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# A cross-level analysis of organizational creativity climate and perceived innovation

Creativity  
climate and  
innovation

## The mediating effect of work motivation

55

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### Abstract

**Purpose** – The concept that creativity climate facilitates innovation outcome is well-received, yet it has not been widely tested in non-Western countries. To fill the gap between concept and practical value, this study adopted the eight-dimensional model of organizational creativity climate proposed by Amabile and associates with the aim of investigating the cross-level relationship between creativity climate and employee-perceived innovation in an Asian work place, i.e. Taiwan.

**Design/methodology/approach** – Using survey data of 398 employees from different companies of Taiwan, the effect of organizational creativity climate on innovation was explored. Furthermore, the mediating effect of employees' work motivation was also examined.

**Findings** – By employing hierarchical linear modeling (HLM), statistical analysis indicates that 27 percent variance of perceived innovation could potentially be explained by creativity climate. Five out of the eight dimensions, namely, organizational encouragement, supervisory encouragement, work group support, sufficient resource and challenging work, relate significantly to perceived innovation with the mediation of work motivation.

**Research limitations/implications** – As most companies are reluctant to reveal their objective innovation data, the authors had to rely on self-reported data that are inevitably subjective in nature. Moreover, the fact that only 13 organizations were sampled may weaken the generalizability of the findings to more diverse business contexts.

**Originality/value** – The findings of this study contribute to advancing organizational climate research and innovation management in a non-Western country. In addition, by surveying this topic in an innovation-active context, i.e. Taiwan, this study uncovers rich information on organizational creativity issues for interested parties and for future research.

**Keywords** Organizational innovation, Creativity climate, Work motivation, Perceived innovation

**Paper type** Research paper

### 1. Introduction

Innovation is increasingly recognized as a key source of sustainable competitive advantage that organizations can use to cope with the rapidly changing economic environment. The concept of innovation has attracted the attention of numerous



scholars and practitioners from various disciplinary perspectives. Studies have suggested that creativity and innovation in products, work processes, and services are key contributors to long-term organizational survival and success (Amabile *et al.*, 1996; Lin and Chen, 2007; Martin and Terblanche, 2003; Shalley, 1995; Zhou and Shalley, 2008).

Creativity, namely, the ability to produce novel work, is considered to be both the starting point and the root of innovation (Amabile *et al.*, 1996; Shalley and Perry-Smith, 2001). Previous studies on creativity development have mainly focused on individual factors, including intelligence (Cropley, 1966; Sternberg and O'Hara, 1999), personality (Helson, 1996), cognition (Runco, 1986), and methods of improving individual creativity (Amabile, 1982). In addition to personal qualities, many studies have attempted to identify work environments and social climates that may foster or impede innovation in a working setting (Shalley *et al.*, 2004; Wongtada and Rice, 2008).

Studies on work-related environmental features have been brought together under the general heading of "climate" which has also been defined as a set of shared views regarding individuals' perceptions of organizational policies, practices and procedures (Patterson *et al.*, 2004). The past two decades have seen growing research interest in studying creativity climate or the climate for innovation. The literature suggests that the combination of a supportive and challenging environment sustains particularly high creativity in individuals and organizations (see McLean, 2005, for a review).

Some studies have supported a direct link between creativity climate and performance (Abbey and Dickson, 1983; Baer and Frese, 2003). Although a positive relationship between climate and performance was well received, its inconsistent research results persist. In an investigation of research excellence in 14 universities, West *et al.* (1998) found that climate was not a predictor of research performance and questioned whether climate perception and description are a consequence rather than a cause of organizational performance. Seibert *et al.* (2004) also failed to identify a significant relationship between empowerment climate and individual job performance. The inconsistency may possibly result from the mediating effect of various variables such as perceived justice, perceived organizational support, commitment, job involvement, job satisfaction and motivation (Patterson *et al.*, 2004). Among these variables, motivation in particular is seen as a crucial mediator of the relationship between climate and performance. Several authors have argued that context influences creativity and organizational productivity via employee motivation (Amabile *et al.*, 1996; Parker *et al.*, 2003; Patterson *et al.*, 2004; Shalley and Gilson, 2004). Although Kopelman *et al.* (1990) proposed that the cognitive state of work motivation mediated the relationship between climate and outcomes, few works have empirically tested its mediating effect on the aforementioned relationship (Carr *et al.*, 2003; Shalley and Gilson, 2004). As a result, this study attempts to test the effect with real data.

Since multilevel theories have emerged as highly effective models for mapping organizational phenomena (Drazin *et al.*, 1999), multilevel management research designs and analyses have been widely used recently with the thinking that variables basically reside at multiple levels. Hitt *et al.* (2007) also pointed out that a micro or a macro lens alone yields incomplete understanding at either level. The variables under investigation in this study contain both organizational and individual levels; therefore we employed the cross-level analysis to reflect the nature of the data source.

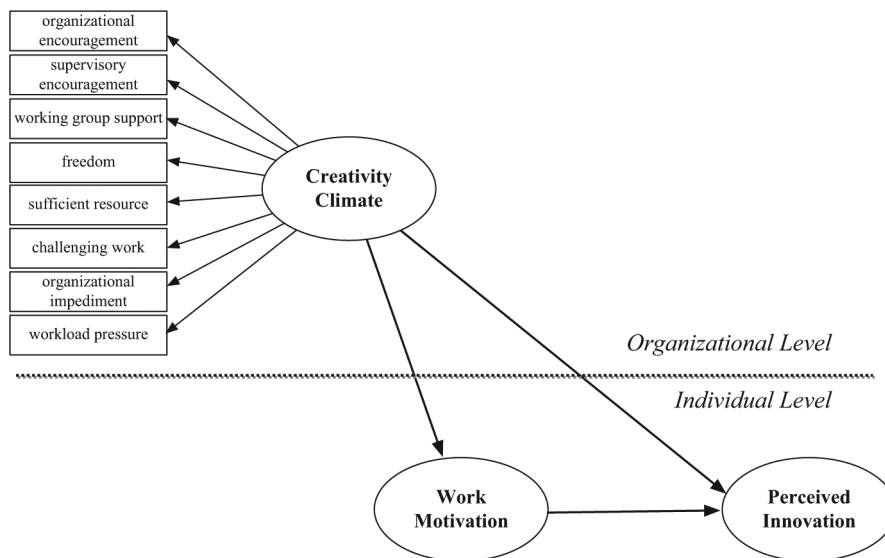
This research addresses an important problem of organizational behavior in the contemporary business environment; that is, the influence of organizational context on innovation. Specifically, this study aims to model the cross-level influences of organizational creativity climate on perceived innovation, and the mediating effect of work motivation on this relationship. The hypothesized model is depicted in Figure 1.

The potential contribution of this research is the uncovering of relationship between organizational creativity climate and perceived innovation in an Asian work setting. While Asia has an expanding role in the global economy, several authors advocated inquiry relevant to innovation among organizations in Asia (Drazin and Schoonhoven, 1996; Farmer *et al.*, 2003). In addition, because multinational companies are increasingly moving knowledge-creative work to Asian countries (Yeung, 2007), how to operate in countries with the dominant Asian Confucius culture becomes an issue worthy of investigation. The added value of conducting such study in Taiwan includes that Taiwan carries the traditional Confucius values and is an innovation-active economy, ranked as the second place in patent productivity by IMD (Institute for Management Development) World Competitiveness Yearbook (2008). Hopefully, research results of this study may shed some light for organizations that aspire to obtain competitiveness through innovation.

## 2. Literature review

### 2.1 Creativity climate

Studies on work-related environmental features have been brought together under the general heading of “climate” (Patterson *et al.*, 2004). Ekvall (1991) defined climate as “the observed and recurring patterns of behavior, attitudes and feelings that characterize life in an organization.” Climate has also been defined as a set of shared views regarding individuals’ perceptions of organizational policies, practices and procedures (Patterson *et al.*, 2004). To be specific, organizational climate is a property



**Figure 1.**  
Hypothesized model

of the organization itself and represents employees' descriptions of an area of strategic focus or organizational functioning (Parker *et al.*, 2003). Literature review shows that there is great interest in particular climate foci; examples include climate for safety (Baer and Frese, 2003), ethical climate (Wimbush *et al.*, 1997) and service climate (Schneider *et al.*, 1998; Tsai and Wu, 2001), procedural justice climate (Naumann and Bennett, 2002) and organizational climate that are characterized by fairness, innovativeness and affiliation (Brock *et al.*, 2005).

Theories regarding creativity climate have attempted to identify aspects of work environments that facilitate creativity, mainly from organizational perspective (Amabile *et al.*, 1996). Ekvall and Ryhammar (1999) argued that creativity climate composes of challenge, freedom, and support; in addition, it encourages openness and the tolerance of uncertainty. By discerning the importance of environment, Amabile's componential model (1988) of organizational creativity identified contextual components as essential to creativity climate, such as encouragement of creativity, autonomy, freedom, resources, pressures, and organizational impediments to creativity. This theoretical model led to the development of the "KEYS: Assessing the Climate for Creativity" as an instrument assessing organizational creativity climate that could facilitate interventions to promote innovation within organizations. Woodman *et al.* (1993) took a similar perspective on Amabile's view and comment further that an important feature of creativity context is its ability to address influences across different levels which can enhance or inhibit creative behavior in complex social systems. In addition, by integrating psychological and sociological descriptions of creativity, Ford (1996) proposed a theory of individual creative action within organizational settings. He pointed out that creativity in organizational settings could best be conceived in terms of creative actions that may be simultaneously influenced and assessed across multiple social domains within and between levels of analysis.

Although climate perception originates from individuals, organizational members are typically exposed to the same work environment and other proximal influence. These perspectives regard creativity climate as employees' shared perceptions about the structure and practices occurring in organizations. Once a work unit establishes a distinct character, it may result in greater homogeneity among unit members' attitude and values and how they perceive the organization (Seibert *et al.*, 2004), the same rule expands to the whole organization. With the rationale that climate more often refers to the whole organization, this study labeled creativity climate as an organizational-level construct. In addition, the organizational level of creativity climate covers both the social environment and work environment that influence the work carried out in organizations (Amabile *et al.*, 1996).

### *2.2 Creativity climate and perceived innovation*

The main purpose of an organizational climate study is to identify the variables which result in an organization's ability to mobilize its workforce in order to achieve business goals and enhance performance (see Abbey and Dickson, 1983; Baer and Frese, 2003; Denison, 1990). Various studies have proposed the link between organizational climate and outcome (Abbey and Dickson, 1983; Baer and Frese, 2003; Ekvall and Ryhammar, 1999; Payne and Pugh, 1976). Particularly, some studies proposed that creativity

climate was an important predictor of organizational performance (see Amabile *et al.*, 1996; Ekvall, 1996). Ismail (2005) found creative climate influence firm's innovation. Similarly, Tsai and Kao (2004) surveyed 254 employees from Taiwanese enterprises in which the employee have higher innovative behaviors when they perceived higher organizational creativity climate. Chiou (2002) also reported that organizational creativity climate influence teachers' creativity performance at campus. However, previous researches were mainly constructed at the same level, either individual level or aggregating data for organizational level analysis.

With complex and dynamic organizational phenomena, adopting either a micro (individual) or a macro (organizational) stance yields an incomplete understanding of organizational behaviors (Porter, 1996). Therefore, scholars recommended applying multilevel designs to draw our attention to the social context in which behavior occurs in organizations (Hitt *et al.*, 2007; Klein *et al.*, 2000). To our knowledge, there have been relatively few studies employing multilevel perspective to investigate the relationship between organizational creativity climate and individual level outcome.

Generally speaking, there is emerging evidence that psychological perceptions of workplace innovation are likely to provide the drive for better performance (Amabile *et al.*, 1996). That is, workplace innovation may represent performance to a certain extent. Isaksen *et al.* (1999) asserted that climate for creativity promotes the generation, consideration, and use of new products, services and ways of working, as creativity climate supports the development, assimilation, and utilization of new and different approaches and concepts. Amabile's componential model (1988, 1996) of organizational creativity focuses on individual work-environment perception that influence the creativity of organizations. Based on this model, Amabile identified two major organizational contextual dimensions as essential to creativity climate, namely, environmental stimulants and obstacles. The stimulants are hypothesized to encourage organizational creativity and consist of six factors, namely, organizational encouragement, supervisory encouragement, work group supports, freedom, sufficient resources, and work challenge. Two factors, named "organizational impediments" and "workload pressure," are considered to hinder creativity.

Outcome can be assessed objectively or subjectively. Although assessing objective outcome is sometimes preferred, Allen *et al.* (2008) asserted that subjective (perceived) measure permit a broader range of evaluations and a richer description of the effectiveness of an organization that enable more organizations to be compared within a single study. Therefore, this study conceives employee-perceived innovation as a subjective outcome indicator to test its relationship with creativity climate. On the basis of the aforementioned arguments, we hypothesize that:

- H1.* Organizational creativity climate is significantly associated with perceived innovation.
- H1a.* Creativity stimulants (organizational encouragement, supervisory encouragement, work group supports, freedom, sufficient resources, and work challenge) are positively associated with perceived innovation.
- H1b.* Creativity obstacles (organizational impediments and workload pressure) are negatively associated with perceived innovation.

*2.3 Mediating role of work motivation*

Creative workplace behaviors are fostered by a cognitive combination of both personal qualities and work-environment factors (West and Richards, 1999). Climate affects individual and organizational performance by modifying psychological processes (Isaksen *et al.*, 2001) and has long been recognized as a significant influence on employee cognitions, attitudes and behavior (Hofmann, 1997).

Amabile (1988) regarded that creativity, expertise and creativity skills must be accompanied by motivation to produce highly creative behavior. In fact, many studies indicate that creative behavior is influenced by employee motivation (Brown and Leigh, 1996; Griffin and Neal, 2000; Oldham and Cummings, 1996; Shalley and Gilson, 2004; Shalley *et al.*, 2004). Although studies on creativity have identified critical contextual variables that contribute to innovative performance, the psychological mechanisms through which these factors influence creative performance have not yet been systematically investigated (Choi, 2004). While the arguments were important in proposing that work motivation mediates the relationship between organizational climate and individual behaviors, it was limited in its empirical findings on creativity related issues.

Pintrich and Schunk (1996) described motivation as involving processes that occur when individuals instigate and sustain goal-directed actions. Work motivation is also defined as the degree of self-motivation required for employees to perform effectively and efficiently on their job in a work context (Ambrose and Kulik, 1999; Williams and Yang, 1999). To facilitate employees' work motivation, job design has long been considered an important contributor to employee work motivation, performance and satisfaction (Mitchell, 1982). Job Characteristics Theory (JCT) is conceptualized as a comprehensive model with five-core job dimensions, namely skill variety, task identity, task significance, autonomy and feedback. This model predicted that under certain conditions individuals who valued and experienced a job high on these dimensions were more likely to exhibit high work motivation, better attendance, greater productivity and report higher levels of job satisfaction.

Since scholars posited the importance of examining the possible mediating role of work motivation in the performance model (Kopelman *et al.*, 1990; Patterson *et al.*, 2004) and Amabile (1996) reported that psychological perceptions of organizational creativity climate are likely to influence employee motivation to generate new ideas, we hypothesize that:

- H2.* Employee's work motivation mediates the relationship between organizational creativity climate and perceived innovation.

### **3. Methods**

#### *3.1 Samples*

This study was conducted in Taiwan, surveying three different industrial sectors, including high-tech (about 50 per cent), manufacturing (about 32 per cent) and service (about 18 per cent) companies. A total of 398 respondents from 13 companies returned valid data, representing a response rate of 67 per cent. Among the subjects, 92 per cent had university and above education, 236 (59 per cent) were male and 162 (41 per cent) were female. The mean age was 38 with a range of 20-65 years. The mean tenure was approximately four years with about a quarter having worked less than 3 years, and

one-third over ten years. The respondents performed different work functions, including administration, human resource, marketing, R&D and sales. In terms of job position, about 46 per cent were managers. Please refer to Table I for the sample profile.

### 3.2 Measures

*Organizational creativity climate.* This study adopted the KEYS: Assessing the Climate for Creativity (Amabile *et al.*, 1996) for it measures climate that facilitates innovation. Having obtained authorization from the Center for Creative Leadership (CCL) to utilize this measurement, the translation and back translation procedures was taken to validate the Taiwan version KEYS instrument. No major differences between the translated and the original version were observed (Tseng and Liu, in press). As presented in Table II, eight factors were identified as essential to creativity climate, namely organizational encouragement, supervisory encouragement, work group support, freedom, sufficient resource, challenging work, organizational impediments, and workload pressure. The first six variables address the environment stimulants, while the last two are impediments. All the items are on a four-point Likert scale. The

Characteristic	Number	Percentage
<i>Gender</i>		
Male	236	59.3
Female	162	40.7
<i>Age</i>		
< 25	55	13.8
26-35	211	53
36-45	101	25.4
46-55	30	7.5
> 55	1	0.3
<i>Education</i>		
High school	32	8.0
University	269	67.6
Graduate school	97	24.4
<i>Job tenure</i>		
< 3 years	92	24.4
3-6	90	23.1
7-10	80	22.6
11-15	55	20.1
> 15	81	13.8
<i>Job position</i>		
Manager	182	45.8
Administrative staff	216	44.2
<i>Industry</i>		
High-tech	198	49.7
Manufacturing	129	32.4
Service	71	17.8

**Table I.**  
Distributions of  
respondent  
characteristics



Dimension and factors	Description	Sample Item
<i>Stimulant dimensions</i>		
Organizational encouragement	An organizational culture that encourages creativity through the fair, constructive judgment of ideas, reward and recognition for creative work, mechanisms for developing new ideas, and active flow of ideas, and a shared vision of what the organization is trying to do	People are encouraged to solve problems creatively in this organization
Supervisory encouragement	A supervisor who serves as a good work model, sets goals appropriately, supports the work group, values individual contribution and shows confidence in the work group	My supervisor serves as a good work model
Work group supports	A diversely skilled work group in which people communicate well, are open to new ideas, constructively challenge each other's work, trust and help each other, and feel committed to the work they are doing	There is free and open communication within my work group
Freedom	Freedom in deciding what work to do or how to do it; a sense of control over one's work	I have the freedom to decide how I am going to carry out my project
Sufficient resources	Access to appropriate resources, including funds, materials, facilities, and information	Generally, I can get the resources I need for my work
Challenging work	A sense of have to work hard on challenging tasks and important projects	I feel challenged by the work I am currently doing
<i>Obstacle dimensions</i>		
Organizational impediments	An organizational culture that impedes creativity through internal political problems, harsh criticism of new ideas, destructive internal competition, an avoidance of risk, and an overemphasis on the status quo	There are many political problems in this organization
Workload pressure	Extreme time pressure, unrealistic expectations for productivity, and distractions from creative work	I have too much work to do in too little time

**Table II.**  
Theoretical eight  
dimensions of creativity  
climate

**Source:** Adopted from Amabile *et al.* (1996)

reported Cronbach's alpha of the original US version varied from 0.66 to 0.91, and the Taiwan version achieved a similar internal consistency ranging from 0.61 to 0.92 (Tseng and Liu, n.d., in press).

*Perceived innovation.* Perceived innovation measures employees' perceived innovativeness in the workplace. This study adopted five items from Amabile's *et al.* (1996) criterion scale to describe employee's perception of organizational innovation in

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this paper. An item example is “My area in this organization is innovative” The Cronbach’s alpha of this construct is .81 in this study.

*Work motivation.* This study adopts seven items from the Job Diagnostic Survey (Hackman and Oldham, 1976), which have been found to correlate closely with the total score of the original scales based on the JCT model with the following formula to calculate the score for job motivating potential:

$$\frac{SkillVariety + TaskIdentity + TaskSignificance}{3} \times Autonomy \times Feedback$$

The Cronbach’s alpha of this construct is 0.76 in this study.

### 3.3 Analyses

As mentioned earlier, we would like to explore cross-level relationships between creativity climate at the organizational level of analysis, and perceived innovation and employee work motivation at the individual level of analysis. Yet, both analyses have potential empirical and conceptual weaknesses: disaggregation (individual level) provides biased standard errors estimates whereas aggregation (organizational level) weakens the statistical testing power and does not possess meaningful individual-level variance (Bliese, 2000; Klein *et al.*, 1994). To remedy these potential flaws, this study adopted hierarchical linear modeling (HLM 6.03) for it can test cross-level models and permit a researcher to model both individual- and organizational-level variance (Seibert *et al.*, 2004). In addition, this study follows the logic of traditional method to test the mediation effect (Baron and Kenny, 1986).

Since all data are self-reported, using the same questionnaire for the same period, common method variance may be a concern. Harman’s one-factor test was performed to test the presence of common method variance. An un-rotated principal component factor analysis yields 15 distinct factors having eigenvalue exceeding one, rather than a single factor. These factors together represented 61.52 per cent of the total variance; moreover, the first largest factor did not account for the majority of the variance (25.52 per cent), and so no general factor is apparent. The lack of an apparent general factor suggests that common method variance is insignificant and unlikely to confound the interpretations of the results.

### 3.4 Data aggregation

Parker *et al.* (2003) characterized organizational climate as a group-level construct, which may be measured by aggregating psychological climate perception. Other scholars also commented that if organizational members perceive the psychological climate similarly, it is legitimate to aggregate the individual perceptions to produce an indicator of organizational climate (James *et al.*, 1984; Kopelman *et al.*, 1990). As a result, this study collected creativity climate data from the same respondents and aggregated to a composite score for the subsequent analysis as an organizational-level variable.

As mentioned earlier, aggregation to the upper level weakens statistical testing power, overlooks meaningful individual-level variance, and possibly results in inappropriate inferences (Bryk and Raudenbush, 1989). Therefore, data of this nature require demonstrated between-units variability and within-unit agreement (Klein *et al.*,

1994). To check the potential for, and the appropriateness of, the aggregation of creativity climate, this study used James's *et al.* (1984) within-group agreement statistics ( $r_{wg}$ ) to justify aggregating individual member's responses.  $r_{wg}$  values  $\geq 0.70$  is generally considered as a sufficient agreement to warrant aggregation (James *et al.*, 1984, 1993; Klein and Kozlowski, 2000). In this study,  $r_{wg}$  the values ranged from .70 to .96.

To further justify aggregation of the individual data to the organizational level, intra-class correlation coefficient referred to ICC(1) as an indicator of within-group agreement (Bliese, 2000; Seibert *et al.*, 2004). The ICC(1) value of 0.41 ( $p < 0.001$ ) was based on a one-way analysis of variance (ANOVA) and the use of the Spearman-Brown formula (Bliese, 2000). Together, the  $r_{wg}$  and ICC(1) values justified the aggregation of creativity climate data to the organizational level.

#### 4. Results

Hofmann (1997) stated the first task of a hierarchical analysis is to show that significant between-groups differences exist for the dependent variables of interest. The result of data analysis provided evidence of significant between-groups variance in perceived innovation ( $\tau = 1.66, df = 12, \chi^2 = 115.95, p < 0.001$ ) and justified further cross-level analysis. Our further calculation showed that 27 percent variance of perceived innovation (level 1) could potentially be explained by creativity climate (level 2) predictor variables.

Tseng *et al.* (2009) suggested investigating various dimensions of creativity climate to uncover the influence of each individual variable on performance. Table III lists the descriptive statistics and zero-order correlations among the variables considered in this study. The table shows that all six creativity stimulants, including organizational encouragement, supervisory encouragement, working-group support, freedom, sufficient resources, and challenging work have a significant and positive correlation with perceived innovation; meanwhile, organizational impediments has a significant yet negative relationship with perceived innovation, and workload pressure. In addition, work motivation was positively related to the six creativity stimulants, but not to the two obstacle dimensions (organizational impediments and workload pressure).

Table IV reports the cross-level influence of the eight creativity climate dimensions and work motivation on perceived innovation. The baseline model, model 1, shows the significant positive effect of job position on perceived innovation. This could mean that employees with a higher job position perceived a more positive creativity climate and perceived innovation than those with no supervisory status. Work motivation is significantly related to perceived innovation ( $\gamma_{04} = 0.23, p < 0.001$ ) in model 2. Model 3 to model 10 show that the hierarchical regression coefficients of five dimensions of creativity climate are significant. That is, "organizational encouragement" was positively related to perceived innovation ( $\gamma_{10} = 0.32, p < 0.001$ ); so were "supervisory encouragement" ( $\gamma_{20} = 0.58, p < 0.001$ ); "work group support" ( $\gamma_{30} = 0.76, p < 0.001$ ); "sufficient resource" ( $\gamma_{50} = 0.92, p < 0.01$ ); and "challenging work" ( $\gamma_{40} = 0.87, p < 0.001$ ). Freedom and the two obstacle dimensions, organizational impediments and workload pressure, do not have significant effect on perceived innovation.

	Mean	s.d.	I_1	I_2	I_3	I_4	I_5	I_6	I_7	I_8	II
I. Organizational creativity climate											
1 Organization encouragement	2.55	0.52									
2 Supervisory encouragement	2.49	0.51	0.69**								
3 Work group support	2.79	0.50	0.78**	0.66**							
4 Freedom	2.20	0.50	0.34**	0.32**	0.30**						
5 Sufficient resources	2.52	0.45	0.58**	0.56**	0.52**	0.37**					
6 Challenging work	2.66	0.58	0.64**	0.47**	0.55**	0.26**	0.41**				
7 Organizational impediments	2.14	0.38	-0.35**	-0.46**	-0.33**	-0.34**	-0.31**	-0.03			
8 Workload pressure	2.30	0.38	-0.13**	-0.22**	-0.14**	-0.39**	-0.24**	0.13**	0.48**		
9 Work motivation	16.04	8.26	0.39**	0.34**	0.36**	0.34**	0.29**	0.55**	-0.00	0.04	
10 Perceived innovation variable	2.50	0.58	0.73**	0.53**	0.61**	0.28**	0.42**	0.71**	-0.12**	0.01	0.50**

Notes: \* $p < 0.01$ , \*\* $p < 0.01$

**Table III.**  
Descriptive statistics and  
correlations of variables

**Table IV.**  
Cross-level analysis of  
creativity climate on  
perceived innovation

	Dependent variable: perceived innovation									
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8	Model 9	Model 10
<i>Control variable</i>										
Education	$\gamma_{01}$ 0.29	0.19	0.22	0.24	0.17	0.30	0.27	0.32	0.27	0.28
Job tenure	$\gamma_{02}$ 0.01	-0.09	-0.03	-0.00	-0.02	0.00	-0.01	0.00	0.00	0.01
Job position	$\gamma_{03}$ 0.68**	0.21*	0.74**	0.66*	0.72**	0.69*	0.70**	0.68*	0.69*	0.68*
<i>Level 1</i>										
Work motivation	$\gamma_{04}$	0.23**								
<i>Level 2</i>										
Dimensions of creativity climate										
<i>Stimulants dimensions</i>										
Organizational encouragement	$\gamma_{10}$		0.32**	0.58**						
Supervisory encouragement	$\gamma_{20}$				0.76**					
Work group support	$\gamma_{30}$					0.60				
Freedom	$\gamma_{40}$						0.92*			
Sufficient resources	$\gamma_{50}$							0.87**		
Challenging work	$\gamma_{60}$									
<i>Obstacle dimensions</i>										
Organizational impediments	$\gamma_{70}$								-0.26	
Workload pressure	$\gamma_{80}$	2.52**	1.42**	0.09	0.72**	2.37**	1.47**	0.46*	2.62**	2.68**
$\tau_{00}$		6.58	5.12	6.62	6.59	6.58	6.59	6.60	6.58	6.58
$\sigma^2$										

**Notes:** \*  $p < 0.01$ , \*\*  $p < 0.01$

The next set of analysis was conducted to test a cross-level mediation hypothesis stating that work motivation (a level-1 variable) will respectively mediate the effects of eight dimensions of creativity climate (a level-2 variable) on perceived innovation. In order for this mediation hypothesis to be supported, three preconditions must be met (Baron and Kenny, 1986). That is, significant relationships need to be established between the independent variable and the dependent variable, between the independent variable and the mediating variable and between the mediating variable and the dependent variable (Hofmann and Stetzer, 1996; Seibert *et al.*, 2004). Given these three conditions, the mediation effects would be supported if the relationship dynamics between the eight dimensions of creativity climate and perceived innovation were to exhibit a decrease or were no longer significant, when work motivation was included in the model.

The first precondition – direct relationship between the eight dimensions of creativity climate and perceived innovation – is displayed in Table IV model 3 to model 10 and repeats in Table V for easier reference. The second precondition for mediation is a positive relationship between the eight dimensions and work motivation. As Table V model 11 to model 16 indicate, the hierarchical regression coefficients of all six creativity climate stimulants (organizational encouragement =  $\gamma_{10}0.38p < 0.001$ ; supervisory encouragement  $\gamma_{20}=0.71p < 0.001$ , work group support  $\gamma_{30}=1.01p < 0.001$ , freedom  $\gamma_{40}=1.96p < 0.001$ , sufficient resource  $\gamma_{50}=1.37p < 0.01$  and challenging work  $\gamma_{60}=1.45p < 0.001$ ) reach significant level, but not the two obstacles.

The third precondition for mediation was the presence of a positive relationship between work motivation and perceived innovation. The result shows a significant and positive relationship for all dimensions. Yet, Baron and Kenny's (1986) mediation testing reveals that only five dimensions (organizational encouragement, supervisory encouragement, work group support, sufficient resource and challenging work) have partial mediation effects, the remaining three dimensions (freedom, organizational impediments and workload pressure) are insignificant.

## 5. Discussion

The purpose of the present study was to employ a cross-level framework to investigate the relationship between creativity climate (an organizational-level construct) and perceived innovation at the individual level in a non-western setting. Moreover, we used cross-level analysis to further examine the mediating effect of work motivation on the creativity climate-innovation relationship as proposed by Kopelman *et al.* (1990). Our findings support the previously untested proposition that the positive impact of creativity climate on innovation is actually partially mediated by work motivation in an innovation-active Asian culture. In other words, beyond providing an empirical support for earlier conceptual proposition of creativity climate-innovation relationship, this study also confirms the role of work motivation as an important mediating link. Specifically, employees who perceive creativity climate in their organization are more likely to engage in higher level of work motivation, which in turn positively impacts their perception of organizational innovation.

The mechanism underlying the impact of creativity climate on perceived innovation may be explained by “ambient stimuli” (Hackman, 1992); that is, members' exposure to

**Table V.**  
HLM analyses of  
cross-level mediation of  
work motivation between  
each creativity climate  
dimension and perceived  
innovation

Model	Independent variable		Perceived innovation		Dependent variable		Perceived innovation		Mediating effect
	Mean	SD	Mean	SD	Mean	SD	Mean	SD	
11	Level 2	Organizational encouragement	0.32**	0.03	0.38**	0.10	0.24**	0.04	Yes
	Level 1	Work motivation					0.22**	0.02	
12	Level 2	Supervisory encouragement	0.58**	0.11	0.71**	0.16	0.42**	0.10	Yes
	Level 1	Work motivation					0.23**	0.01	
13	Level 2	Work group support	0.76**	0.11	1.01**	0.27	0.53**	0.12	Yes
	Level 1	Work motivation					0.22**	0.02	
14	Level 2	Freedom	0.60	0.48	1.96**	0.50	0.16	0.23	No
	Level 1	Work motivation					0.23**	0.01	
15	Level 2	Sufficient resources	0.92*	0.33	1.37*	0.56	0.61*	0.26	Yes
	Level 1	Work motivation					0.23**	0.01	
16	Level 2	Challenging work	0.87**	0.18	1.45**	0.21	0.51*	0.01	Yes
	Level 1	Work motivation					0.22**	0.01	
17	Level 2	Organizational impediments	-0.26	0.21	-0.45	0.43	-0.15	0.16	No
	Level 1	Work motivation					0.23**	0.01	
18	Level 2	Workload pressure	0.29	0.43	-0.64	0.93	0.45	0.29	No
	Level 1	Work motivation					0.23**	0.01	

Notes:  $p < .01$ , \*\* $p < .01$

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such stimuli as a regular part of their life in the work setting. The social context heightens the motivation of members to behave in a certain way; in addition, the organization-supplied stimuli are usually immediate, highly salient and are the primary proximal cause of variation in members' behavior. Our results were consistent with the prediction of contextual theory in such a way that organizational creativity climate facilitates compatible perception of work environment among employees and ultimately enhances innovation in organizations (Ekvall and Ryhammar, 1999; Oldham and Cummings, 1996).

Theoretically, this study contributes to the empirical confirmation of previously untested concept (Carr *et al.*, 2003; Kopelman *et al.*, 1990) that climate impacts important individual- and organizational-level performance through an individual's cognitive and affective state, such as work motivation. In addition, the results showed some differential relationships between the eight facets of creativity climate and perceived innovation, which have some cultural implications. Based on Amabile *et al.*'s (1996) eight climate dimensions, we tested the hypothesized dimensional relationships separately since the original theory regards those dimensions as orthogonal and keeping a number of factors rather than a single composite score may increase the practical value of this research.

As a result, we found that the stimulants of creativity climate had stronger relationships with employee innovation than did the obstacles. The results clearly indicate the importance of the five stimulant factors: organizational encouragement, supervisory encouragement, work group support, sufficient resources and challenging work. However, one stimulant (freedom) and two obstacles (organizational impediments and workload pressure) failed to show significant influences on perceived innovation. The finding enriches this field of study by unveiling how component construct of organizational creativity works in a non-Western culture.

In comparison to the US study (Amabile *et al.*, 1999), employees in Taiwan perceived that their organizations provide less freedom (Taiwan  $x = 2.2$ ,  $s.d. = 0.5$ ; US  $x = 2.94$ ,  $s.d. = 0.18$ ) and have more organizational impediments (Taiwan  $x = 2.14$ ,  $s.d. = 0.38$ ; US  $x = 1.21$ ,  $s.d. = 0.24$ ) and workload pressure (Taiwan  $x = 2.3$ ,  $s.d. = 0.47$ ; US  $x = 1.58$ ,  $s.d. = 0.18$ ). Such findings may reflect differences not only in sample characteristics but also in organizational cultures. For instance, Hofstede's (2001) study reported that significant differences existed between Taiwan and US, particularly in three dimensions related to innovation (i.e. uncertainty avoidance, individualism, and power distance). Compared to the US, organizational culture in Taiwan is characterized by larger power distances, higher uncertainty avoidance, and lower individualism. Taiwanese companies are likely to favor attempts at innovation, if the proposed new ideas are supported, by individuals, with status, power, and resources (Shane *et al.*, 1995).

The two obstacle components, "organizational impediments" and "workload pressure", were expected to hinder performance in the original theoretical framework. However, these two factors did not explain perceived innovation in a significant way in our study. A likely answer is that employees in Taiwan may regard organizational impediments (including internal strife, conservatism, and rigid formal management structure) and workload pressure as common phenomena that they serve neither as a stimulant nor a suppressor of work performance. For instance, internal strife is a



common element in many organizations and conservatism is a preferable belief in the resource-constrained SMEs that constitute about 98% of the economic entities in Taiwan (Lin and Chen, 2007). Heavy performance-based workload pressure has become a norm in the workplace in Taiwan. Since Taiwanese are generally hard working, the tolerance for work overload varies, which may explain the non-significant result.

In summary, although both the stimulant and obstacle dimension of creativity climate should be important in almost any culture, the relative strength of their effects on employees' perceived innovation may depend on culture-bound work values (Abdullan *et al.*, 2006). Consequently, international business researchers who would like to examine innovation and performance issues in a Confucius culture need to attend to this potential difference.

For practical managerial implications, our results highlight several important areas for organizational leaders to contemplate future competitiveness, especially for multinational corporations operating in the Greater China economies. First of all, stimulants including encouragement, support, resources and challenging tasks are more effective for inducing work motivation and performance than the regulated structure or heavy workload. In other words, positive reinforcement is better received than the negative reinforcement in the studied cultural setting. Second, the finding that organizational impediments and workload pressure exert neither positive nor negative effect on perceived innovation does not imply that managers can exploit these factors. Indeed, certain structure and modest work pressure are essential for effective management; yet, managers need to be aware of the inverted "U" shape and detrimental effect of over exploitation. Third, since new ideas supported by individuals with status, power, and resources have better chances to be implemented, increased emphasis can be placed on educating higher level managers or influential persons concerning how to detect potentials and what to see in innovation proposals for maximizing the benefits of innovation. Fourth, since motivation determined what people would actually do (Amabile, 1998), managers need to design jobs under the principle of skill variety, task identity, task significance, autonomy and feedback for evoking employees' work motivation. Although this is not a new model, a particular focus should be on employees "actually perceived" those characteristics rather than "organizations said" these principles are to be followed. Therefore, probing employees' perception can be regularly employed to ensure better organizational performance. Finally, for western expatriates working in a Confucius culture, attending to subtle cultural difference is strongly suggested. In a more collectivist culture, employees may not be innovation-active unless the managers constantly provide positive reinforcement for creativity or innovation at all levels, so that employees feel safe to propose new ideas in the pro-innovation company norm.

This study has certain limitations, as is the case with other social science studies. First, the fact that only 13 organizations were sampled may weaken the generalization of research results. Sampling from a large number of more diverse settings could provide a more powerful test of the studied hypotheses. Second, innovation data-based on respondents' perceptions is inevitably subjective in nature. Unfortunately, most non-listed Taiwanese companies are reluctant to reveal their objective performance, mainly for the reason that they regard it as business secret to guard against

competition. Third, a cross-sectional design does not permit a strictly causal conclusion (Seibert *et al.*, 2004). Future studies may employ a longitudinal research to trace the relationship and reconfirm the research results. Anderson and West (1998) stated that the evidence for the relationships between climate and performance is reasonably convincing, but to understand the relationship in depth will require consideration of the subtle dynamics among antecedents, mediating process, and contextual contingencies. Without longitudinal data, the dynamic relationship will be impossible to determine using cross-sectional survey data only.

For future research, greater attention can be given to the influence of cultural forces on creativity climate-innovation relationship; in addition, extending similar study to other Asian societies should be valuable as well.

## 6. Conclusion

Given the condition of keener global competition, innovation has become a buzzword. Yet, the value of innovation goes beyond the conceptual level. It has to be effectively perceived and implemented to generate real values. Therefore, understanding how organizational innovation is perceived by employees helps managers identify required improvement and management practices for maximizing organizational performance.

The theory of organizational creativity and innovation developed by Amabile and associates (Amabile, 1988, 1996; Amabile *et al.*, 1996) together with motivation theories, offers a useful framework for measuring and managing perception of innovation performance in the workplace. Research results of this study provide a basis for ongoing articulation of the various facets of creativity climate, workplace innovation and the mediating role of employee's work motivation in a non-western country.

Another added value of this research is the findings that freedom, organizational internal strife, conservatism, and workload pressure do not show expected effects on perceived innovation, very likely because of cultural difference. It is always fascinating to see how a western theory applies to the eastern world; this opens an ample avenue for researchers to explore in this increasingly globalized economy.

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