



# A Study of the Influence of Organizational Learning on Employees' Innovative Behavior and Work Engagement by a Cross-Level Examination

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## ABSTRACT

The purpose of this study is to examine the influence of organizational learning on employee's innovative behavior, and further proposed the mediation effect of work engagement between the relationship of organizational learning and employee's innovative behavior. The study targets on executives and their subordinates by paired samples within the Southern Taiwan Science Park and a total of 21 useful firms collected, including 54 managers and 511 employees, and to evaluate research model by using hierarchical linear modeling (HLM). The empirical results indicated that work engagement fully mediated the relationship between organizational learning and employee's innovative behavior, that is, executives with organizational learning can strengthen the work engagement of employees, thereby affecting employee's innovation behavior. Besides, we further found that work engagement also plays a full mediating role among organizational learning and employee's innovative ideas generation, advocacy, and implementation respectively. This paper suggests managers should take advantage of their learning culture to enhance their employees' work engagement and then this is also beneficial for the generation of innovative behavior of employees.

**Keywords:** organizational learning, employees' innovative behavior, work engagement

## INTRODUCTION

Economic development in Taiwan has shifted from an efficiency-driven stage that emphasized cost-reduction to an innovation-driven stage that is geared towards a value-added economy. The core elements of innovation-driven include innovations and R&D efforts. Its developments require enough knowledge production and innovation capabilities. Moreover, it requires talents who act as the carrier of knowledge and also the foundation of innovations and R&D. Flood, Turner, and Hannaway (2000) proposed that an industry which has high

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### **State of the literature**

- Most past research on employees' innovation behavior focused on personal factors of personality and ability, but little on organizational characteristics, e.g. the effect of learning culture on employees' innovation behavior.
- Few literatures proposed the effect of organizational learning on employees' innovation behavior. However, the mechanism affecting such a relationship is the major concern in this study.
- It is wondered whether the enhancement of organizational learning would affect the generation, advocacy, and implementation of the idea of employees' innovation behavior as well as on the positive mental states of vigor, absorption, and dedication at work through employees.

### **Contribution of this paper to the literature**

- Organizational learning positively and significantly affects employees' overall innovation behavior, and work engagement presents mediation effects on the relationship between the two.
- Work engagement does not simply mediate employees' overall innovation behavior but also completely mediates the effect of organizational learning on the generation, advocacy, and implementation of innovative ideas.
- Cross-level analysis could deal with the nest-structure relationship between supervisors and employees. In addition to avoiding the parameter standard error underestimate, it could reduce the problem of common method variance (CMV).

knowledge contents is able to enhance its organizational competitiveness and those employees play the key role of value creation for the organization. Moreover, an employee's innovative behavior is a critical factor to the long-term sustainability and success of an organization (Janssen, 2000). Furthermore, it is beneficial of organizational innovations if an organization is equipped with a learning culture (Senge, 1990; Bates and Khasawneh, 2005). During the learning processes, members interact with each other so that their current knowledge and new knowledge can be effectively transferred, exchanged, and recombined so as to form the organizational intelligence. A higher capability and degree of organizational learning not only results in a higher degree of responses to the environment, but also is beneficial of organizational developments including new product developments and organizational performance (Blazevic & Lievens, 2004; Atuahene-Gima & Murray, 2007).

Janssen (2000) defined an employee's innovative behavior as the creation, promotion, and execution of an individual's innovative ideas during his/her job tasks within a group or organization. He and other scholars such as Tsai (2008), Afuah (2003), and Krause (2004) proposed that an innovative behavior, the course of multistage actions which occur during the interactions with others on the job. It is known from the study of Kahn (1990) that, when an employee's work engagement is lower, an individual will keep him/herself from generating the performance that is required for his/her job role. On the contrary, when the work engagement is higher, an individual devotes all of his/her efforts into the job role and goes all

out comprehensively. In this study, we propose that even though organizational learning is very important for innovative behavior, work engagement might play a critical mediating role between organizational learning and innovative behavior. In other words, a member can utilize the existing knowledge resources within an organization and achieve knowledge learning and the growth of his/her vocational capabilities. Via the enhancement of an employee's work engagement, he/she can demonstrate the presentation of innovative behavior beyond his/her own expectation.

This study targets on top and middle-level managers and their direct subordinates by paired-samples. The HLM approach was used for cross-level analyses so as to investigate the influence of the organizational learning at the organizational level and the work engagement at the individual level on an employee's innovative behavior.

## LITERATURE REVIEW AND HYPOTHESES

### **Organizational learning**

During the era of knowledge economy, the key to industrial competitions is no longer based on resources but rather the accumulation and utilization of knowledge within an organization. The expectation is to acquire more knowledge via learning so as to enhance its competitiveness (Markovic, 2008). Therefore, within an organization, it is extremely important to be good at creating, acquiring, transforming, and utilizing knowledge so as to correct its behavior by organizational learning in order to cope well with the rapid-changing environment (Senge, 1990; Real, Leal & Rolda'n, 2006). Moreover, organizational learning is a critical factor to an organization's long-term performance and survival (Yukl, 2009). Calantone, Cavusgil & Zhao (2002) proposed that, an organization collects knowledge and information from various sources and ensure their activity and the guidance for application in future operations. They proposed four constituent elements for organizational learning as the criteria for assessment described as follows. (1) The commitment to learning: Learning should be viewed as the major rooted value for a company and should be deep rooted in the organizational culture. This value also affects how much actively its members will act with the learning attitude (Chaveerug & Ussahawantichakit, 2008). (2) Shared vision: The management should share the company's vision for future developments and further provide the learning direction so as to make commitments to the company and achieve the goal. (3) Open mind: This deals with creative thinking beyond the rules and the degree of belief and assumption to actively challenge the existing conventions that have been held for a long term (Santos-Vijande, Sanzo-Perez, Alarez-Gonzalez, & Vazquez-Casielles, 2005; Chaveerug & Ussahawantichakit, 2008). (4) Knowledge sharing within the organization: The overall belief of the organization can be enhanced by the learning and knowledge diffusion across departments. The knowledge and experiences of different departments should be accumulated and stored in the organizational memory so as to enhance organizational performance.

## **Work Engagement**

Work engagement is an important indicator among work attitudes. The information related to work learning, work resources, work performance, turnover intention, innovation, and service atmosphere can be acquired so as to reflect an individual's willingness of devotion to his/her job (Robbins, 2001; Song, Kolb, Lee, & Kim, 2012). When the work engagement is at a lower level, an individual tends to distance him/herself from his/her job role so as to keep him/herself from generating the performance that is required for his/her job role. On the contrary, when the work engagement is higher, an individual devotes all of his/her efforts into the job role and goes all out comprehensively. When an individual recognizes the importance of his/her job, he/she is willing to devote and participate. For example, his/her managements and colleagues will support so that the employee's work engagement is enhanced (Schaufeli & Bakker, 2004; Fleming & Asplund, 2007). Schaufeli and Bakker (2004) proposed that a high degree of job demands and the lack of resource will generate mental storming and eventually lead to job burnouts or even health problems. It will also generate certain specific attitudes and behavioral results such as turnover intention, reduced commitments to the organization, reduced job satisfaction, and reduced degree of work engagement. On the contrary, the acquisition of resources can generate a positive mental state such as the sense of accomplishment and work ethics so that the intention to quit is reduced. Therefore, from a preventative point of view, an organization or enterprise needs to enhance its employees' work engagement by participative managements and social supports so as to increase work resources and avoid any negative results for the organization.

## **Innovative behavior of employees**

The most important key to the competitiveness enhancement for an enterprise or organization to overcome the deadlock under the present highly-competitive environment is whether its employees can perform innovative behavior (Pieterse, Knippenberg, Schippers, & Stam, 2010). Feirong & Richard (2010) proposed that an individual's innovative behavior is to apply unique and useful concepts to products and the way he/she does his/her job. Moreover, an innovative behavior should be viewed as a process that has multiple stages and is across several different fields which include (1) The recognition and creation of new opportunities; (2) The acquisition of resources; (3) Implementation and promotion; (4) The application process (Kanter, 1988). Scott and Burce (1994) proposed that an individual's innovative behavior can be divided into three stages, which are respectively (1) Recognizing a problem and creating new ideas or solutions; (2) Seeking for the recognition of innovative ideas and building an alliance with supporters; (3) Constructing innovation archetypes or models so as to allow them to be produced in a large number and become a preferable way so that the innovative ideas can be realized. Kleysen and Street (2001) reviewed 28 earlier papers regarding innovation and creativity and concluded that an individual's innovative behavior include five constituent elements which are opportunity exploration, generativity, formative investigation, championing, and application. Therefore, when reviewing the definition of an employee's innovative behavior, the concept proposed by Scott and Burce (1994) corresponds in essence

to the definition proposed by Kanter (1988) and Kleysen and Street (2001). All of them viewed an employee's innovative behavior as a course of multistage innovation activities.

### **Influence of organizational learning on employee's innovative behavior**

Based on the knowledge spiral theory proposed by Nonaka and Takeuchi (1995), an individual's tacit knowledge can be expanded to the higher level of the ontology level between teams and organizations via four knowledge transformation model such as socialization, externalization, combination, and internalization. Therefore, a learning-oriented employee can look for the innovative thinking and approach for resolving a problem via the process of interacting with the group so as to enhance and achieve the realization of personal accomplishment goal. Tsai and Chen (2010) also proposed that it is easier for a learning-oriented organization to form an innovative culture, which stresses the learning and developments of its members, encourages the generation of new knowledge, diffuses and transforms the knowledge for the application to the improvement of the organization's activities so as to enhance the innovation capability. Lee, Wu, Ay, & Tu (2007) selected vendors in the knowledge-intensive industry including high tech manufacturing industries and individuals, producer services as their research targets and found that organizational learning has a significantly positive influence on knowledge sharing and new product developments. Therefore, a hypothesis was proposed in this study as follows.

H<sub>1</sub>: Organizational learning has a significantly positive influence on employees' innovative behavior.

### **Mediation effect of work engagement on the influence of organizational learning on employees' innovative behavior**

Schaufeli & Bakker (2004) proposed that for an organization to keep its knowledge workers and to achieve the goals, the importance and values of its employees' work engagement could not be neglected. Members within an organization can take job challenges and obtain the growth opportunities via the interacting processes of experiences and mental models. Therefore, learning orientation is an internal driven force for the capability enhancement of an individual. It allows an employee to generate vitality on his/her job and results in positive mental states related to his/her job such as concentration, devotion, and self-realization. Moreover, the enhancement of organizational learning capabilities keeps employees growing and also creates the organization's competitive edge (Mirheidary, Siadat, Hoveida & Abedi, 2012). Therefore, a hypothesis was proposed in this study as follows.

H<sub>2</sub>: Organizational learning has a significantly positive influence on work engagement.

Schaufeli and Bakker (2004) proposed that, work engagement is a positive and job related mental state with self-realization. It is consisted of three constituent elements which include vigor, absorption, and dedication and it is viewed as the internal motivation index for a job (Salanova & Schaufeli, 2008). Studies in the last few years indicated that, there is a significantly positive correlation between work engagement and employees' innovative

behavior. For example, Salanova and Schaufeli (2008) found that work engagement could positively affect an employee's positive behavior such as the attitude of immediately seeking for a solution to a problem. Tang (2008) found that the innovative behavior of an employee is most apparent when both the external and internal motivations are at a higher level. Gorgievski, Bakker, and Schaufeli (2010) also proposed that work engagement has a significantly positive influence on an employee's creative capabilities. Therefore, a hypothesis was proposed in this study as follows.

H<sub>3</sub>: Work engagement has a significantly positive influence on an employee's innovative behavior.

Jerez-Gomez, Cespedes-Lorentw, & Valle-Cabrera (2005) proposed that subordinates acquire, transfer, and integrate knowledge into shared knowledge within an organization and it is called the organizational memory. Via the interactive processes of internalizing the knowledge into the personal tacit knowledge, an employee is driven by the internal learning motivation so that he/she generates the mental states of vigor, absorption, and dedication to his/her job and applies them to any aspect of products, processes, or management. In other words, an employee demonstrates his/her innovative behavior via this process. The following hypothesis could be derived by integrating the above-mentioned results.

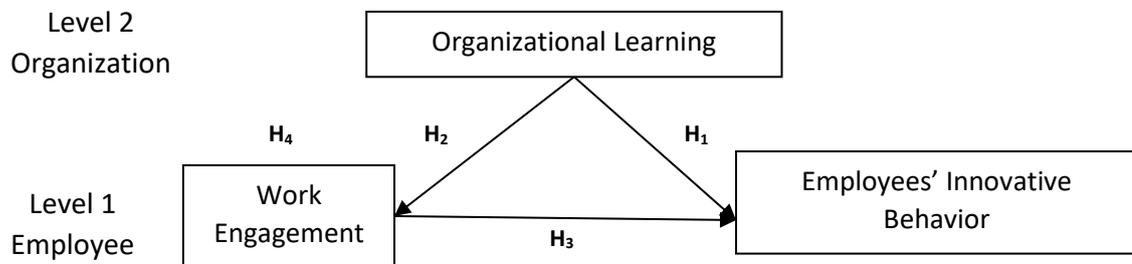
H<sub>4</sub>: Work engagement plays a role in mediating the influence of organizational learning on an employee's innovative behavior.

## METHODOLOGY

### Research framework

This study is to investigate the influence of organizational learning (at the organizational level) on an employee's innovative behavior (at an individual level). The data structure features a nested hierarchical relationship. Moreover, due to the interactions between the conceptions of these two levels, contextual effects and cross-level interactions are generated (Wen & Chiou, 2009). However, if the study was carried out only by summations without considering the analysis by hierarchical data structure, problems such as the bias due to summations and the inaccuracy from estimations will arise.

Based on the reviewing on relevant literature as mentioned above and by combining the research results obtained by various scholars, the research framework is shown as **Figure 1**. The variables in this study can be classified into two levels. The individual level (level-1) includes variables such as work engagement and employees' innovative behavior. The organizational level (level-2) includes the variable of organizational learning. The mediation effect of the work engagement on the influence of the organizational learning on employees' innovative behavior can be examined from the viewpoint of cross-level.



**Figure 1.** Research framework

### Constructs and measurement

The constructs of this study include organizational learning, employees' innovative behavior, and work engagement. The conceptual definitions, operational definitions, sources of scales, and assessment approach are described respectively as follows.

#### (1) Organizational learning

The conceptual definition of organizational learning in this study is as follows. "It is a process of continuous actions which view learning as the most fundamental value for an organization. It also allows the sharing of the vision of future developments with members in the organization, encourages members to do creative thinking beyond the rules, boosts the mutual understanding in order to realize the shared vision via the learning and sharing of knowledge across different departments within the organization." The organizational learning scale proposed by Clantone et al. (2002) was used along with four dimensions which include *commitments to learning, shared vision, open mind, and knowledge sharing within the organization*.

#### (2) Employees' innovative behavior

The conceptual definition of employees' innovative behavior in this study is as follows. "For the production procedures and achievements of products or services and from the aspects of technological and management approaches, the course of an employee's activities for generating innovative ideas and further establishing the supports and alliances of his/her innovation ideas so as to successfully implement his/her innovative ideas". It is consisted of three dimensions which include *the generation of innovative ideas, the advocacy of innovative ideas, and the implementation of innovative ideas*. The innovative behavior scale proposed by Scott & Bruce (1994) was used in this study with some modifications.

#### (3) Work engagement

The conceptual definition of work engagement in this study is as follows. "The mental state which is generated by an individual's behavior due to the perception of his/her work values and the emotional perception that is formed thereafter." The work engagement scale

**Table 1.** Mean, standard deviation, and correlation analysis

Variable	Average	Standard deviation	1	2	3
1. Organizational learning	3.756	0.386	1		
2. Work engagement	3.505	0.569	.143**	1	
3. Employees' innovative behavior	3.540	0.447	.138**	.538**	1

Note: N=511, \* p<.05\*; \*\* p<.01; \*\*\* p<.001

proposed by Schaufeli, Salanova, and Bakker (2006) was used in this study and it is consisted of three dimensions including vigor, absorption, and dedication.

## ANALYSIS AND RESULTS

### Descriptive statistical analysis

The research targets in this study include vendors of the photo-electricity industry, integrated circuit industry, precision machinery industry, computer peripherals & communication industry, and biotechnology industry. The intention of this study was to invite a top and middle-level manager and ten of his/her subordinates from the R&D department, engineering department, and operational department of each of the vendors for the questionnaire survey. A total of 25 vendors received the questionnaire copies and 21 valid copies were returned from them. A total of 75 copies for managers were dispatched and 58 copies were returned with a total of 54 valid copies. A total of 750 copies for employees were dispatched and 531 copies were collected with a total of 511 valid copies. The average number of valid copies from employees is 10 per manager.

### Correlation analysis

Since the organizational learning scale was filled out by those managers, the disaggregating approach was used. That is, the self-assessment scores collected from the manager level on the organizational learning as the scores of the subordinates under this manager so as to carry out the correlation analysis.

The mean, standard deviation, and correlation analysis of each construct are shown in **Table 1**. There are significantly positive correlations between various constructs including organizational learning, work engagement, and employees' innovative behavior.

### Reliability and validity

The Cronbach's  $\alpha$  value of the organizational learning is .92, the Cronbach's  $\alpha$  value of the work engagement is .86, and the Cronbach's  $\alpha$  value of the employees' innovative behavior is .86. Therefore, the Cronbach's  $\alpha$  values of all of the constructs in this study are higher than .7, which indicates good reliability for each construct. Since there are supports from earlier studies and verifications from various scholars that the dimensions of the assessments on various constructs by the scale used in this study have good reliability and validity, we also used adequate scales depending on the characteristics of the research target. Furthermore, we

**Table 2.** Results of one-way random analysis

	Variance	Chi-square value	Degree of freedom	P value
Intercept	0.013	89.762	53	0.001***
Level 1	0.186			

Dependent variable: employees' innovative behavior

invited scholars from the academic circle and professionals in the industry to assess the adequacy of the constituent elements and questions used in these scales so as to achieve good content validity. Meanwhile, confirmatory factor analysis (CFA) was used for the construct validity analysis on the organizational learning, employees' innovative behavior and work engagement scales. The results indicated that the standardized factor loading for each scale is larger than 0.7, which indicates the convergent validity of each scale is good. Furthermore, the discriminant validity was tested using the Chi-square difference test in Amos. The results show that the Chi-square difference ( $\Delta\chi^2$ ) between the two dimensions is greater than 3.84; therefore, the constructs possess discriminant validity.

### Hierarchical linear modeling

This study also investigated the mediation effect of work engagement on the influence of organizational learning on employees' innovative behavior. However, an employee is nested under a manager within a company's hierarchy. An employee as level 1 and a manager as a level 2. There are several employees under a manager and therefore it is required to use the hierarchical linear modeling to examine the cross-level research hypotheses.

#### *One-way random effect*

The first step is to examine the null model which has no affecting factors for level 1 and level 2 on variable Y (employees' innovative behavior). It is the most fundamental form of cross-level analysis and its model is as follows.

Level 1:

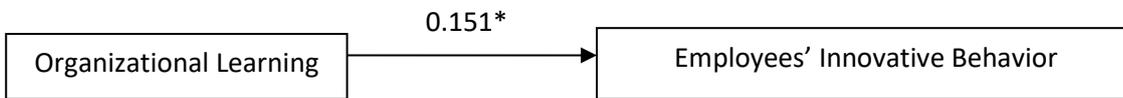
$$Y_{ij} = \beta_{0j} + \epsilon_{ij} \text{ where the random error is assumed to be } \epsilon_{ij} \sim N(0, \sigma^2)$$

Level 2:

$\beta_{0j} = \gamma_{00} + \mu_{0j}$  where the random error is assumed to be  $\mu_{0j} \sim N(0, \tau_{00})$ ,  $\beta_{0j}$  of level 2 is substituted into level 1 and the null model can be obtained by  $Y_{ij} = \gamma_{00} + \mu_{0j} + \epsilon_{ij}$ .

The employees' innovative behavior is set as an outcome variable to test whether the average innovative behavior of employees under different managers have significant difference. The results of the null model analysis are summarized in **Table 2**.

It is known from **Table 2** that chi-square value=89.762, the variance of U0:  $\tau_{00} = 0.01$  and the corresponding P value=0.001, which is significant. This results indicated that the average innovative behavior of employees under different managers have a significant



**Figure 2.** Total effect of organizational learning on employees' innovative behavior

difference. Since the employees within the same department have similar cultural background, the homogeneity among employees within the same department is higher than those in different departments and they are consistent for their opinions toward a problem. For the approaches of measuring whether the individuals within a group have the same response, the most commonly used indicator is the Intraclass correlation (ICC). It is to measure the proportion of level 2 variance within the total variance (0.013/0.013+0.186). It was found from the ICC measurement results that, about 7% of the variance of employees' innovative behavior are due to the differences between managers. Furthermore, the ICC values can be converted into F values and the significance of ICC can be determined by looking up in the F table. The resulting value after calculation is P value=.001, which is significant. This indicates the same manager has a consistent opinion toward innovative behavior but the severity is not high.

*Total effect of organizational learning on employees' innovative behavior*

Since there are significant differences between various managers, it is required to further investigate the reason for it. The next step is to investigate whether organizational learning is the main factor that affects employees' innovative behavior. That is, this is examine the hypothesis H<sub>1</sub> with the control variables including gender, age, and educational background. This study also adopts the method of Random-Intercept Model with Level-1 Covariates, which is briefly described as follows.

Level-1 Model

$$\text{Employees' innovative behavior} = B_0 + B_1 * (\text{Employee gender}) + B_2 * (\text{Employee age}) + B_3 * (\text{Educational background}) + R$$

Level-2 Model

$$B_0 = G_{00} + G_{01} * (\text{Organizational learning}) + G_{02} * (\text{Manager gender}) + G_{03} * (\text{Manager age}) + U_0$$

The results of this study indicated that the coefficient of organizational learning on employees' innovative behavior is 0.151 and P value=0.018, which is significant. This indicates organizational learning has a positive influence on employees' innovative behavior. That is, hypothesis H<sub>1</sub> is supported. The influence path of organizational learning on employees' innovative behavior is shown in **Figure 2**.

*Analysis of the mediation effect of work engagement*

Since the influence of organizational learning on employees' innovative behavior is significant. We further investigated what mechanism or process causes the influence of

**Table 3.** Analysis of Total effects

	Employees' innovative behavior coefficient	p value
Intercept	2.537	0.000
Organizational learning	0.151*	0.018
Manager gender	0.028	0.658
Manager age	-0.001	0.797
Employee gender	0.046	0.275
Employee age	0.008*	0.017
Educational background	0.040	0.206

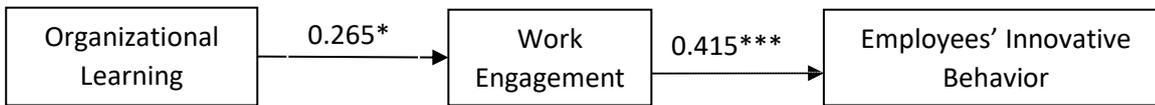
Note: \*  $p < .05$ ; \*\*  $p < .01$ ; \*\*\*  $p < .001$

organizational learning on employees' innovative behavior and carried out the analysis of the mediation effect. Based on the results obtained from the above-mentioned literature review, we proposed work engagement as a mediating variable for the influence of organizational learning on employees' innovative behavior and then examined hypotheses  $H_2 \sim H_4$  in sequence.

Since the organizational learning is at the manager level (level 2) and work engagement is at the employee level (level1), HLM 6.0 can be used to perform the regression analysis of work engagement on organizational learning. This is, the first-stage effect evaluation of organizational learning on work engagement. Besides, we continued with the analysis of the influence of organizational learning and work engagement on employees' innovative behavior. This deals with the evaluation of the second-stage as well as indirect effects and the results of the analysis are summarized into **Table 3**.

The path coefficient of organizational learning on work engagement is 0.265 and the P value is significant. This indicates that organizational learning has a significant influence on work engagement and therefore Hypothesis  $H_2$  is supported.

The path coefficient of organizational learning on employees' innovative behavior is 0.050 and the P value is insignificant. Therefore, the organizational learning doesn't have a significant influence on employees' innovative behavior. With organizational learning controlled, the coefficient of work engagement on employees' innovative behavior is 0.415 and the P value is significant, which indicates a significant second-stage effect. Therefore, with organizational learning controlled, work engagement has a significantly positive influence on employees' innovative behavior, which indicates Hypothesis  $H_3$  is supported. However, the direct effect of organizational learning on employees' innovative behavior is not significant since P value=0.304 is not significant. This indicates work engagement fully mediates the influence of organizational learning on employees' innovative behavior. That is, Hypothesis  $H_4$  is supported. Its mediation path is shown in **Figure 3**.



**Figure 3.** Complete mediation effect of work engagement

**Table 4.** Analysis the mediation effect of work engagement

	Work Engagement coefficient	Work Engagement P value	Employees' Innovative Behavior coefficient	Employees' Innovative Behavior P value
Intercept	2.014	0.000	1.628	0.000
Organizational learning	0.265*	0.018	0.050	0.304
Work engagement			0.415***	0.000
Manager gender	-0.037	0.738	0.050	0.288
Manager age	0.002	0.710	-0.001	0.633
Employee gender	-0.001	0.887	0.062	0.082
Employee age	0.011*	0.011	0.003	0.212
Educational background	0.021	0.628	0.037	0.194

Note: \* p<.05; \*\* p<.01; \*\*\* p<.001

*The relationship between organizational learning, work engagement, and the idea generation, advocacy, and implementation of employees' innovative behavior*

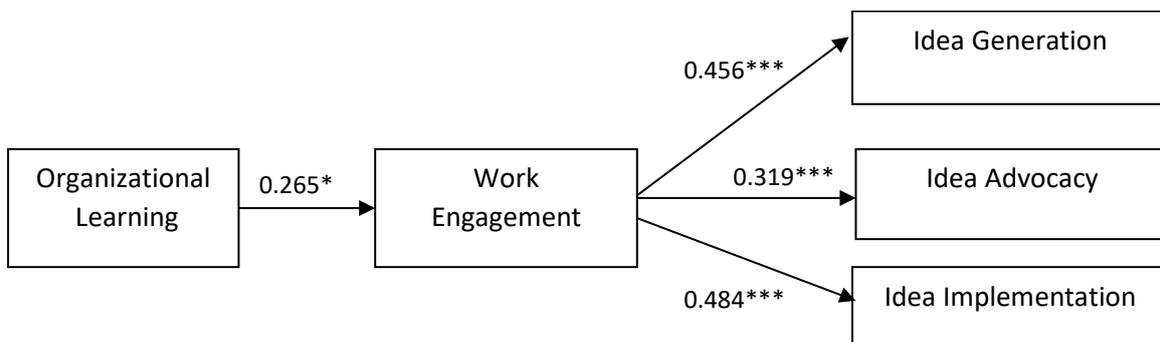
The above-mentioned results indicated that, work engagement fully mediates the influence of organizational learning on employees' innovative behavior. However, the innovative behavior scale was obtained by the integration of three dimensions which include *idea generation*, *idea advocacy*, and *idea implementation*. Therefore, it is required to carry out a further examination on the mediation effects of work engagement on the influence of organizational learning on these three dimensions. The results of analysis are summarized as **Table 4**.

By combining the analysis results in **Table 4** and **Table 5**, it is clear that the influence of organizational learning on work engagement is significant ( $\beta=0.265^*$ ). Moreover, the influence of work engagement on the generation, advocacy, and implementation of employees' innovative ideas is significant ( $\beta$ : 0.456\*\*\*; 0.319\*\*\*; 0.484\*\*\*). This indicates organizational learning does affect employees' idea generation, idea advocacy, and idea implementation respectively via work engagement. On the contrary, the influence of organizational learning on employees' innovative idea generation, innovative idea advocacy, and innovative idea implementation is insignificant ( $\beta$ : 0.046; 0.125; 0.012). This result indicates the work engagement has a complete mediation effect. The results are summarized as **Figure 4**.

**Table 5.** The influence of organizational learning and work engagement on the three dimensions of employees’ innovative behavior

	<b>Idea generation Coefficient</b>	<b>Idea advocacy Coefficient</b>	<b>Idea implementation Coefficient</b>
Intercept	1.677	1.397	1.681
Organizational learning	0.046	0.125	0.012
Work engagement	0.456***	0.319***	0.484***
Manager gender	0.049	0.056	0.046
Manager age	0.000	-0.002	-0.001
Employee gender	0.167	0.019	-0.004
Employee age	0.006	0.000	0.004
Educational background	0.010	0.071	0.031

Note: \* p<.05; \*\* p<.01; \*\*\* p<.001



**Figure 4.** Analysis of the mediation effect

### CONCLUSION AND SUGGESTIONS

The first stage of this study is to examine the model of the employees’ innovative behavior. The results indicated that the variance of employees’ innovative behavior exist between different groups. In other words, the average innovative behavior of employees under different managers do present differences in their performance. Moreover, these differences are positively correlated to organizational learning. When the capacity of degree of organizational learning is higher, an employee tends to present his/her innovative behavior. Secondly, it was also found in this study that the relationship between organizational learning and employees’ innovative behavior is fully affected by the mediation effect of employees’ work engagement. Gagne & Deci (2005) proposed that increasing work resources can boost an employee’s willingness of engaging into the achievement of job tasks. For example, the work resources such as the supports and assistances from his/her manager and colleagues and information sharing can satisfy an individual’s social demands and self-esteem. On the contrary, when an individual lacks work resources, it will cause job burnout, reducing in the degree of work engagement, and even the generation of turnover intention. Moreover, work engagement indicates the degree of an individual’s emphasis or recognition

of his/her job. When an individual devotes himself/herself completely, he/she will make a higher degree of commitments to his/her job and has the courage to devote him/herself into scenarios with challenging threats. Therefore, for a R&D department of a high tech industry that often needs to face innovation challenges, its employees can trigger more positive evaluation of the stressful scenarios if they are equipped with this belief and think their jobs are meaningful. Therefore, members within an organization can learn internal or external knowledge via the trusts and cooperative learning so as to help the organization develop new knowledge or new thinking. During the process of sharing and applying new knowledge that is created by the above-mentioned approach, the inner perception of the members is greatly affected and this is helpful for the enhancement of their work engagement. This mental state or internalization process is beneficial for the generation of employees' innovative behavior. That is to say, a member of a learning organization shares the process of interactions via his/her experiences and mental models. He/she is driven by the inner learning motivation so that he/she generates mental states such as vigor, absorption, and devotion for his/her job. This approach also triggers personal growth, learning, and developments

More importantly, employees' innovative behavior are viewed as multistage dynamic processes, which include the generation, advocacy, and implementation of innovative ideas (Scott & Bruce, 1994). Although an organization needs to emphasize and strengthen the generation, advocacy, and implementation of its employees' innovative ideas from the aspect of its learning culture, no matter which stage of innovative behavior, the affecting process is realized completely by changing an employee's mental state so as to drive him/her to devote more into his/her job. Therefore, the managements need to view organizational learning as the core of innovations, utilize knowledge-sharing projects to transfer and share the tacit and explicit knowledge between members in the organization. This is helpful for the innovation potentials and the generation of employees' innovative behavior will follow the process of idea generation, advocacy, and implementation so as to realize the innovative behavior.

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