

The Effect of Intrinsic Motivation and Transformational Leadership on Organizational Commitment of Firefighters in Taiwan

Yao-Chieh Tsai, Cheng-Ping Shih

Abstract—This study is to find the factors that have effects on firefighters' commitment toward fire departments in order to lower the turnover rate and higher their willingness of devoting or contributing to fire departments. In Taiwan, natural disasters such as typhoons and earthquakes happen frequently, and firefighters play a significant role of preventing the communities from getting damaged and rescuing injured people and victims. The society has a strong need of firefighters. However, the working condition of firefighters is challenging and severe, and their job is also dangerous. This study is conducted in hoping to examine whether intrinsic motivation and transformational leadership have effects on their organizational commitment. Regarding to the adaptability or fitness of the questionnaire for this study, the questionnaire was completed with two stages. For the qualitative approach, the interviews with firefighters was the first stage to clarify their working environment, difficulties, values, and objectives and also to assure that the questions are reviewed and modified properly according to experts' opinions. After this phase, the next stage is to conduct a quantitative data collection by sending and receiving questionnaires with the modified questions. The participants of this study includes 150 firefighters who are currently serving in fire stations or fire departments, and 126 valid samples were retrieved. The goal of this study is to examine how firefighters' intrinsic motivation and transformational leadership will be associated with their commitment of staying in the fire department.

Keywords—intrinsic motivation, transformational leadership, organizational commitment, firefighters, Taiwan

I. INTRODUCTION

FIREFIGHTERS work long and irregular hours. Their shifts are twenty-four hours and they have to be on call for every fire line when they are on duty. They work in the middle of the night, they miss family events, holiday celebrations, or the birth of their children due to their schedules (Institute for Career Research, 2006). In Taiwan, natural disaster happens frequently. Each year during summer seasons, strong typhoons hit the island invariably, and in 2016, Typhoon Meranti barreled

Taiwan and brought a lot of damages (Griffiths & Miller, 2016). Besides frequently-coming typhoons, citizens in Taiwan face numerous earthquakes. In February of 2016, total 116 people have been confirmed dead after the powerful 6.4-magnitude earthquake called 2016 Taiwan earthquake, with all but two of the victims living at the 17-storey Weiguan Jinlong (Golden Dragon) building, the building toppled down during the earthquake (Watkinson, 2016). Unfortunately, natural disasters will happen even more intensely and frequently due to climate change. For instance, the recent serious impact on United States' wild land brought by climate change is wild-land fire that causes lots of deaths and injuries and the number is increasing within previous years, and those firefighters are at risk and in danger (Withen, 2015). Regarding to the negative influence of climate change in Taiwan, it results in global warming that continuously leads to devastating typhoons over Asian area (RÓŻYŃSKI & Ostrowski, 2009), which makes frequently struck Taiwan even more be at stake, causing the local firefighters to face more challenges and difficulties when helping people tide over the disasters. Taking Morakot typhoon as an example, it hit mostly the south part of Taiwan and totally flooded and destroyed the entire village of Xiaolin and killed at least 300 people (Chan, 2009). Whenever this kind of disaster happens, firefighters are putting their own lives at risk to look victims and they recognize their mission as top priority.

In addition, Taiwan is also on the hazard of compound disasters such as the earthquake of "921 earthquake" occurred on September 21, 1999, and every disaster contains some complex elements that can lead to a compound disaster with devastating results (Haung & Hosoe, 2016), especially the existent case of 2011 Tōhoku earthquake and tsunami that indirectly brought nuclear disaster can be seen as the best lesson that Taiwanese people have to learn in order to prevent the problematic aftermath management (Barr, 2012). Therefore, as time goes on, the future disasters will be more and more complex and complicated. Hence, firefighters are not only required to work for long hours and in jeopardy but also expected to be intellectual and knowledgeable on the aspect of dealing with compound or complex disasters in the future. However, as the demand of firefighters arises, Taiwan is lacking of sufficient well-trained firefighters at the meanwhile. Accordingly, this study aims to firefighters' organizational commitment toward their organizations (fire departments).

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When workers are more committed to their organization, they will have lower possibility of leaving from their organizations (Zhang et al, 2015). Besides, those committed workers are more likely to devote their efforts at work and contribute better performance (Ingram, 1989). Therefore, the researcher is looking for the factors that have relationships with organizational commitment in order to solve the problem of shortage of firefighters. By improving organization commitment, firefighters will be more willing to learn and stay in fire departments. Firefighters are working under dangerous conditions and they are surrounded by risks of getting seriously injured. Despite the fact that their job is relatively secured for they work under the government, this extrinsic motivator may not help as long as they do not satisfy with the job, because motivation is not only affected by monetary rewards (Kvaløy et al, 2015) Therefore, the main purpose of the study is focused on finding out the factors that have effects on firefighters' organizational commitment toward fire departments in hoping that firefighters will be more committed to fire departments in avoiding of the shortage problem of firefighters in the future. Moreover, in order to come up with countermeasures for climate change and compound disasters, sufficient and well-trained firefighters will be needed, and when they are highly committed to their organizations, they will have stronger desire to put their efforts at work.

II. LITERATURE REVIEW

A. Organizational Commitment

According to Three-Component Model (Meyer & Allen, 1991), Organizational Commitment (OC) can be more specifically classified into affective commitment (AC), continuance commitment, and normative commitment. Organizational commitment refers to those who are organizationally committed are willing to give something of themselves in order to contribute to the organization's well-being (Pradhan, 2015). Meyer and Allen pegged AC as the "desire" component of organizational commitment. An employee who is affectively committed strongly identifies with the goals of the organization and desires to remain a part of the organization. Continuous commitment is focused on the cost of staying and leaving, whereas normative commitment is higher in organizations that value loyalty and systematically communicate the fact to employees with rewards.

It is found that organizational commitment is negatively related to turnover intention and burnout, indicating that employees with better organizational commitment toward their organizations have lower possibility of leaving the organization and they will be less likely feeling overwhelmed or burnout at work (Cannon & Herda, 2016). Furthermore, highly committed employees usually contribute better organizational citizenship behavior and job performance (Sawitri et al., 2016).

B. Intrinsic Motivation

The term motivation can be classified into intrinsic and extrinsic motivation (Moldovan, 2014). Intrinsic motivation is

associated with personal interest, enjoyment, and satisfaction, while extrinsic motivation includes synthesis of goals, involvement, and extrinsic rewards or punishment (Ryan & Deci, 2000). In this study, the salary for firefighters in Taiwan cannot be risen in a huge manner, and extrinsic motivation is not the concern. In discussing the detailed definition of intrinsic motivation, Vallerand et al developed a tripartite model of intrinsic motivation in the year of 1992 with three dimensions: intrinsic motivation to know, intrinsic motivation toward accomplishments, and intrinsic motivation to experience stimulation. IM to know indicates the pleasure and the satisfaction that one experiences while learning, exploring, or trying to understand something new, IM toward accomplishment is for the pleasure and satisfaction experienced when one attempts to accomplish or create something, and IM to experience stimulation is about engaging in an activity in order to experience stimulating sensations (Pelletier & Tuson, 1995).

From the previous studies, it is found that the levels of emotional commitment, continuance commitment and normative commitment increase if the intrinsic and extrinsic motivation levels of the teachers increase. (Çınar & Saraçlı, 2015), and the finding of significant correlation between intrinsic motivation and organizational commitment suggests that the factors the individual considered in making a job choice, as well as whatever is experienced on the job, are predictive of subsequent commitment and the hypothesis that positive relationship between intrinsic decision factors and commitment was also supported (O'Reilly & Caldwell, 1980).

Hypothesis 1: Intrinsic motivation has no effect on organizational commitment

C. Transformational Leadership

Transformational leaders are those leaders who provide visions and expectations to their subordinates instead of using rewards and punishments (Robbins, 2015). The transformational leader motivates followers to do more than originally expected. Such a transformation can be achieved by raising an awareness of the importance and value of designated outcomes, getting followers to transcend their own self-interests, and altering or expanding followers' needs on Maslow's hierarchy of needs (Hater & Bass, 1988). In Bass model of leadership, four dimensions comprise transformational leadership behavior (Avolio & Bass, 1995) including individualized consideration, intellectual stimulation, inspirational motivation, and idealized influence. Individualized consideration demonstrates the leader's trait of understanding that each individual has different needs, abilities, aspirations, and requires personal attention, builds a one-to-one relationship with his or her followers, intellectual stimulation indicates the ability of stimulating followers to think about old problems in new ways (Bass, 1985), inspirational motivation describes how transformational leaders shows the followers how to achieve the goals, and has the ability to motivate the followers to outstanding performance, and idealized influence

means role modeling for the follower around the leader and such leaders are regarded as a role model either because they exhibit certain personal characteristics, attitudes or charisma. The idealized influence is divided into idealized attributes and idealized behaviors.

Based on previous studies, transformational leadership (TL) is positively corrected with organizational commitment (OC) of the followers (Mert et al., 2010), and the relationship is significant (Tseng & Kang, 2008). Research has it said that employees will be more committed when their leaders demonstrate the leadership of transformational style. An existent case in India also incitates the linkage between TL and subordinate's OC (Rai & Sinha, 2000).

Hypothesis 2: Transformational leadership has no effect on Organizational Commitment

III. RESEARCH METHOD

Intrinsic motivation, transformational leadership, organizational commitment (ITO) Model is developed to build an integrated systematic framework of this study. To test the framework, the researcher will examine the directions and significance between the variables. If significant relationship is explored, the null hypotheses can be rejected. That is, it can be known that the intrinsic motivation and transformational leadership do have effects on organizational commitment.

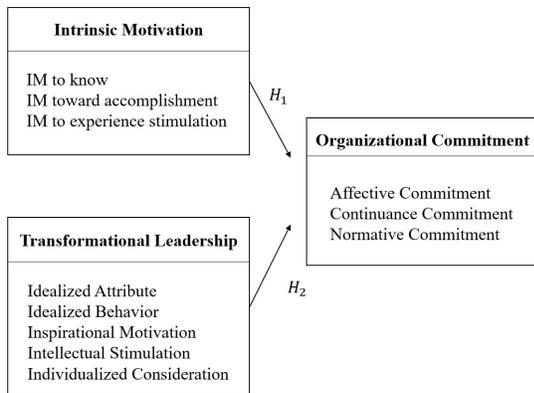


Fig.1 Research Framework, ITO Model Developed by Shih and Tsai

The total population is calculated at the number of 13,511 by the end of 2015. For the samples of pilot test. The researcher applied snowball sampling strategy by making connections with acquainted firefighters and request them to deliver the questionnaires to their team members. 37 samples were collected for the pilot test. After reliability and internal validity test of the questionnaire was executed, the researcher visited fire departments personally for collecting samples and regarding to departments in other counties, the researcher delivered the online questionnaire link via E-mail to receive samples. The data were collected by both paper-based and online-based questionnaire and out of 150 collected data, 126 valid samples are received ultimately. The instrument consists of 4 variables with total amount of 56 questions. All items in the

questionnaires were measured on a five-point Likert scale (1=strongly disagree; 5=strongly agree). Regarding to the adoption of questionnaires, the research applied.

TABLE I
ADOPTED QUESTIONNAIRE FOR INTRINSIC MOTIVATION, TRANSFORMATIONAL LEADERSHIP, AND ORGANIZATIONAL COMMITMENT

Variables	Dimensions	Total Items	Adopted from
Intrinsic Motivation	IM to know IM toward accomplishment IM to experience stimulation	12	Pelletier & Tuson (1995)
Transformational Leadership	Individualized Consideration Inspirational Motivation Intellectual Stimulation Idealized Attribute Idealized Behavior	20	Avolio & Bass (1995)
Organizational Commitment	Affective Commitment Continuance Commitment Normative Commitment	24	Allen & Meyer (1990)

IV. DATA ANALYSIS

A. Validity and Reliability

Convergent validity refers to the AVE (Average Variance Extracted) values of PLS results, the value of AVE or above 0.5 is considered acceptable (Fornell & Larcker, 1981; Bagozzi & Yi, 1988). Table 1 showed that the AVE values of each construct are higher than 0.5 expect for intrinsic motivation (0.924), transformational leadership (0.863), and organizational commitment (0.670). The AVE values that are over 0.5 represents the indicator of one construct converge are well.

Cronbach's Alpha and composite reliability (internal consistency) values were obtained for the reliability of the data in Table 1. All of the Cronbach's Alpha values of each dimension are greater than 0.7 which are represented excellent.

Factor loadings represented the individual items reliabilities. Loadings of 0.5 or greater may be acceptable if there are additional indicators to describe the latent construct (Chin, 1998); items with loading of 0.5 or greater are retained. From Table 2, all loadings were greater than 0.5. However, the factor loading of dimension OC_C (0.618) is relevantly low, but it still passed the standard of 0.5.

TABLE II
FACTOR LOADINGS AND INTERNAL CONSISTENCY RELIABILITY ANALYSIS VIA PLS

Constructs	Items Remaining	Factor Loading	Composite Reliability	Cronbach Alpha	AVE	R ²
Intrinsic Motivation	IM_K	0.957	0.973	0.959	0.924	
	IM_A	0.962				
	IM_S	0.966				
Transformational Leadership	TLI_C	0.936	0.969	0.961	0.863	
	TLI_S	0.916				
	TLI_M	0.929				
	TLI_A	0.950				
	TLI_B	0.914				
Organizational Commitment	OC_A	0.904	0.858	0.764	0.670	53.5%
	OC_C	0.618				
	OC_N	0.906				

Note: IM_K = to Know, IM_A=Toward Accomplishment, IM_S=to Experience Stimulation, TLI_C=Individualized Consideration, TLI_S=Intellectual Stimulation, TLI_M=Inspirational Motivation, TLI_A=Idealized Attribute, TLI_B=Idealized Behavior, OC_A=Affective, OC_C=Continuous, OC_N=Normative.

B. Partial Least Square

PLS path-modeling algorithm is a type of SEM technique and was developed by Herman Wold in 1975. It allows the simultaneous modeling of relationships among multiple constructs, and estimates path models using latent variables. PLS also permits the analysis of a system of constructs. Moreover, it has the ability to handle complicated model based on exploratory research. Therefore, this study used PLS as data analysis because it reflects the relationship between variables and measurement of construct. Moreover, the Path coefficients values, which are used to judge the relationship between variables and determine the direction of the relationships and its significance (Hair, et al., 2011), were also tested by using SmartPLS 3.0.

C. Bootstrapping

Bootstrapping is used to test whether the sample would be significant or not, by duplicating the sample and retrieve the t-value. Henseler, Ringle, and Sinlovics (2009) indicated that bootstrapping assumes that the sample is reasonably repeated of the assumed population distribution, so the estimated coefficient in the PLS-SEM could be tested for their significance. The result, such as the t-value and the path coefficient were estimated by using the bootstrapping samples of PLS algorithm. The t-values for the two-tailed test, 1.65, 1.96, and 2.58, representing weak, moderate, and strong relations (Hair et al., 2011). Therefore, the significance of relationship between variables can be assessed.

D. Results of Hypothesis Testing

Table 3. showed the results of the multivariate test of the structural model. To test the effects between variables, the path coefficient and their respective t-values are examined. Path coefficients values are suggested more accurate than correlations since they account for mediating and indirect casual paths (Bontis & Fitx-enz, 2002). Referring to Table 3., all of the path coefficients for this study’s variables were greater than 0.5, which were considered meaningful on the basis of guidelines (Chin, 1998). These paths also provided the magnitude and direction of effects, and the results showed all of them have positive influences that rejected the null hypotheses.

TABLE III
EMPIRICAL RESULT OF PLS PATH ANALYSIS (HYPOTHESIS, STANDARDIZED BETA COEFFICIENTS AND ADJUSTED T-VALUES)

Path	Hypothesis	β-path	Adj. t-value	Sig.	Dir.	Results
IM → OC	H1	.681	13.108	***	+	Rejected
TL → OC	H2	.137	2.024	**	+	Rejected

Note: IM=Intrinsic Motivation; TL=Transformational Leadership; OC=Organizational Commitment.
*p<0.10; ** p<0.05; *** p<0.001.

Null hypothesis 1 concerned that there is no effect between intrinsic motivation and organizational commitment. The results showed that there is a positive effect of intrinsic motivation on organizational commitment (β = .681, p < .001). Thus, null hypothesis 1 was rejected. Transformational leadership also has a positive effect on organizational commitment (β = .137, p < .05). Thus null, hypothesis 2 was rejected. Regarding to the extent of how much intrinsic motivation and transformational leadership can explain organizational commitment, intrinsic motivation and transformational leadership together accounts for 53.5% of variance of organizational commitment.

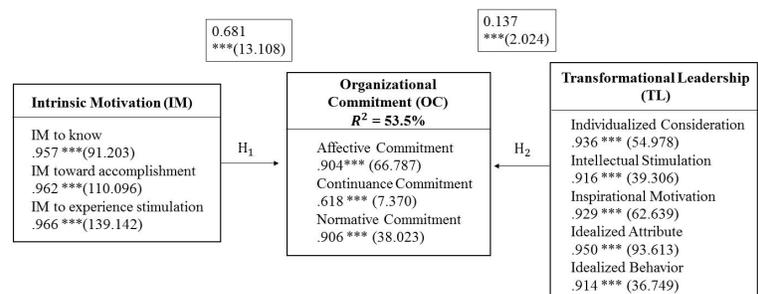


Fig.2 ITO Integrated Model, results via SmartPLS3.0

V. CONCLUSION

By comparing means and examining correlation table, the results do not indicate correlations between age and intrinsic motivation or tenure and intrinsic motivation. However, during the interviews with senior firefighters, they told the researcher that most of firefighters decided to take the job because they believe the job itself is meaningful and crucial, but as they get

older and have children, they are losing their intrinsic motivation and external factors such as stable job are the real motivators driving them to work. Nonetheless, from the result of data analysis, it can be inferred that intrinsic motivation is positively correlated with organizational commitment and the effect is strong ($t = 13.108$). Thus, it is important to inspire firefighters' intrinsic motivation on work. It is suggested to provide professional trainings and emphasize the meaning and the importance of the job. Other than that, give beautiful visions and appreciate firefighters' hard-work in order to help firefighters remain their intrinsic motivation. With regard to the other factor transformational leadership, it is found that firefighters can be more committed to their organization when they perceive their leader as transformational leaders ($t = 2.024$). Unfortunately, out of 126 samples, the mean value of transformational leadership (3.04) is relevantly low compared to intrinsic motivation (3.99) and organizational commitment (3.51). This implies that the firefighters participating in this study either do not consider their leader as transformational leaders or are not satisfied with their leaders. That is to say, the leadership part in fire departments should be improved if committed firefighters are needed.

Intrinsic motivation has a greater effect on firefighters' commitment toward their organization than transformational leadership does. Therefore, intrinsic motivation is a critical matter and it should be managed properly when recruiting and retaining talents in fire departments. Now that intrinsic motivation is correlated with organizational commitment strongly and positively, it can be an indicator or predictor that tells whether a firefighter will stay and devote himself to self-development and the organization or behave social loafing. Instead of only focusing on paper examinations, during the process of recruiting and selecting firefighters, it is important to evaluate their motivation such as how they desire to know and learn firefighter's job-related techniques, to accomplish their missions, and to experience challenges. Examine whether their characteristics and traits are suitable for the position.

Transformational leadership, not as effective on organizational commitment as intrinsic motivation, is also a profound factor that affects firefighters' commitment toward their job and fire departments. Among those five sub-dimensions under transformational leadership, the leaders' individualized consideration (2.97), inspirational motivation (2.85), and idealized attribute (2.91) are not obviously perceived. In order to improve firefighters' organizational commitment, leaders have to consider the different need for each individual rather than the collective. They can spend time coaching and teaching and getting familiar with every team members. In fire departments, leaders should build out their personal charisma and act as a role model to enhance their idealized attribute. Besides, leaders can motivate their team members by sharing their visions and goals that everybody has to accomplish and show their confidence in achieving those things. Remind firefighters how significant and meaningful their job is.

LIMITATION

From the collected samples, most respondents are male firefighters (92.1%) and female firefighters only accounts for 7.9%. This may cause some bias because the received opinions mostly come from male firefighter's perspective. Nevertheless, this percentage quite much reflects the real ratio between male and female firefighters. Secondly, the samples were collected by means of snowball sampling or convenient sampling instead of equally distributed to each fire department. Therefore, the researcher is not able to compare whether there are differences between the firefighters in the urban area and those in the countryside area. The third limitation is self-reported issue, which means that respondents may answer the questions subjectively rather than report their situation or status according to the reality because for example, when a firefighter rated 4 and 5 at the level of their intrinsic motivation, the research cannot find a third party to oversee whether the participant is really enthusiastic in their work. Finally, during the interviews with firefighters, many of them mentioned the importance of teamwork and this factor is not included in the study. For future research related to this topic, the researcher suggests that teamwork should be involved and considered as a variable. In this study, supervision was discussed, but relationship with team members or coworkers were not.

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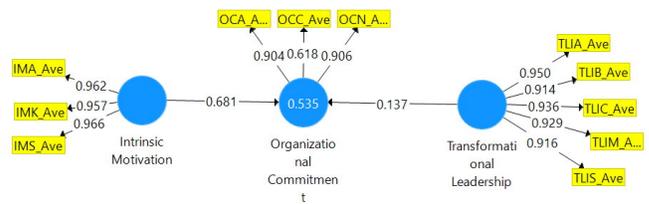


Fig.3 ITO Integrated Model, results of algorithm via SmartPLS3.0



Fig.4 ITO Integrated Model, results of bootstrapping via SmartPLS3.0