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How Intrinsic Motivation Facilitate Employee Creativity in Work Process

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Abstract : In this article, we examined how intrinsic motivation influence employee creativity in work process. Using survey data from 398 professional or technical workers and their direct supervisors in a large automobile manufacturing enterprise, the results of our study showed that intrinsic motivation influenced every sub-process of creative process engagement, while creative process engagement had a positive influence on employee creativity. We further discuss the limitations of the study.

Keywords: intrinsic motivation, creative process engagement, employee creativity

1. INTRODUCTION

With the development of economic globalization, the survival environment for organizations is becoming increasingly complex and changeful, competition is particularly fierce. Noticeable evidences demonstrated that employee creativity is the foundation of organizational innovation^{[1][2]}, basically contributes to organizational effectiveness and survival, and facilitates an organization to adapt to increasingly turbulent environment^[2]. Creativity has been defined as novel and useful ideas generated by individuals or teams^[3].

Intrinsic motivation deemed to be a well predictor of employee creativity^{[1][2][4]}, and has been conceptualized as the extent to which an individual is interested in a task and engaged in it because of the task itself^[5]. We expect that intrinsic motivation has critical effect on employee creativity by significantly influencing an employee's engagement in creative process, as it has a significant influence on employees' creative behaviors^[6]. Researchers began to realize the value of understanding creative process and advocated more studies focus on it^{[2][4][7]}, but there are few relevant researches^[4]. By now, we didn't find any research to examine the relationship between intrinsic motivation and each sub-process of creative process engagement. We then argue creative process engagement, which has been defined as employee's involvement in creativity-related methods or processes^{[6][8]}, as the mediating mechanism.

In this study, we looked into the details of if and how intrinsic motivation will influence the sub-processes of creative process engagement: (1) problem identification, (2) information searching and encoding, and (3) ideas and alternatives generation^{[4][6][8]}. As for the relationship between creative process engagement and employee creativity, we treat the former as a dynamic set of recursive sub-processes^[9], these sub-processes will promote each other mutually, and it leads to employee creativity. To do so, we may have a more comprehensive understanding of creativity, creative process engagement, and the relationship between them theoretically and empirically.

In sum, the main purpose of our study was and is to build and test a model to make a better understanding of how the intrinsic motivation facilitates employee creativity via creative process engagement^{[4][7]}.

2. THEORY AND HYPOTHESES

In this section, firstly, we explore the general relationships between intrinsic motivation and employee creativity. Secondly, we examine how intrinsic motivation influences the sub-processes of creative process engagement. Finally, we examine links between creative process engagement and employee creativity. The

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hypothesized model is depicted in Figure 1.

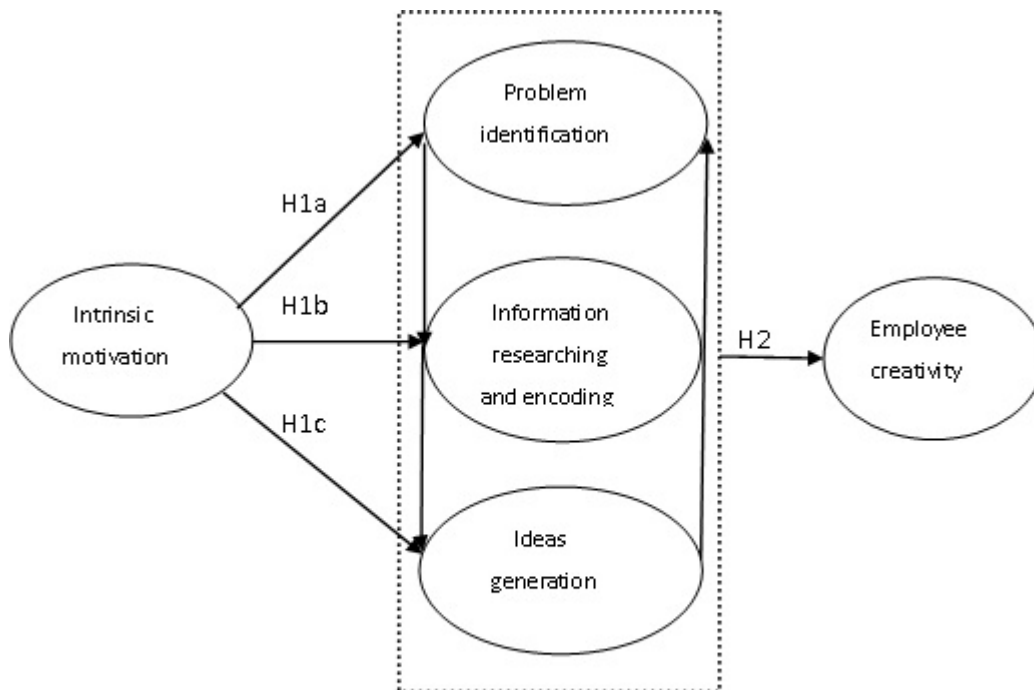


Figure 1. Hypothesized model^a

^a To make the figure simple, we use H instead of Hypothesis

2.1 Intrinsic motivation and employee creativity

Much of the prior research has found that intrinsic motivation influenced on creativity. For example, Amabile (1983) proposed that intrinsic motivation has a significant influence on employee's creative behaviors [6], because it deemed to be a well predictor of employee creativity [1][2][4]. The main function of intrinsic motivation is to control individuals' attention [10]. When employees are intrinsically motivated to engage in a given task, they have a high possibility to pay all of their attention to the problems they confront, and are more likely to take greater risks to explore new pathways [11]. That is to say, intrinsic motivation influenced on employee creativity.

2.2 Intrinsic motivation and creative process engagement

The intrinsic motivation's elementary function is to control individuals' attention [10]. Kanfer (1990) argued that such attention drives individual to engage in creative process [12]. When employees are intrinsically motivated to engage in a given task, they have a high possibility to pay all of their attention to the problems they confront, and are more likely to take greater risks to explore new pathways [11]. Therefore, intrinsic motivation affects the extent to which an individual will engage in creative process [4][13].

Problem identification is the first step of creative process engagement [9][14]. Generally, problem identification tends to suit with problem solvers' past experience [15]. In that case, the solutions may less creative. While if employees have intrinsic motivation to be creative, they may devote more attention to the problem they encounter and spent more time on it. That could lead to a problem be finely identified [16]. Employees with intrinsic motivation will indentify the problem from multiple perspectives and incline to communicate with others about the problem, which will in turn improve the quality and originality of the solutions [16][17]. Thus intrinsic motivation can promote problem identification. We propose that:

Hypothesis 1a. Intrinsic motivation is positively related to problem identification.

After problem identification, employees must collect and synthesize a large number of diverse but relevant information. The internal and external information must be retrieved, connected, integrated in an original way and then must be encoded appropriately to enhance creativity^[18]. It needs great cognitive effort^[19]. Lacking intrinsic motivation, people in groups, especially in those high homogeneous groups, will be not easy to get rid of ‘groupthink’^[20]. In this situation, they depend heavily on the shared value of the group and tend to search information that is confirmed by all group members only^[21]. While when employees have intrinsic motivation, they will devote more attention and time to search relevant but diverse information from internal and external sources and encode it appropriately. That is, intrinsic motivation for creativity has a high possibility to influence information searching and encoding positively. Accordingly:

Hypothesis 1b. Intrinsic motivation is positively related to information searching and encoding.

When information is available, individuals then turn into the process of ideas and alternatives generation^[9]. Johns and Morse (1997) argued that ideas and alternatives generation is also time-consuming like the two previous processes^[22]. And researches demonstrated that time constraints is one of the biggest limitations of the quantity and quality of ideas and alternatives generation^[23]. In addition, Runco (1986) found that ideas generated first usually routine and less creative, and novel ideas tend to generate later during the ideas and alternatives generation process^[24]. So in order to generate a plenty of novel ideas, employees should spent more time in and devote more attention to this process, otherwise ideas generated probably not creative. Considerable evidences indicated that when individuals are motivated to be creative, they tend to generate more original ideas^[24]. Therefore, the intrinsically motivated employees may devote more attention and time to ideas and alternatives generation process, and use their divergent thinking which has a high possibility to result in the generation of creative ideas and alternatives^{[25][26]}. So we offer that:

Hypothesis 1c. Intrinsic motivation is positively related to ideas and alternatives generation.

2.3 Creative process engagement and employee creativity

Creative process engagement can be identified as a prerequisite for creativity^[27]. The creative idea is formed and refined during the creative process, and finally improve the level of creativity. Although some researches indicated that engagement in different sub-processes related to employee creativity^{[7][9]}, researches have not gained a clear idea of how creative process engagement leads to the increase of employee creativity. Lately, Zhang and Bartol (2010) proved that creative process engagement is positively related to employee creativity, but they didn’t examine how it affects employee creativity detailedly^[4]. In the present study, we treat creative process as a dynamic set of recursive sub-processes^[9]. Well identified problem guides for information researching and encoding, which will be the foundation of ideals and alternatives generation, while the latter processes in turn can contribute to the former ones. These sub-processes will promote each other mutually, and it leads to employee creativity. Accordingly, we argue that:

Hypothesis 2. Creative process engagement is positively related to employee creativity by creative sub-processes’ mutual promotion process.

3. METHODS

3.1 Research setting and participants

The samples for this study were selected from one of automobile manufacturing enterprises in China, and the participants were professional or technical workers and their direct supervisors. To ensure the validity of original English inventory, all the scales used in our study were back-translated. By means of E-mail, we sent questionnaires to 513 professional or technical workers, and 455 completed questionnaires were returned, the response rate was 88.70 percent. Subsequently, we collected those respondents’ creativity assessment data from

their direct department or group supervisors. We sent questionnaires to 69 supervisors and 62 completed questionnaires were returned. The final paired sample contained 398 professional or technical workers. And 15.78 percent were female, the average age of the participants was 29.83 years (s.d.=5.47), undergraduate education accounted for 89.00 percent and master's degree or above accounted for 11.00 percent, the average organizational tenure of the participants was 3.19 years (s.d.=2.29).

3.2 Measures

Intrinsic motivation. Three items were used to measure intrinsic motivation adapted from the work of Amabile (1985) [28] and Tierney, Farmer, and Graen (1999) [29]. EFA led to a one factor solution (eigenvalue =2.407, average factor loading was .896, explained 80.23 percent of the total variance), and the Cronbach's alpha for intrinsic motivation was .876. A sample item was "I enjoy finding solutions to complex problems".

Creative process engagement. In this study, we adopted Zhang and Bartol's (2010) creative process engagement scale [4], which on the basis of the conceptual work of Amabile (1983) and Reiter-Palmon and Illies (2004) [6][8]. The scale contained 11 items, 3 dimensions, namely, problem identification, information searching and encoding and ideas and alternatives generation. EFA led to 3 factors with eigenvalues greater than 1, each factor's average factor loading was .834, .859, .859, and explained 81.90 percent of the total variance. The Cronbach's alpha of the three factors (.885, .891, .941) indicated a acceptable level. The CFA results ($\chi^2_{(41)}=104.37$, RMSEA =.062, CFI =.99, NFI =.98) indicated that the creative process engagement measure fit our data well.

Employee creativity. We used Zhou and George's (2001) 13-item creativity scale to measure employee creativity, and the scale was completed by employees' direct supervisors [30]. One of the sample items was "Comes up with new and practical ideas to improve performance." EFA led to a one factor solution (eigenvalue = 10.782, the average factor loading was .911, explained 82.94 percent of total variance). Cronbach's alpha for employee creativity was .913. CFA results showed that employee creativity measure fit our survey data well ($\chi^2_{(65)}=177.30$, RMSEA=.066 , CFI=.98 , NFI=.97).

Control variables. We controlled four of the participants' demographic variables. They are gender, age, educational level, and organizational tenure. As these factors had high potential effects on LMX quality, TMX quality, creative self-efficacy, intrinsic motivation, creative process engagement and creativity [4][8][31][32]. Gender was a dichotomous variable and we measured it by coding as 0 for male and 1 for female. We measured age using years. Educational level was measured as an employee's highest degree. Organizational tenure was measured as the years that an employee worked for the organization.

3.3 Analysis

In this study, we mainly used structural equation modeling (SEM) with LISREL8.7 and adopted a three-step analytical strategy to examine the hypothesized model depicted in Figure 1. First, we used SPSS19.0 to examine the questionnaire's validity and reliability and correlations among variables of the model. Second, we utilized LISREL8.7 to check the relationships between intrinsic motivation and the three sub-processes of creative process engagement of the model. Finally, we adopted regression analysis to test the relationship between creative process engagement and employee creativity.

4. RESULTS

Table 1 provides the descriptive statistics, correlations, and scale reliabilities and validities of the variables in the study. The table 1 shows: the variables' reliabilities are reasonable, the value is between .88 and .94;

Table 1. Descriptive statistics, correlations, reliabilities and validities^a

	mean	std	AVE	\sqrt{AVE}	1	2	3	4	5	6	7	8	9	10
1 Gender	.16	.365	-	-										
2 Age	29.83	4.24	-	-	-0.92									
3 Educational level	3.11	.311	-	-	-0.40	.050								
4 Organizational tenure	38.27	27.48	-	-	.078	.008	-0.93							
5 Intrinsic motivation	3.52	1.00	.70	.84	.055	-0.89	-0.65	.065	(.88)					
6 Problem identification	3.34	.96	.72	.85	.007	.028	-0.05	-0.10	.381**	(.89)				
7 Information researching and encoding	3.22	1.08	.74	.86	.004	-0.41	.002	-0.60	.397**	.515**	(.89)			
8 Ideas and alternatives generation	3.40	1.05	.76	.87	.003	-0.45	-0.34	.007	.457**	.556**	.460**	(.94)		
9 Creative process engagement	3.33	.86	.74	.86	.005	-0.31	-0.20	-0.20	.509**	.794**	.758**	.888**	(.92)	
10 Employee creativity	3.50	.63	.45	.67	.018	.005	-0.08	.043	.444**	.430**	.360**	.512**	.542**	(.91)

^a n = 398. Internal reliabilities (alpha coefficients) for the overall constructs are given in parentheses on the diagonal. * p ≤ .05 ** p ≤ .01

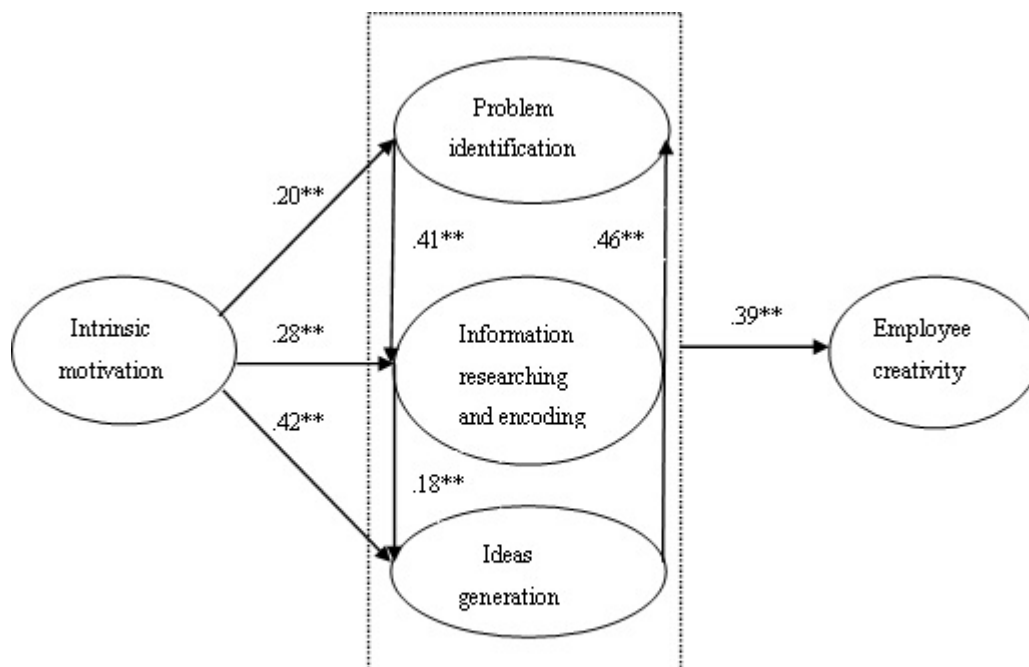


Figure 2. Structural equation modeling with moderation results*

^a n =398. All paths in structural model analysis are significant at p≤.05. Control variables are not shown for ease of presentation. ** p≤.05

except control variables, the correlations among other variables reach significant level; the convergent validities

and discriminative validities of the variables are reasonable. In addition, the three sub-processes are regard as creative process engagement' dimensions, discriminative validities among them don't reach significant level is normal.

Structural modeling results suggested that the hypothesized model fit the data well ($\chi^2(318)=672$, CFI=.99, GFI=.95, IFI=.99, NFI=.98, RMSEA=.052). Figure 2 presents the path coefficients of the overall structural model and we can see that the majority of our hypotheses are supported. Hypothesis 1a, Hypothesis 1b, Hypothesis 1c each states that intrinsic motivation positively related to problem identification, information searching and encoding, ideas and alternatives generation. As expected, they all receive well support ($\beta=.20$, $p<.05$; $\beta=.28$, $p<.05$; $\beta=.42$, $p<.05$). Hypothesis 2 says that creative process engagement positively related to employee creativity by creative sub-processes' mutual promotion process, which also been supported ($\beta=.41$, $p<.05$; $\beta=.18$, $p<.05$; $\beta=.46$, $p<.05$; $\beta=.39$, $p<.05$).

5. DISCUSSION

In this study, we examined the influence of mediating role of creative process engagement on the relationship between intrinsic motivation and employee creativity.

As we expected, intrinsic motivation positively related to each sub-process of creative process engagement. This study followed the research of Zhang and Bartol (2010), who demonstrated that intrinsic motivation has positive effect on creative process engagement^[4]. And it also was a response to Binnewies et al (2007), who demonstrated that personal initiative is positively related to each sub-process of creative process engagement and called for further research emphasized on it^[7]. We looked into the details of how intrinsic motivation influence problem identification, information researching and encoding, and ideas and alternatives generation. Our study make a better understanding of creative process engagement and perhaps also have a small notice for managers. They may improve employees' creativity by boosting their intrinsic motivation to engage in creative process.

We proved that creative process engagement had a positive influence on employee creativity. But Binnewies et al (2007) tested that not every sub-process of creative process engagement has a significant effect on employee creativity^[7]. So we proposed it is the creative sub-processes' mutual promotion process leads to employee creativity. In our study, the mutual promotion process didn't fully proved because of the data of our study was static. Therefore, future research may focus on creative sub-processes' mutual promotion process.

While like any study, our study also has some limitations. First, the data of our study were collected within a single company, which is belonging to manufacturing industry. When data come from other industries, the results may have some differences. So future research should collect data from various industries to conform weather the results of our study are universal. Second, we didn't adopt day-by-day data collection method as Amabile, Schatzel, Moneta and Kramer (2004) did^[33]. Therefore, the creative sub-processes' mutual promotion process of the model couldn't be fully depicted. We hope future research could collect day-by-day data to explore how sub-processes of creative process engagement promote mutually.

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