

# CREATIVITY, AND INNOVATION AT WORKPLACE: THE MODERATING ROLE OF PLAYFULNESS CLIMATE

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**Abstract**—This study explores the relationships among employees' creativity within an organization, organizational playfulness climate, as well as organizational innovation; it also examines the difference between male and female employees in personal creativity and playfulness. Findings show that employees' creativity within an organization and organizational playfulness climate promote organizational innovation, and a playfulness climate moderates the relationship between employees' creativity and innovation. It is also shown that difference between female and male employees does exist in terms of personal creativity and playfulness.

**Key Words**—Creativity, gender, organizational innovation, organizational playfulness climate

## 1. INTRODUCTION

Workplace playfulness comprises implications for organizational behavior. For instance, it is argued that playfulness is conducive to reducing boredom, releasing tension, and expressing solidarity within a working group. Research on psychology and organizational management also indicates that playfulness at workplace is associated with individual creativity [1]–[3], learning at both personal and organizational levels [4], as well as performance as a whole [5]. While some studies tend to consider playfulness as a stable personality trait (e.g., [6], [7]), some studies claim that employees' playfulness can be enhanced by designing a playful working environment (e.g., [8]–[10]).

Studies on creativity in recent decades demonstrate a gap between sex roles because appraisals of successful creativity involve social judgments and women's activities in most societies have not been highly valued. Research on women's creativity and creative processes is therefore rather limited. According to the prior literature and real world situations, barriers to women's creativity could result from both internal and external factors. Internal impediments to women's creativity cover personality traits and religious beliefs [11], while external impediments cover education, financial security, marriage, lack of support from the husband, lack of free time, as well as pressure from work [12]. As the number of female employees continue to grow in most industries and innovation is critical for organizational growth and survival, an in-depth study on the processes by which women's creativity is transformed into successful organizational innovation is therefore necessary.

## 2. LITERATURE REVIEW AND HYPOTHESES

### A. Study 1

*Employees' creativity and organizational innovation.* Previous research tended to treat individual creativity as a critical antecedent of organizational innovation [8], [13]–[14]. Organizational innovation is arguably the most complex construct in multilevel innovation studies because factors regarding the individual (e.g., personality, motivation, cognitive ability, and job characteristics), group (e.g., team structure, team climate, team member characteristics, team process, and leadership style), and organizational (e.g., structure, strategy, size, resource, and culture) levels are all involved in the analysis. Moreover, factors that affect innovation at one level will hinder innovations at another level [15]. If one assumes organization involves factors at single level only, "the dynamism of level shifting can mean that the innovations and complexity characteristic of a multilevel field can be missed if one assumes a single vantage point" [16]. In spite the fact that a successful innovation relies on the coordination of factors at individual, group, and organizational levels, as well as factors external to the organization (e.g., [14], [17]), individual/employee's creativity can still account for one of the important sources for organizational innovation.

**H1:** Employees' creativity in a company positively relates to organizational innovation.

*Organizational playfulness climate and organizational innovation.* In [9], it is stated that creativity and innovation will be directly improved, if the entire organization formally and informally supports creativity and innovation. Moreover, organizational culture, supportive resources, and management practice are prerequisites to innovation. Also, some scholars (e.g., [18]) argue that the primary mission for firms is to set up a right direction and organizational climate because working in a proper organizational climate makes employees stay in the

organization, and also facilitates efficiency and performance in the organizational operation. A joyful working environment and climate is beneficial to the generation of innovations.

**H2:** Organizational playfulness climate promotes organizational innovation.

*The moderating effect of organizational playfulness climate.* Organizational climate is argued to have a subjective effect on employees, for it is regarded as the outer layer of organizational culture, structure, incentive system and leadership [19]–[20]. In the top-down transformation process, employees show much playfulness at work if the organizational climate is more playful. When the management system in an organization supports freedom of action, offers supportive leadership, and implements relatively flexible rules, employees tend to show more playfulness and creativity [3]. It is in this playfulness climate that employees' creativity can be easily transformed into organizational innovation, for playfulness helps to ease tension, increase autonomy, as well as pursue new ideas.

**H3:** Organizational playfulness climate positively moderates the relationship between employees' creativity and organizational innovation.

### **B. Study 2**

*Women's creativity at work.* In organizations and societies nowadays, successful creativity and innovation may require aggressive endeavors and full devotion that only few women will or can engage in. The majority of women tend to give up self-interest out of altruism, particularly toward family members [21]. Pregnancy and lactation can further reduce women's ambition and commitment to accomplishments in their career. In Taiwan, taking care of elders in the family can further occupies women's free time for professional and creative work. Reference [22] argues that the meditation between internal impulses and external cultural forces of socialization is an essential task in individual development, whereas the process of such meditation commonly narrows women's opinion and creativity.

**H4:** Female employees tend to have less creativity than male employees.

*Women's playfulness at work.* The connection between playfulness and creativity has a strong basis. Reference [18] indicates that performing activities with humor can encourage a more playful attitude and improve individuals' creativity. While a sense of humor can release negative energy and reduce the seriousness of difficult jobs, humor at work can reduce tension and potential conflict, supports close friendship, improves communication, as well as increases creativity [1], [3]. Following the line indicated in **H4** that female employees are less creative than male counterparts, this study proposes that:

**H5:** Female employees tend to have less personal playfulness than male employees.

## **3. METHODOLOGY**

### **A. Sample and data collection**

This study takes both individual and organizational levels into consideration and collects data by selecting high-tech companies located in Hsinchu Science and Industrial Park (HSIP), as well as distributing questionnaires to CEOs of the sample companies. With regard to individual data, they are collected from employees in manufacturing departments, as OEM and ODM are the predominant operating types in Taiwan's information and electronic industries.

A sample company will be included in this study, provided that two criteria are satisfied: (1) CEO of the company completes measures of organizational innovation, and (2) the company has at least three employees who have completed the measures of employees' creativity and organizational playfulness climate. Totally 850 employees in 123 companies are included in this study, with an average of 6.91 respondents per company (minimum = 3; maximum = 10).

The aggregation of employees' ratings represents the playfulness climate of each company. In order to check whether the employees see the same thing, this study computes a measure of within group agreement ( $r_{wg}$ ) for each component of organizational playfulness climate (5 components in SOQ).

### **B. Measures (Study 1)**

*Employee creativity and Employees' creativity within an organization.* This study adopts Daily Creative Thought to measure employee creativity (5-point Likert), for this measure captures the creation of novel ideas or new problem solutions, and the quality of the actual ideas or solutions. Employees' creativity within an organization is measured by the mean value of each employee's creativity in an organization. The Cronbach alpha coefficient of this measure is 0.86, and the adjusted goodness of fit index from confirmatory factor analysis (CFA) is 0.94.

*Organizational playfulness climate.* Situational Outlook Questionnaire (SOQ) is used to measure organizational climate for creativity and playfulness, and consists of 50 items within 9 subscales, namely challenge/involvement, freedom, trust/openness, idea time, playfulness/humor, conflict, idea support, debate, and risk-taking. After deleting 4 unimportant dimensions with eigenvalue less than 1 in the CFA [23], freedom (6 items), trust/openness (3 items), idea time (4 items), playfulness/humor (6 items), and idea support (5 items) are regarded as suitable measures of organizational playfulness climate [3]. This study employs these five 7-point subscales to evaluate organizational playfulness climate in companies. The Cronbach alpha coefficients are 0.81, 0.75, 0.86, 0.89 and 0.81, respectively. The adjusted goodness of fit indices from CFA was 0.92, 0.96, 0.91, 0.90 and 0.94 respectively.

*Organizational innovation.* Organizational innovation is measured by three 7-point subscales, namely product innovation, process innovation and marketing innovation. The product innovation scale is comprised of three

items concerning new product, new service, and patent, whereas the process innovation scale is comprised of three items concerning new production process, flexible process for customer, and low-cost production process. As for the marketing innovation scale, it is comprised of eight items concerning nontraditional marketing methods, marketing program innovation and product positioning, etc. The Cronbach alpha coefficients of above subscales are 0.81, 0.86 and 0.85, respectively. The adjusted goodness of fit indices from CFA was 0.96, 0.91 and 0.95 respectively.

*Control variables.* Control variable used in this study is company size. Company size is measured based on the number of full-time workers in a company.

**C. Measures (Study 2)**

*Employee playfulness.* This article adopts the Adult Playfulness Scale (APS) that employs the semantic differential approach to measure individuals' stable characteristics based on their descriptions of how they characterize themselves and their own judgment about the meaning of work and play. APS is consisted of 25 semantic differential items within 5 dimensions, namely Spontaneous (voluntary), Expressive (evocative and enjoyable), Fun (humorous), Creative (inventive), and Silly (purposeless). The Cronbach alpha coefficients were 0.82, 0.80, 0.76, 0.80 and 0.75 respectively. The adjusted goodness of fit indices from CFA was 0.97, 0.96, 0.92, 0.93 and 0.93 respectively.

*Employee creativity.* For this measure, please see *Employee creativity and employees' creativity within an organization* mentioned in Study 1.

*Employee gender.* In Study 2, male employee is coded as 0, whereas female employee is coded as 1.

**4. RESULTS**

**A. Study 1**

Study 1 concerns the relationship among employees' creativity within an organization, organizational playfulness climate and organizational innovation. The correlation matrix of major variables in Table I demonstrates that product innovation relates to employees' creativity within an organization, as well as organizational playfulness climate in the dimensions of trust/openness, idea time, playfulness/humor and idea support. With regard to process innovation, it relates to organizational playfulness climate in the dimensions of freedom, idea time and playfulness/humor. Finally, marketing innovation relates to an organizational climate characterizing freedom, trust/openness, idea time, playfulness/humor and idea support. In order to examine Hypotheses 1 to 3, hierarchical regression processes are applied to examine the potential determinants of organizational innovation. Firm size is also introduced as control variables.

**TABLE I. CORRELATION MATRIX FOR MAJOR VARIABLES**

|                          | 1      | 2      | 3      | 4      | 5     |
|--------------------------|--------|--------|--------|--------|-------|
| 1. Product innovation    |        |        |        |        |       |
| 2. Process innovation    | 0.10   |        |        |        |       |
| 3. Marketing innovation  | 0.02   | 0.04   |        |        |       |
| 4. Employees' creativity | 0.26** | 0.17   | 0.16   |        |       |
| 5. Freedom               | 0.05   | 0.25** | 0.18*  | 0.17   |       |
| 6. Trust/Openness        | 0.32** | 0.08   | 0.22*  | 0.15   | -0.05 |
| 7. Idea time             | 0.24*  | 0.41** | 0.36** | 0.41** | 0.04  |
| 8. Playfulness/Humor     | 0.41** | 0.21*  | 0.26** | 0.17   | -0.01 |
| 9. Idea support          | 0.36** | 0.10   | 0.26** | 0.21*  | -0.05 |
| 10. Firm size            | 0.32** | 0.15*  | 0.12   | 0.09   | 0.08  |

Notes: \* $p < 0.05$ ; \*\* $p < 0.01$ ;  $n = 123$  firms

**TABLE I. (CONTINUED)**

|                          | 6     | 7     | 8     | 9    |
|--------------------------|-------|-------|-------|------|
| 1. Product innovation    |       |       |       |      |
| 2. Process innovation    |       |       |       |      |
| 3. Marketing innovation  |       |       |       |      |
| 4. Employees' creativity |       |       |       |      |
| 5. Freedom               |       |       |       |      |
| 6. Trust/Openness        |       |       |       |      |
| 7. Idea time             | 0.23* |       |       |      |
| 8. Playfulness/Humor     | 0.32* | 0.26* |       |      |
| 9. Idea support          | 0.15  | 0.20* | 0.20* |      |
| 10. Firm size            | 0.10  | -0.05 | 0.09  | 0.04 |

Notes: \* $p < 0.05$ ; \*\* $p < 0.01$ ;  $n = 123$  firms

In models that exclude moderating effect (Models 1, 3, 5 in Table II), employees' creativity has positive influence on product innovation ( $b = 0.18, p < 0.05$ ), process innovation ( $b = 0.24, p < 0.01$ ), as well as marketing innovations ( $b = 0.21, p < 0.05$ ) in organizations. H1 is therefore supported in a way that employees' creativity within an organization positively affects organizational innovation. Models 1, 3, and 5 also show that playfulness/humor ( $b = 0.28, p < 0.01$ ) and idea support ( $b = 0.19, p < 0.05$ ) facilitate product innovation; freedom ( $b = 0.22, p < 0.01$ ) and idea time ( $b = 0.40, p < 0.01$ ) facilitate process innovation; and freedom ( $b = 0.18, p < 0.05$ ) and idea time ( $b = 0.27, p < 0.05$ ) facilitate marketing innovation. As organizational playfulness climate has a positive effect on organizational innovation, H2 is also supported.

**TABLE II. RESULTS OF REGRESSION ANALYSES FOR ORGANIZATIONAL INNOVATION**

| Dependent              | Product innovation |                  | Process innovation |                  | Marketing innovation |                  |
|------------------------|--------------------|------------------|--------------------|------------------|----------------------|------------------|
|                        | Model 1            | Model 2          | Model 3            | Model 4          | Model 5              | Model 6          |
| <b>Independent</b>     |                    |                  |                    |                  |                      |                  |
| <b>Direct effects</b>  |                    |                  |                    |                  |                      |                  |
| Employees' creativity  | 0.18<br>(2.01*)    | 0.17<br>(1.98*)  | 0.24<br>(2.44**)   | 0.15<br>(2.01*)  | 0.21<br>(2.15*)      | 0.22<br>(2.58**) |
| Freedom                | 0.03<br>(0.35)     | 0.08<br>(0.10)   | 0.22<br>(2.79**)   | 0.23<br>(2.81**) | 0.18<br>(2.05*)      | 0.17<br>(2.04*)  |
| Trust/Open             | 0.14<br>(1.40)     | 0.17<br>(1.71)   | -0.12<br>(-1.30)   | -0.14<br>(-1.38) | 0.12<br>(1.09)       | 0.13<br>(1.15)   |
| Idea time              | -0.14<br>(-1.41)   | -0.15<br>(-1.50) | 0.40<br>(3.95**)   | 0.39<br>(3.79**) | 0.27<br>(2.40*)      | 0.28<br>(2.51*)  |
| Playfulness/Humor      | 0.28<br>(2.69**)   | 0.33<br>(3.00**) | 0.03<br>(0.31)     | 0.06<br>(0.56)   | 0.01<br>(0.05)       | -0.05<br>(-0.42) |
| Idea support           | 0.19<br>(1.98*)    | 0.18<br>(1.95*)  | 0.02<br>(0.03)     | 0.01<br>(0.12)   | 0.07<br>(0.74)       | 0.08<br>(0.85)   |
| <b>Controls</b>        |                    |                  |                    |                  |                      |                  |
| Firm size              | 0.27<br>(3.16**)   | 0.26<br>(2.97**) | -0.05<br>(-0.60)   | -0.08<br>(-0.88) | -0.03<br>(-0.34)     | -0.01<br>(-0.06) |
| <b>Interactions</b>    |                    |                  |                    |                  |                      |                  |
| Creativity × Freedom   |                    | -0.04<br>(-0.47) |                    | 0.17<br>(2.00*)  |                      | 0.02<br>(0.15)   |
| Creativity × Trust     |                    | 0.17<br>(2.03*)  |                    | 0.05<br>(0.61)   |                      | 0.16<br>(2.00*)  |
| Creativity × Idea time |                    | -0.13<br>(-1.21) |                    | 0.07<br>(0.72)   |                      | -0.05<br>(-0.46) |
| Creativity × Playful   |                    | 0.18<br>(1.94*)  |                    | -0.02<br>(-0.26) |                      | 0.05<br>(0.48)   |
| Creativity × Support   |                    | -0.06<br>(-0.80) |                    | -0.04<br>(-0.61) |                      | 0.03<br>(0.34)   |
| $R^2$                  | 0.36               | 0.42             | 0.32               | 0.37             | 0.31                 | 0.35             |
| $\Delta R^2$           |                    | 0.06             |                    | 0.05             |                      | 0.04             |
| F                      | 6.21**             | 4.72**           | 4.28**             | 4.87**           | 3.61**               | 3.62**           |
| Partial F              |                    | 3.37*            |                    | 3.73**           |                      | 3.02*            |

Notes: \*  $p < 0.05$ ; \*\*  $p < 0.01$ ;  $n = 123$  firms; standardized regression coefficients used; t-value in each cell given in parentheses.

Finally, regarding the moderating effect of organizational playfulness climate on the relationship between employees' creativity within an organization and organization innovation (Models 2, 4, 6 in Table II), creativity × trust ( $b = 0.17, p < 0.05$ ) and creativity × playfulness/humor ( $b = 0.18, p < 0.05$ ) are important in product innovation; creativity × freedom ( $b = 0.17, p < 0.05$ ) is important in process innovation; and creativity × trust ( $b = 0.16, p < 0.05$ ) is important in marketing innovation. This result reveals that the relationship between employees' creativity within an organization and organizational innovation in a high playfulness climate is stronger than that in a low playfulness climate, which thereby supports H3.

### B. Study 2

Study 2 examines the differences of personal playfulness and creativity between male and female employees. A large sample of 570 male employees and 280 female employees reported in Table III reveals that male employees tend to have more personal creativity ( $p < 0.01$ ) and playfulness ( $p < 0.01$ ) than female employees. H4 and H5 are therefore supported.

**TABLE III. DIFFERENCE OF EMPLOYEE CREATIVITY AND EMPLOYEE PLAYFULNESS BETWEEN MALE AND**

| <b>FEMALE WORKERS</b>   |                           |                             |                 |
|-------------------------|---------------------------|-----------------------------|-----------------|
|                         | Male<br>employee<br>(570) | Female<br>employee<br>(280) | <i>t</i> -value |
| Employee<br>creativity  | 0.07                      | -0.03                       | 2.95**          |
| Employee<br>playfulness | 0.08                      | -0.04                       | 3.21**          |

Notes: \* $p < 0.05$ ; \*\* $p < 0.01$ ; Standardized coefficients used; Number in cells given in parentheses.

## 5. DISCUSSION

This empirical study investigates 850 employees in 123 companies and reveals that employees' creativity and organizational playfulness climate positively affect organizational innovation, and an organizational climate of playfulness moderates the relationship between employees' creativity and innovation. This also verifies two important antecedents of successful innovations, namely the improvement of employee's creativity and the establishment of a playful climate within an organization. It is also noteworthy that female workers seem to be relatively less creative and playful in the workplace. In modern organizations and societies, being creative and innovative demands aggressive endeavors, while women usually have to struggle between family and career [11]. Additionally, as the society sees women as the nurturer of their family and caretaker of children, most women are longing for being accepted by the society and thereby lose their ambition and commitment in career. Concerning external obstacles, glass ceiling effect is still a rather common phenomenon in organizations.

Women's creativity is an important issue in women studies and organizational management. Given the situation that the number of female employees has been increasing in most of the industries, the unequal results between female and male employees indicate that enhancing a firm's innovativeness and competitiveness lies in the creation of a female-friendly environment conducive to stimulating creativity of female employees. Since education and support from the husband can increase women's playfulness and creativity, providing on-the-job training and helping female workers ease family pressure are also necessary. In addition to these explicit factors, women's inherent playfulness characteristics, such as attitude, experience, the use of idiomatic expressions and the enjoyment of natural pleasures, are important during their leisure time. Clearly, many methods are available for improving women's playfulness. Building work environments that are playful and friendly to women is a good example. Accordingly, studies concerning the development of mechanisms to facilitate women's creativity and develop intervention techniques to improve women's playful skills should be undertaken. Understanding how playfulness influences learning, flexibility, and adapt-ability in the workplace is essential in human resource management.

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