and the sixth number stands for the interviewee code.)

Manager H of C international bank also mentioned that they are currently

transforming the "SMART" information system. "SMART" information system has functions such as virtual classroom networks providing online one on one learning, online virtual trading operations, online test, the organization and knowledge sharing platform for staff to exchange ideas, and instructors on-site guidance. At preparing period, the district banks sent counseling and problem-solving advisors for training for two years prior full implementation is done. This planning reduced the uncomfortable period. C bank shortened the adaptation period in implementing new information systems to one month. In fact, they returned to normal operation one week after the implementation work. For most banks, it might take three months before normal operation came back and managers and employees were standby until midnight during the implementation period. (0308-5-A).

It is said (Bharadwaj, 2000) that the value of information cultural can be described as the following four facts: 1, information technology can help in customization and keeping superior product and service quality, 2, information technology is one of the key elements that improves customer services and quickly responses to the customer demands, 3, information technology plays an important role in managing organizational knowledge and it builds knowledge assets, 4, information technology can help build a better synergy through coordination and cross-department resources sharing.

From the literatures, interviews, and questionnaire survey results, we verify that information culture affects organizational innovation. When the organization's information application develops to a higher level of cultural, the organizational innovation will show positive growth, accordingly.

## **5.2 Job satisfaction affects on organizational innovation**

Analysis results showed those employees' job satisfaction significant impacts on organizational innovation. In other words, when workers satisfy more with their work, they are willing to pay more efforts into the organization. It may result in the industry innovation. The conclusion obtained from access to five executive officers, that organizations provide customers with full range services and the recognition of the good services and brand supports the business of the organization. Employees of a famous organization are proud of as part the organization and it seems that remarkable innovations lift up employees' capabilities and performance that is respected by the customers. It results in high degree of satisfaction and employees are more willing to make contribution efforts to the organization's innovation. (03011-5). Laudon & Laudon (Laudon & Laudon, 2000) also pointed out that several way to improve the job satisfaction. They are, for example, improving operating conditions, increasing the organizational learning capabilities, increasing resource utilization rate, more up-to-date information, improving decision-making process, improving customer satisfaction, improving resource control, improving organizational planning ability and

flexibility, law-abiding, and shaping the good image of the company, The long-term application of them will enhance the employees' willingness to work and effectively raises the job satisfaction.

A company will shorten the preparation period due to the staff making faithfully contributions during a transformation to cope with rapid changes, leading the organization to achieve business opportunities in the industry. Therefore job satisfaction will affect organizational innovation.

### **5.3 Moderating effect of different leadership styles on information culture and organizational innovation**

The high structure, high consideration leadership style has a moderating effect on the information culture and organizational innovation. According to the results of interviews with five managers of various industries, they all agreed that these two factors of organizational innovation were very important elements and were indispensable in the long run. An organization always set performance goals for the technology of information cultural and the operation of information system to ensure that they are well-designed, well-planned, can provide training services for staff, allow the actual operation be simulated, can provide ideas exchange and communication, and have functions such as problem solving, and decision making information available. When C Bank renewed their IT system, chairman Koo went on TV, thanked and apologized to all families of his employee. The head of each branch also issued a letter of thanks to the staff. It is a successful story of influence of information culture on organizational innovation under high consideration leadership styles. (0316-6-C).

Under the high structure, low consideration leadership style, the information culture has a moderating effect on organizational innovation. According to the results of interviews with five managers of various industries, they all agreed that a policy set of structural system performance goals is needed for the IT technology and information systems implementation. Although a leader of low consideration may lack of understanding and not concern for staff incentives with a pushing manner for short term IT transformation, there may be some minor resistance and complaints at the beginning, however, in the long run, people will find the new information system very easy to use and give more information. They will also find it runs quicker and can provide cross-sectoral information exchange, increase customer satisfaction and recognition that enhance individual performance, so employees eventually will devote every effort to achieve their goals with the organization's new policy. (0320-6-A).

Leadership styles of low structure, high consideration and low structure, low consideration have no moderating effect on the information culture and organizational innovation. Interviews with five managers of various industries



pointed out that no matter what kind of leadership style was, if the director had not developed a system of organizational performance goals, it was impossible to form information culture leading to organizational innovation. Since there were no performance goals the staff used to thinking of the old model were afraid of changing information culture and would not accept new technologies. Then employees would have a lot of excuses not to learn and they waited to see how the change should be. (03020-6-C).

Leaders should establish a performance goal of information system and educate employees how to apply in the routine work. The new IT system should have functions such as knowledge sharing, information for decision-making, and operational convenience. The benefits of IT are achieving corporate culture of innovation and help organization to quickly respond to industry competition.

#### **5.4 Impact of job satisfaction on organizational innovation under different leadership styles**

Empirical results showed that no matter what kind of leadership style an organization is under, employee's job satisfaction and organizational innovation are influenced. Some researchers (Zhu & Shr, 2007) pointed out that employees will produce more to meet the psychological sense of accomplishment when they feel highly competent under the high initiating structure, high consideration leadership style..

Five interviewed managers agreed that a competent leader should not only care for staff's emotion but timely pressure is also essential. Incentives and penalties should be applied simultaneously since employee job satisfaction and organizational innovation are mutually dependent on each other. Employees may improve their satisfaction by utilizing organizational innovation and return with greater contributions to the organization. It is very important for the leaders to let his employees know what his goals are. Good leader would, at first, clearly specify his objectives and provide fully supports to his staff rather than simply respect employees and take sentimental actions after listening to their words. Obviously, when a competent leader supervises his employees to completion goal of the organization by focusing on performance and leadership can also inspire employees with job satisfaction. It probably promotes organizational innovation more than caring. (0322-6-C).

However, practically speaking, especially for the orient people, interpersonal relationship always works better than the cold regulations. Leaders can play "moderate compassionate" to induce employees "do anything" for him because huge amount of institutional incentives still incompatible with psychological desires of compassion from the boss, after all. Many business owners share profit to employees as bonus in the year-end party and ultimately prepare huge "red money envelope" in order to keep the loyalties of the key members. Despite of the

leadership style, employee job satisfaction does influence the organizational innovation.

## 5.5 Study limitations

Although the works in this study were required to be of accurate, however, there still have some factors went beyond our control. The limitations of the study are given as follows:

- (1). The subjects are for the domestic enterprises, including financial services, manufacturing, technology and others using convenient sampling. This approach cannot cover all subjects for us to obtain large amounts of data for analysis, therefore, the presence of errors are inevitable. .
- (2). The questionnaire scale design was based on literature; however, respondents might be subject to the environment at answering and misinterpreted for what we were asking and introduced errors.

## References

- [1] Anon, Organizational culture and information systems. Paper presented at the UK Academy for Information Systems, 1st *Annual Conference, Cranfield School of Management*, (1996).
- [2] W. Bennis, *On Becoming a Leader*, Addison-Wesley Publishing, p. 21994.
- [3] A.S. Bharadwaj, A Resource-based Perspective on Information Technology Capability and Firm Performance: An Empirical Investigation, *MIS Quarterly*, **24**(1), (2000), 169-196.
- [4] R.J. Boland and R.V Tenkasi, Perspective making and perspective taking in communities of knowing, *Organization Science*, **6**(4), 1995, 350-372.
- [5] M. Broadbent and P. Weill, Management by maxim: How Business and IT Managers can create IT infrastructures, *Sloan Management Review*, **38**(3), (1997), 77-92.
- [6] W.H. Chih, T.R. Yang and J.R. Liu, The influences of internal marketing and emotional intelligence on employee's performance, *Chung Hua Journal of Management*, **9**(3), (2008), 1-22.
- [7] J.N. Chung, A Study on civil servants' cognition of core value and incorruption government: a case of Tainan County Government, *Paper presented in Taiwan New Public Management Trend and Challenges Conference -under the development of globalization*, (2009), 75-100.
- [8] Adrienne Curry and Caroline Moore, Accessing information culture- a exploratory model, *International Journal of Information Management*, **23**(2), (2003), 91-110.
- [9] Y.D. Dai, G.Y. Chung and W.R. Chung, A study of the relationship of organization justice, work satisfaction, organizational commitment, and

- organizational citizenship behaviors, *Paper presented at the Eighth Conference of Management, Taichung, Taiwan*, (2007), 19-32.
- [10] A.J. Dubrin, *Leadership-Research Finding, Practices, and Skills*, Third Edition, Houghton Mifflin Company Boston, New York, 2006.
- [11] C.Y. Feng, *The research about learning organization and leadership to the influence of high technology industry employee's work stress and satisfaction*, Unpublished M.A, National Cheng Kung University, Tainan, Taiwan, 1997 .
- [12] S.W. Hsu and H.T. Yeh, A study of work values, work attitude and job performance of employees of international tourist hotels – leadership style as a moderator, *Journal of Business Administration*, 87(4), (2010), 77-110.
- [13] S.C. Hsu, *Management Science*, (Tenth Edition), Taipei, Tung Hua, 1990.
- [14] M.L. Hu, *A study of non-profit organizations on relationship among organizational culture, transformation leadership and employee work attitude-a case study of seven city and county governments in Southern Taiwan*, Unpublished M.A, Chang Jung Christian University, Department Business and Operations Management, Tainan, Taiwan, 2002.
- [15] R.H. Kao, A study on the relationship among leadership behavior, organizational climate and service quality: the case of Kaohsiung Harbor Police Office, *Journal of Human Resource Management*, 6(3), (2006), 95-117.
- [16] O. M. Karatepe, O. Uludag, I. Menevis, L. Hadzimehmedagic and L. Baddar, The effects of selected individual characteristics on frontline employee performance and job satisfaction, *Tourism Management*, 27(4), (2006), 547-560.
- [17] O.M. Karatepe and A. Sokmen, The effects of work role and family role variables on psychological and behavioral outcomes of frontline employees, *Tourism Management*, 27(2), (2006), 255-268.
- [18] D. Katz and R.L. Kahn, *The Social Psychology of Organization*, New York, John Willey & Sons, Inc, 1978.
- [19] J.P. Kotter, *On What Leaders Really Do*, Harvard Business School Press Through Arts & Licensing International. Inc, U.S.A, 1999.
- [20] K.C. Laudon and J.P. Laudon, *Management Information Systems: Managing the Digital Firm Management information systems: organization and technology in the networked enterprise* (6 rd ed.), Upper Saddle River, New Jersey, Prentice-Hall, Inc, 2000.
- [21] R.J. Liao, *A study of the relationship between star signs and leadership behaviors-a case study of civil servants at Yi-lan County*, Unpublished M.A, National Tung Hua University, Department of Graduate Institute of Public Administration Hualien, Taiwan, 2007.
- [22] B.K. Lin, *A study about the influence of leadership and internal marketing on job satisfaction - a case study of the franchisees in Taiwan*, Unpublished M.A, National Cheng Kung University, Department of Business Administration, Tainan, Taiwan, 2007.

- [23] E.A. Locke, S. Kirkpartick, J.K. Wheeler, J. Schneider, K. Niles, H. Goldstein, K. Welsh and D. Chah, *The Essence of Leadership: The Four Keys to Leading Successfully*, Lexington Books, New York, NY, 1991.
- [24] Sandra E. Lundy, Executive Resource Books, *Managing*, (1986), 4-5.
- [25] Donald A. Marchand, William J. Kettinger and John Rollins, Information Orientation: People, *Technology and the Bottom Sloan Management Review*, (2000), 69-80.
- [26] S.P Robbins, *Organizational behavior: Concepts, controversies, and applications*, New Jersey, Prentice- Hall, 1991.
- [27] P.E. Spector, Measurement of human service staff satisfaction: Development of the job satisfaction survey, *American Journal of Community Psychology*, **13**, (1985), 693-713.
- [28] D.J. Suen, C.Y. Jeng, and MG. Chung, The relationship between leadership behavior, commitment of organization, and leadership effectiveness for management level of high technology industry in Taiwan-the case of Hsinchu Science-based Industrial Park, *The Journal of Chaoyang University of Technology*, **8**, (2003), 191-222.
- [29] C.T. Tsai, *Organizational factors, creativity of organizational members and organizational innovation*, Unpublished Ph. D., National Taiwan University, University, Department of Business, Taipei, Taiwan, 1997.
- [30] V.H. Vroom, *Work and Motivation*, New York, John Willey & Sons, Inc, 2004.
- [31] W.Y Wu, A study on leadership concepts through the connotation of leadership concepts, behaviors and cognition, *School Administration Research*, **31**, (2004), 46-61.
- [32] H.Q. Zhu and Y.P Shr, A study of leadership style and leadership effectiveness in a military aircraft maintenance plant- an example of an aircraft maintenance plant, *Paper presented at the South Taiwan Information Technology and Application Conference, Kaohsiung, Taiwan*, (2007), 285-297.