

## **Modeling creativity performance and the psychological contract in technology industry** **建構科技產業創造力績效與心理契約**

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**Abstract:** This study predicts the psychological contract as a major driver of flow experience and creativity performance. In the proposed model of this study, creativity performance relates to training contract, transactional contract, and relational contract directly and also indirectly via the mediation of flow experience. Empirical testing of this study, by surveying working professionals across quality control departments of high-tech firms, confirms the applicability of flow theory in understanding creativity performance. Last, this study provides managerial implications and limitations.

**Keywords:** Innovation, technology industry, flow experience, the psychological contract, creativity performance.

**摘要：**本研究預測心理契約為沈浸經驗與創造力績效之主要驅動力，在本研究所提出的架構中，創造力績效受到訓練型契約、交易型契約與關係型契約的直接影響，同時透過沈浸經驗的中介而受到此三種契約的間接影響。本研究透過調查科技產業品管部門的專業人員來進行實證，同時確認沈浸理論對於認識創造力績效的可應用性，最後，本研究提供管理意涵與研究限制。

**關鍵詞：**創新科技產業、沈浸經驗、心理契約、創造力績效

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## **1. Introduction**

The literature has documented the importance of creativity performance in business organizations (Chatterjee, Sarker, and Fuller, 2009; Liu *et al.*, 2017; Liu *et al.*, 2016). Creativity performance is defined as the generation of novel and applicable ideas, processes and products (Simmons and Sower, 2012). There has been a substantial increase in research that views employees' creativity performance in their company as an important approach for achieving the company's success (Simmons and Sower, 2012). High creativity performance can be substantially improved by employees with favorable work experiences as suggested in flow theory (Csikszentmihalyi, 1990; Hamari *et al.*, 2016), because such experience (i.e., flow experience) contributes intrinsic and self-motivated dynamics in organizational innovation and creativity (Csikszentmihalyi, 1999; Hamari *et al.*, 2016) regardless of managers' supervision.

Flow refers to the holistic sensation that employees feel when they work with total involvement and immersion and nothing else seems to matter at the time (Csikszentmihalyi, 1990; Eisenberger *et al.*, 2005). The state of flow happens when individuals participate in a creative activity for its own sake, and the participative state is so satisfying that individuals attempt to continue partaking in the activity (Choi, Kim, and Kim, 2007; Pratt, Chen, and Cole, 2016). In other words, flow experience allows one to become further involved in a creative task and thus stretch one's skills and abilities to the limit (Csikszentmihalyi and Rathunde, 1993; Pratt *et al.*, 2016), suggesting the importance of flow theory in understanding employees' creativity performance. Indeed, flow theory highlights the importance of psychological strength in boosting creativity performance given that flow mechanisms facilitate individuals' high concentration and absorption for creating new ideas, processes or product (e.g., Zito, Cortese, and Colombo, 2016). Unfortunately, little is known so far about how flow theory can be appropriately utilized in understanding creativity performance.

Professionals and managers responsible for human resource development may be unable to directly manipulate employees' flow experience, but they can affect human resource practices that improve the psychological contract

(Gardner *et al.*, 2015), which can substantially influence the flow experience. Specifically, human resource development managers can improve employees' creativity performance by effectively maintaining the quality psychological contract. Previous literature has indicated that an effective way for making employees more creative is to develop better psychological contract that increases their flow experience (McDermott *et al.*, 2013). Hence, the focus of this study concerning the psychological contract and creativity performance based on flow theory should be of interest to scholars and practitioners (e.g., Colombo and Zito, 2014).

Due to the absence of the aforementioned literature about flow theory in organizational creativity, this study derives two research questions of interest: (1) How can flow theory be appropriately applied to understanding employees' creativity performance in their organization? (2) What key antecedents and mediators drive creativity performance and how? Exploring these research questions is important, because an improved understanding of creativity performance can help management reinforce key motivators with effective methods or policies to strengthen organizational competitive advantage and core competency.

This study differs from previous research in two critical ways. First, while a majority of research applies flow theory from a hedonic viewpoint such as online gaming or shopping (e.g., Choi *et al.*, 2007; Koufaris, 2002; Mathwick and Rigdon, 2004), employees' creativity performance which is considered a utilitarian issue in business organizations are rarely assessed based on flow theory. More specifically, traditional predictors of flow experience, such as vividness, skills, and challenges which are popularly used in hedonic contexts in previous research (e.g., online video games) (e.g., Huang *et al.*, 2017) are unlikely transplantable in the contexts of individuals' creativity performance in business organizations. For that reason, this study tries to explore a fresh application of flow theory in workplaces and is thus one of the first to use flow theory to examine creativity performance and its antecedents in business organizations. Second, this study is one of the few to build a bridge between the psychological contract, flow experience, and creativity performance by empirically testing a model with a survey of working professionals across quality control departments of high-tech firms in Taiwan. Given that the psychological

contract has been indicated to influence individuals' job experience and their organizational underemployment (Karagonlar, Eisenberger, and Aselage, 2016; Lee, 2005), it is important to learn whether the psychological contract influences flow experience of employees and their creativity performance. Specifically, while organizations unite their members by fostering individuals' psychological contract (Si, Wei, and Li, 2008), little is known about whether the psychological contract can be contributory to creativity performance in organizations. Hence, this study provides an illustrative example of how the psychological contract influences creativity performance based on flow theory.

## **2. Research model and hypotheses' development**

This research proposes a model explaining the formation of creativity performance based on flow theory. In the proposed model, creativity performance relates to three dimensions of the psychological contract (i.e., training, and transactional and relational psychological contract) directly and indirectly through the partial mediation of flow experience. Previous studies have presented that unfulfilled psychological contract may lead to a variety of negative outcomes (Caldwell *et al.*, 2016; Luu, 2016), including decreased job satisfaction, decreased organizational trust, increased turnover, decreased organizational commitment, and decreased job effectiveness (e.g., Castaing, 2006; Turnley *et al.*, 2003). The literature has described that characteristics of flow experience include the loss of a sense of passing time, the loss of self-consciousness, increased focus on job activities, and a sense of control (Chen, 2006; Chiang *et al.*, 2011; Pace, 2004). These characteristics of flow experience can substantially motivate creativity performance (Amabile, 1988, 1997; Rutkowski *et al.*, 2007), suggesting a positive relationship between flow experience and creativity performance. Meanwhile, the literature has indicated a positive relationship between psychological contract and creativity performance (Wellin, 2016). For example, previous studies have shown a significant association between psychological contract and innovation performance (e.g., Boer *et al.*, 2005; Thompson and Heron, 2006). This association is theoretically justifiable because the psychological contract that underpins the employment relationship is likely to facilitate workers' performance orientation towards

creativity and innovation (Thompson and Heron, 2006). At any rate, the psychological contract fulfillment creates a positive context within which employees are likely encouraged to actively develop new ideas, processes, and product in an innovative way (e.g., Rahman *et al.*, 2017; Thompson and Heron, 2006).

In addition to the above-mentioned relationship between the psychological contract and creativity performance, the psychological contract may relate to creativity performance indirectly via the partial mediation of flow experience based on flow theory. Sosik, Kahai and Avolio (1999) have empirically demonstrated that flow mediates the relationship between employees' perceived leadership and their consequent creativity of GDSS (i.e., group decision support systems). Applying Csikszentmihalyi's (1990) flow theory of optimal experience to the workplace, Eisenberger *et al.* indicate that repeated experience of flow (i.e., positive mood) mediate the interactive influence of skill/challenge and achievement orientation on organizational spontaneity (Eisenberger *et al.*, 2005). Previous research concerning flow theory in virtual contexts indicates that flow mediates the relationship between the online users' feelings, their subsequent attitude and online behavior (Guo, 2003; Weibel *et al.*, 2008). Many previous studies are in unison to show that mediating effects of flow experience do exist in the people's psychological perception that consequently affects their behavioral outcomes.

The three dimensions of the psychological contract have been proposed and empirically supported by Coyle-Shapiro and Kessler (2000). The research model of this study is theoretically framed based on these kinds of the psychological contract owing to two critical reasons. First, the psychological contract that describes individuals' beliefs regarding the terms and conditions of a reciprocal exchange agreement between the focal individuals and their organization (Morrison and Robinson, 1997) can substantially influence creative work outcomes. Second, since intrinsic and favorable subjective experiences (i.e., flow experiences) are often affected by the degree with which individuals' psychological expectations are fulfilled by their organization (e.g., Coyle-Shapiro and Kessler, 2000), psychological contract fulfillment plays an important role to understand individuals' flow experience and creativity performance in work settings. At any rate, given that the flow theory provides

one of the most widely cited explanations for pleasurable absorption in leisure and sports activities (Eisenberger *et al.*, 2005), it is a must for researchers to move on to the rarely explored area of work settings (Eisenberger *et al.*, 2005) regarding creativity performance in this study.

In this study, flow experience of individuals means that individuals are so focused that it amounts to absolute absorption in an activity of developing creative ideas or innovative product, providing a sense of discovery and a creative feeling of pushing to higher levels of performance (Heckman, 1997). When individuals enjoy the experiences of working on their own tasks of innovation or creativity, they stretch their capabilities and increase the likelihood that they will, for example, learn new things, be propelled by motivation, obtain challenging goals, and eventually increase their creative productivity (Montgomery, Sharafi, and Hedman, 2004). This is called an autotelic experience (auto=self and telos=goal) by Csikszentmihalyi (1990) that strengthens creativity performance, because such an experience exists when employees are all mentally engaged in achieving successful innovation or creativity.

Flow experience represents employees' full engagement, and their synergy manifests in the ways in which they accomplish high levels of organizationally coordination that leads to greater effectiveness of developing novel ideas, fresh processes, or innovative product (i.e., high creativity performance). Employees who enjoy a flow experience are likely to hold themselves and each other accountable for doing high-quality work concentratedly (Johnson and Johnson, 2000). Thus, the first hypothesis is derived as below.

**H1:** Flow experience positively relates to creativity performance.

A major concern behind the interest in the psychological contract is its outcomes on both the experience and the behavior of employees in organizational innovation. Regarding the influence of such contracts on the behavioral outcomes, previous empirical work has demonstrated the influence of the psychological contract on employees' job performance (Robinson, 1996), and so it is therefore expected that the psychological contract similarly facilitates employees' creativity in workplaces. For the purpose of better clarification, the positive relationships between the three different dimensions of the psychological contract and creativity performance are derived in more detail in the following.

Training psychological contract represents the individuals' realization of obtaining specific skills, ability, and practice that are helpful for and encouraged by their firm or managers. Participation in activities of innovation or creativity, such as training courses, informational interviewing, or identifying and interacting with a mentor, can help employees meet the creative goals of their job (Cavanaugh and Noe, 1999; Massenberg, Schulte, and Kauffeld, 2017), supporting the positive effect of training psychological contract on creativity performance. If a comprehensive training plan is implemented to fulfill individuals' needs in their job, then creativity performance has the potential to increase (e.g., Alhejji *et al.*, 2016). Fulfilling employees' training (i.e., training psychological contract) helps develop professional skills that successfully improve individuals' creativity (Forsberg, Mooz, and Cotterman, 2000; Wysocki, Beck, and Crane, 2000), revealing the positive association between training psychological contract and creativity performance. Consequently, the hypothesis is derived as below.

**H2:** Training psychological contract positively relates to creativity performance.

Transactional psychological contract represents the individuals' realization of obtaining specific extrinsic or monetary incentives that help bond the relationship between the individuals and their organization. New ideas, novel processes, or innovative product in an organization should be rewarded and encouraged through incentives from a transactional perspective so as to facilitate creativity performance (Dreachslin *et al.*, 1999). This phenomenon is particularly obvious in business firms that concentrate on the connection between incentives and innovative outcomes, such as stock options and bonuses, to obtain the goal of creativity performance (Tan, Zhang, and Xia, 2008). Employees' transactional need (e.g., the need of salary) is often a basic one for their living and thus they can be more motivated to focus on their creativity if the need is well fulfilled. Hence, the hypothesis is derived as follows.

**H3:** Transactional psychological contract positively relates to creativity performance.

Relational psychological contract represents the individuals' realization of having a close and long-term relationship between them and their organization (Cavanaugh and Noe, 1999), which helps their professional career development

and advancement. Previous research argues that a positive relationship or attachment with their organization facilitates creativity performance (e.g., Tjosvold, Poon and Yu, 2005), because employees' relational conflicts (i.e., low relational psychological contract) with their organization are likely to frustrate their attempt to perform innovative tasks (e.g., Jehn, 1997). If employees believe that their organization intentionally limits their future career development (i.e., low relational contract), then they are unlikely to cling to develop new ideas and innovative product, leading to low creativity performance. Thus, the hypothesis can be stated as follows.

**H4:** Relational psychological contract positively relates to creativity performance.

Regarding the effect of the psychological contract on individuals' flow experience, previous empirical work has demonstrated that the psychological contract reflect a great emphasis on the areas of employees' in-depth involvement with their job (e.g., Bagshaw, 1997), and so it can be therefore expected that the psychological contract are influential to flow experience. To better clarify the associations between the three different dimensions of the psychological contract and flow experience, this study justifies the associations in more detail as follows:

Training is a key success factor for achieving smooth innovation or creativity in a firm, because it helps enhance the work experience by, for example, learning communication and advanced resolution (Gratton and Erickson, 2007) in terms of innovation or creativity. Previous research has examined training practices from a flow theory perspective (e.g., Choi, Kim, and Kim, 2007). It has been found that as individuals' skill increases via training and learning activities, so does the level of their flow in their creative work (e.g., Catino, 2010). Without their fulfilled training contract, employees cannot focus their thoughts for more than a few minutes at a time (Csikszentmihalyi, 1990). On the contrary, it is relatively easy to concentrate when training attention is structured by outside educational stimuli and people place themselves on automatic pilot (Csikszentmihalyi, 1990). Indeed, prior studies of students' academic engagement in learning show that their engagement experience is directly affected by the quantity and quality of the psychological concentration in their learning tasks (i.e., training psychological contract) (McCarthy and



McCarthy, 2003). Failure to fulfill individuals' training is likely to escalate their distraction and disengagement about the tasks of creativity (Stone, 2004), thus refraining flow experience. Thus, the hypothesis is described as below.

**H5:** Training psychological contract positively relates to flow experience.

The absence of fair treatment and reasonable compensation, combined with the loss of fringe benefits (i.e., components of transactional psychological contract), is likely to make employees frustrate and blame the organization for being responsible for not fulfilling the transactional contract (Kickul, Lester, and Finkl, 2002), consequently weakening flow experience. Previous research indicates that flow can be enhanced when clear incentive or reward systems (i.e., a part of transaction) are given, feedback is received from the task, concentration is high and control of the activity is anticipated and derived (Csikszentmihalyi, 1990; Havran, Visser, and Crous, 2003), suggesting a positive relationship between transaction contract and flow experience. As transactional needs are basic for employees' living (Gillet and Vandenberghe, 2014; Hamlin *et al.*, 2016), flow that represents the enjoyable status (Brown and Ryan, 2004) can be better enhanced after such basic transactional needs are fulfilled.

Whereas some research indicates that employees are more likely soaked themselves in their job (i.e., strong flow experience) in case of the fulfilled transactional component (e.g., Michael, 2001), others suggest that the transactional component is composed of short-term and monetary obligations that drives limited involvement and concentration (i.e., low flow experience) of employees in their job (e.g., Cavanaugh and Noe, 1999). To quell the above inconsistent arguments, this study attempts to empirically test the relationship between transactional psychological contract and flow experience by proposing the below hypothesis.

**H6:** Transactional psychological contract positively relates to flow experience.

Flow represents a state of awareness that the current experience is the optimum experience as employees participate together in the task of creativity and conduct the task at the same time via interpersonal relations (e.g., a form of relational contracts) (Csikszentmihalyi, 1990). Previous studies suggest that people's optimal experience with the gaming tasks (i.e., flow experience) can be boosted more highly with stronger social relational interactions (Choi and Kim,

2008; Yeo and Marquardt, 2015), implying the positive effect of relational psychological contract on flow experience.

Fulfilled relational contract helps employees focus on their great engagement and immersion in the work activities for creativity or innovation (Cavanaugh and Noe, 1999; Korte, 2009; Korte, Brunhaver, and Sheppard, 2015). By contrary, when relational components of the psychological contract are breached, employees are discouraged to work hard, leading to a decreased flow experience. Hence, the hypothesis is provided as below.

**H7:** Relational psychological contract positively relates to flow experience.

### **3. Method**

#### **3.1 Subjects and procedures**

The sample subjects investigated in this study were made up of working professionals across quality control departments of high-tech firms. Since creativity was very important for high-tech organizations to coordinate various huge projects, the working professionals recruited from high-tech firms were thus appropriate subjects for this study.

Twelve large high-tech firms located in a well-know science park in northern Taiwan were initially contacted and asked to provide assistance for our survey. These firms were chosen because they were large high-tech firms in which creativity is highly encouraged in the firms. It turned out that 8 out of the 12 firms agreed to help for our survey in their organizations. To reduce the threat of common method variances (CMV), this study collected its data from two different sources. That is, psychological contact and flow experience were measured by employees, while their creativity performance was measured by their direct supervisor. Of the 800 sets of questionnaires (i.e., each set consists of two questionnaires for an employee and his/her direct supervisor respectively) distributed to the employees and their supervisor to fill out our questionnaires, 429 sets of usable questionnaires were collected after a follow-up by telephone (a response rate of 53.62%).

In our sample firms, the span of control by each supervisor ranged 3 to 8 direct subordinates. As the literature suggested that people from the same

business organization shared the same organization-level characteristics, climate, goals, interests, and work environment (Hsieh, 2012; Kim, Solomon, and Zurlo, 2009; Sze *et al.*, 2004; Wang and Hsieh, 2012), it is more necessary for empirical analyses to control different firms rather than individuals from the same organization. For that reason, firms were included as a major control variable in our following empirical analyses.

This study measured the constructs utilized herein by using five-point Likert scale items drawn and modified from the existing literature. The measurements were verified via two pilot tests before the actual survey. Pilot test respondents were excluded in the subsequent survey. The pilot test data were subjected to exploratory factor analysis (EFA) and reliability analysis to identify the inappropriate items that loaded poorly on their hypothesized scales. This process of instrument refinement led to considerable improvement in content validity and scale reliability. The Appendix A lists all the scale items and their sources.

Note that this study measured subjects' flow experience using three items that substantially captured three major traits of flow, including attention, immersion and involvement (Csikszentmihalyi, 1997; Novak, Hoffman, and Yung, 2000). First, previous research suggested that attention (or attention focus) was one of the most important tools in the task of improving the quality of flow experience (Csikszentmihalyi, 1997). For example, for flow to occur in the Web environment, people had to focus their attention on the interaction and narrowed their focus of awareness to filter out irrelevant thoughts (Hoffman and Novak, 1996; Huang, 2006). Hoffman and Novak (1996) indicated that the presence of focused attention was a primary antecedent condition that was essential for the flow state to be experienced (e.g., Huang, 2006). Second, flow was achieved through immersion and effort rather than an activity's ultimate outcome (Cohn, 2004). For instance, Csikszentmihalyi stressed that the most universal trait of flow experience included the sense of concentration (or attention) and a complete immersion in what one was doing (Csikszentmihalyi, 2000). Finally, people with great flow experience were often so involved in what they were doing (i.e., involvement), they were not thinking about themselves as separate from the immediate activity (Csikszentmihalyi, 1997).

## 4. Results

The survey data were analyzed using a two-step structural equation modeling (SEM) approach (Anderson and Gerbing, 1988), including a measurement model and structural model testing. Test results from each stage of analysis are presented in the following.

In the first step of SEM (i.e., confirmatory factory analysis, CFA), the overall goodness-of-fit indices shown in Table 1 indicate that all the fits of the measurement model are acceptable. The CFA model's normalized chi-square (chi-square/degrees of freedom) was smaller than the recommended value of 3.0.

**Table 1**  
**Standardized loadings and reliabilities**

Construct	Indicators	Standardized loading	AVE	Cronbach's $\alpha$
Creativity performance	CP1	0.73 (t = 16.98)	0.65	0.88
	CP2	0.85 (t = 21.23)		
	CP3	0.84 (t = 20.80)		
	CP4	0.79 (t = 18.96)		
	CP5	0.81 (t = 19.67)		
Flow experience	FE1	0.82 (t = 19.21)	0.67	0.86
	FE2	0.86 (t = 20.83)		
	FE3	0.78 (t = 18.17)		
Training contract	TR1	0.72 (t = 15.72)	0.49	0.81
	TR2	0.76 (t = 16.95)		
	TR3	0.68 (t = 14.51)		
	TR4	0.64 (t = 13.60)		
Transactional contract	TC1	0.91 (t = 24.06)	0.70	0.89
	TC2	0.83 (t = 20.45)		
	TC3	0.88 (t = 22.24)		
	TC4	0.72 (t = 16.80)		
Relational contract	RC1	0.84 (t = 20.15)	0.69	0.87
	RC2	0.82 (t = 19.79)		
	RC3	0.83 (t = 19.95)		

Goodness-of-fit indices (N = 429):

$\chi^2_{142} = 305.06$  (p-value < 0.001); NNFI = 0.96; NFI = 0.94; CFI = 0.96; GFI = 0.93; AGFI = 0.90; RMR = 0.02; RMSEA = 0.05.

The indices such as AGFI, CFI, GFI, NNFI, and NFI all exceeded or equaled 0.90 (see Table 1). The RMR was smaller than 0.05, and the RMSEA was smaller than 0.08 (Bentler and Bonnett, 1980; Chiu *et al.*, 2018). These figures strongly support that the hypothesized CFA model in this study fits well with the empirical data from technology industry.

Convergent validity was confirmed by examining the three conditions suggested by Fornell and Larcker (1981). To begin with, all factor loadings were statistically significant at  $p < 0.001$  as shown in Table 1. Furthermore, the average variance extracted (AVE) for all constructs were very close to or larger than 0.50, suggesting that the overall hypothesized items capture sufficient variance in the underlying construct than that attributable to the measurement error. Last, the reliabilities for each construct exceeded 0.70, satisfying the general requirement of reliability for research instruments (e.g., Chiu *et al.*, 2018; Lin, Chiu, and Liu, 2017). Overall, the empirical data that met all three conditions above assure convergent validity.

Discriminant validity was assessed by chi-square difference tests (see Table 2). In this study, chi-square difference statistics for all pairs of constructs exceeded the critical value of 15.14 (i.e., the overall significance level of 0.001 based on the Bonferroni method), thereby assuring discriminant validity for our data sample.

In the second step of SEM, the CFA model was transformed to a structural model that reflects the model paths hypothesized in our research framework for the purposes of statistical testing. Our 8 sample firms are controlled in our SEM analysis with 7 dummies. Table 3 presents the test results of this statistical analysis. Five out of our seven hypothesized model paths were validated at the  $p < 0.05$  or  $p < 0.01$  significance level. Creativity performance is significantly related to flow experience and training contract with the standardized path coefficients of 0.34 ( $p < 0.01$ ) and 0.30 ( $p < 0.01$ ), respectively, thus supporting Hypotheses 1 and 2. However, the relationship between transactional contract and creativity performance is insignificant, and hence Hypothesis 3 is not supported. Meanwhile, the relationship between relational contract and creativity performance is significant with the standardized path coefficient of 0.10 ( $p < 0.05$ ), supporting Hypothesis 4. In addition, flow experience is significantly related to training contract with the standardized path coefficient of 0.38 ( $p < 0.01$ ),

**Table 2**  
**Chi-square difference tests for examining discriminant validity**

Factor pair	$\chi^2_{142} = 305.06$ (unconstrained model)	
	$\chi^2_{143}$ (constrained model)	$\chi^2$ difference
(F1, F2)	740.85***	435.79
(F1, F3)	1323.93***	1018.87
(F1, F4)	623.49***	318.43
(F1, F5)	871.49***	566.43
(F2, F3)	662.81***	357.75
(F2, F4)	882.16***	577.10
(F2, F5)	847.62***	542.56
(F3, F4)	672.46***	367.40
(F3, F5)	686.03***	380.97
(F4, F5)	895.27***	590.21

\*\*\* Significant at the 0.001 overall significance level by using the Bonferroni method.

Note: F1 = Creativity performance; F2 = Flow experience; F3 = Training contract; F4 = Transactional contract; F5 = Relational contract.

**Table 3**  
**Path coefficients and *t* value of SEM test results**

Hypothesis	Standardized coefficient
H <sub>1</sub> : Flow experience → Creativity performance	0.35**
H <sub>2</sub> : Training contract → Creativity performance	0.31**
H <sub>3</sub> : Transactional contract → Creativity performance	0.05
H <sub>4</sub> : Relational contract → Creativity performance	0.10*
H <sub>5</sub> : Training contract → Flow experience	0.39**
H <sub>6</sub> : Transactional contract → Flow experience	-0.04
H <sub>7</sub> : Relational contract → Flow experience	0.14*

$p^* < 0.05$ ;  $p^{**} < 0.01$

Note: Dummies variables are employed to control for 8 different sample firms (7 dummies).

supporting our Hypothesis 5. Finally, while unrelated to transactional contract (Hypothesis 6 is not supported), flow experience is significantly related to relational contract with the standardized path coefficient of 0.15 ( $p < 0.05$ ) (Hypothesis 7 is supported). The unexpected results for the unsupported hypotheses may further warrant future studies, so that the precise causes behind the unsupported hypotheses are not misinterpreted.

The insignificant effects of transactional contract on flow experience and

creativity performance may be explained by agency theory that argues fixed compensation (e.g., transactional contracts) is unlikely to influence employees' effort and performance (Christen, Iyer, and Soberman, 2006). Nevertheless, the empirical results that do not support Hypotheses 3 and 6 may warrant further study so that the insights behind the insignificant models paths can be interpreted accurately.

This study finally conducts a post hoc test to confirm its hypothesized mediation of flow experience by using bootstrapping with 5000 subsamples (see Table 4). This approach of bootstrapping for testing mediating effects is effective and recommended in the literature (Hayes, Montoya, and Rockwood, 2017; Preacher and Hayes, 2008). The test results that shows significant mediation of flow experience (i.e., the confidence intervals do not cover zero) are consistent with the results of our above SEM analysis. More specifically, flow experience indeed mediates the relationships between training contract and creativity performance and between relational contract and creativity performance.

## 5. Discussion

This study proposes an illustrative example of how flow theory can be effectively applied to understanding the formation of creativity performance from the perspective of human resource development. The foremost contribution of this study is its theorizing and empirically validating the novel role of flow experience in bridging the psychological contract and creativity performance. Another contribution of this study is that industry practitioners and managers can learn through this study the importance of showing employer goodwill and concerns for employees. Organizational care for employees should be openly delivered so as to reinforce a positive message that communicates the organizational obligations to the psychological contract (Gardner *et al.*, 2015). The findings of this study complement previous literature by emphasizing that human resource development professionals play a critical role in shaping the perceptions of the psychological contract (McDermott *et al.*, 2013). The perspective of partial mediation tested in this study is analogous with previous research (e.g., Choi *et al.*, 2007; Koufaris, 2002) that argues a partial mediating effect of flow experience on people's perceptions and behavioral outcomes.

**Table 4**  
**The results of the mediation using bootstrapping**

Indirect Effect	Bootstrapping with 5000 subsamples			
	Point estimate	S.E.	95% CI <sub>L</sub>	95% CI <sub>U</sub>
Training contract → Flow exp. → Creativity performance	0.1158	0.0286	0.0677	0.1798
Relational contract → Flow exp. → Creativity performance	0.0953	0.0245	0.0520	0.1486

Note: Flow exp. = Flow experience; CI = Confidence interval.

According to this study's test results, creativity performance positively and directly relates to flow experience, suggesting that the degree of individuals' engagement or absorption in their creative activities should be a prominent standout for management. Although staying focused has been known to be crucial for individuals in general work contexts, less attention has been paid to learn its critical role in lifting individuals' creativity performance. To boost individuals' creativity performance, human resource development managers should periodically evaluate the flow experience by observing the extent to which employees soak themselves in developing fresh ideas, improved processes, or advanced product.

The significant effect of training contract on both flow experience and creativity performance indicates that employees who care strongly about how much they can intrinsically be raised to a higher level (e.g., skill improvement and advances) via the implementation of training are likely to have a sensation of staying focused in their creative work so as to increase their creativity performance. This is understandable, because those who lack training psychological contract are less encouraged and motivated to concentrate on innovation, leading to decreased flow experience and creativity performance. For that reason, management should provide a variety of training programs, because employees differ in terms of their personal interest and specialty. An out-of-date training method unchanged for years can be fatal to creativity performance, because such a method cannot positively inspire individuals' experience during their training, let alone their flow experience and innovative skills (experiences).

The significant effect of relational psychological contract on flow experience



and creativity performance reveals that those who are concerned about how much they can be intrinsically raised to a higher level (e.g., occupational promotion, job career development) through the professional relationship with their firm are likely to have complete absorption in their creative work. Hence, the career advantage and future development of employees should be clearly described and mapped out by management so that the relational contract can be properly strengthened across individuals' different career stages, positively facilitating their creativity performance.

In summary, the findings of this study lend support to the literature that attempts to explain how the lack of psychological contract realization in a workplace can result in a terrible crisis for flow experience and creativity performance. It is necessary to note that no single management practice is superior to another in enhancing creativity performance without constant observations on different dimensions of the psychological contract and flow experience. Management should create an optimistic work climate with friendly policies or measures as suggested above to fulfill employees' psychological contract in order to reinforce creativity performance in a long run.

## **6. Limitations**

The empirical results of this research should be cautiously interpreted and applied in light of two limitations. The first limitation is associated with the survey based on a single country setting (i.e., Taiwan). Future survey across different countries may be carried out as complementarity to this study.

Second, given our theoretical focus on flow theory, we have limited our consideration of the mediator to the only one suggested by the theory (i.e., flow experience). Some important factors (e.g., shared mental models) beyond flow theory may be included in future research (e.g., Chen, Huang, and Wey, 2017; Luan and Tien, 2017). For example, previous literature suggests that better strategy development may lead to higher levels of unsolicited information sharing, better developed team mental models (i.e., a research construct), and greater performance during high workload situations (Ilgen *et al.*, 2005; Tai, 2017; Wang, Chen, and Chiang, 2017).

Despite not being our research focus, creative work that is affected by new

communication media or technology may be further examined in future research from an aspect of information technology. Some factors such as absorptive capacity and knowledge sharing may be taken into account in future research for exploring creativity performance in more depth. To sum up, future researchers are advised to consider other additional mediators beyond flow theory (e.g., Chiu *et al.*, 2018; Joe, Hung *et al.*, 2018; Liu *et al.*, 2017) and compare their explanatory ability to the one examined in this study.

## **Appendix A: Measurement items**

**Creativity performance** (measured by supervisors; source: Zhou and George, 2001)

This employee...

CP1. Suggests new ways to achieve job goals or objectives.

CP2. Comes up with new and critical ideas to improve performance.

CP3. Is a good source of creative ideas.

CP4. Is competent in developing and testing many new ideas, processes, or product.

CP5. Is capable of going through many iterations for improving new ideas, processes, or product.

**Flow experience** (measured by employees; source: Novak, Hoffman and Yung, 2000)

CF1. I experience immersion in innovation with my co-workers in my firm.

CF2. In general, I frequently pay close attention to innovation with my co-workers in my firm.

CF3. I feel that I am deeply involved with innovation in my firm most of the time.

**Training contract** (measured by employees; source: Coyle-Shapiro and Kessler, 2000)

TR1. I have the necessary on-job training to do my job.

TR2. I have up-to-date educational training for helping to improve collaboration with my co-workers.

TR3. I am supported by my coworkers when I want to learn new skills.

TR4. I keep learning new things via collaboration with my co-workers.

**Transactional contract** (measured by employees; source: Coyle-Shapiro and Kessler, 2000)

TC1. I have fair pay compared to others doing similar work in other organizations.

TC2. I receive fringe benefits that are fair compared to what others doing similar work in other organizations get.

TC3. I have fair pay for the responsibilities I have in my company.

TC4. My pay increases to maintain my standard of living.

**Relational contract** (measured by employees; source: Millward and Hopkins, 1998)

RC1. I feel my company reciprocates the effort of its members by providing a chance at career development in the company.

RC2. I have reasonable growth in my company if I work hard.

RC3. My job in my company means more to me than just a means of paying the bills.

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