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Full Length Research Paper

Organizational learning capability and organizational innovation: The moderating role of knowledge inertia

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The capability to learn is a critical factor for organization to grow and innovate. However, there's no research examined the positive relationship between the effect of organizational learning capability and organizational innovation. In addition, employees solve problems with their prior experience and knowledge as facing problems, that is, knowledge inertia, may hinder organizations capability from learning and problems solving. The purpose of this study is to examine the relationship between and organizational innovation, and understand the moderating effect of knowledge inertia in the relationship between organizational learning capability and organizational innovation. This study collected 563 valid questionnaires to analyze. The participants in this study were a regional hospital in middle Taiwan, included nurses, supervisors and managers. The result showed that organizational learning capability positively and significantly related to organizational innovation. Knowledge inertia moderated the relationship between organizational learning capability and organizational innovation. The theoretical and practical implications are discussed.

Key words: Organizational learning capability, organizational innovation, knowledge inertia, medical industries.

INTRODUCTION

The late twentieth century, innovation has been considered as a critical issue for company performance and survival in the competitive environment (Bello, Lohtia, and Sangtani, 2004; Damanpour and Gopalakrishnan, 2001; Hurley and Hult, 1998; Arago´n-Correa, Garcı´a-Morales and Cordo´n-Pozo, 2007; Bueno and Ordon˜ ez, 2004). Organizational innovation effectively is the key to construct and maintain competitive advantages to face changing environment (Lemon and Sahota, 2004; Liao, Fei, and Liu, 2008).

Learning became a key activity for organization development and innovation. According to the importance of organizational innovation, scholars are paying growing attention to examine that the collective capability of organizational learning plays a key role for innovation (Senge, 1990; Senge, Roberts, Ross, Smith, and Kleiner, 1994; Tushman and Nadler, 1986). Recent years have seen increased attention being given to the organizational capability that facilitates organization to learning (Leonard-Barton, 1992; Goh, 1998). The capability to learn is a critical factor for organization to grow and innovate (Jerez-Go' mez, Ce' spedes-Lorente and Valle-Cabrera, 2005; Lynn and Akgun, 2000; Hult et al., 2004).

However, in order to save time and effort, people solve problem with their prior experience and knowledge as facing problems, that is, knowledge inertia (Liao et al., 2002, 2008). Knowledge inertia (KI) may hinder organizations capability from learning and problems solving. Inertia would result in lack of creative thinking and innovative behavior and has negative impact to learning and utilize knowledge efficiently and effectively. However, innovation is essential factor for competitive advantage to survival. Learning capability is any change in the organization's models that maintains or improves performance and then enables organization to innovative (Cyert and March, 1963; Hedberg, 1981; Dibella et al., 1996),

There are some researches to examine the relationship

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between organizational learning and organizational innovation (Calantone et al., 2002; Gerybadze and Reger, 1999; Tushman and Nadler, 1986). However, there's no research examined the positive relationship between the effect of organizational learning capability (OLC) and organization innovation (OI). In order to complete the gap, the purpose of this study is to examine the relationship between OLC and OI, and understand the moderating effect of KI in the relationship between OLC and OI. Figure 1 shows the conceptual model.

LITERATURE REVIEW

Organizational learning capability (OLC) and organizational innovation (OI)

The OLC that is a facilitating factors to learn have been increasingly attention for academics and practitioners. OLC (Dibella, Nevis and Gould, 1996; Goh and Richards, 1997; Hult and Ferrell, 1997; Jerez-Go' mez, Ce' spedes-Lorente and Valle-Cabrera, 2005; Yeung et al., 1999) highlights the factors or characteristics of facilitating organization to learn. OLC is defined as the organizational and managerial characteristics or factors that facilitate the organizational learning process or allow an organization to learn (Dibella et al., 1996; Goh and Richards, 1997; Hult and Ferrell, 1997; Yeung et al., 1999). OLC is consisted with five essential facilitating factors: experimentation, risk taking, interaction with the external environment, dialogue and participative decision making. Below we describe the definition of dimensions of OLC we proposed.

Experimentation be considered the key dimension in the organizational learning literature (Goh and Richards, 1997; Hedberg, 1981; Nevis, DiBella and Gould, 1995; Pedler, Burgoyne and Boydell, 1997; Tannenbaum, 1997; Ulrich, Jick and Von Glinow, 1993; Weick and Westley, 1996), and be defined as the extent to which new ideas and suggestions are attended to and treated (Alegre and Chiva, 2008; Chiva and Alegre, 2009). Risk taking can be considered as the degree to tolerant to ambiguity, uncertainty and errors (Alegre and Chiva, 2008; Chiva and Alegre, 2009). Sitkin (1996, p. 541) and Hedberg (1981) pointed that failure is a key condition for effective organizational learning. Interaction with the external environment making refers to the relationships with the organizational external environment (Alegre and Chiva , 2008; Chiva and Alegre, 2009).

Environmental characteristics are an essential role in learning (Bapuji and Crossan, 2004, p. 407). Dialogue is considered as an essential process to develop common understanding for organizations, could help individuals to understand the hidden meanings in the communications (Alegre and Chiva, 2008; Chiva and Alegre, 2009). Participative decision is considered as the degrees of influence employees have in the decision making process (Cotton et al. , 1988). Implementing participative decision making is to enhance employees' motivation, result in higher employee involvement, job satisfaction and organizational commitment (Daniels and Bailey, 1999; Latham, Winters and Locke, 1994; Scott- Ladd and Chan, 2004; Witt, Andrews and Kacmar, 2000).

As mentioned above, the capacity to learn has been con-sidered a key index of an organization's effectiveness and potential to innovate (Je' rez-Go' mez et al., 2005; Alegre and Chiva, 2008). Innovation involves which generation or adoption of novel ideas or behavior (Kanter, 1988; Scott and Bruce, 1994). Hence, OI can be a new product or service, a new production technology, a new operation procedure or a new management strategy (García-Morales, Ruiz-Moreno, and Llorens-Montes, 2007). Most Thus, we expect a positive, substantial, and significant link between OLC and OI, and then made following hypothesis:

H_1: OLC will positively relate to OI.

Knowledge inertia (KI)

Inertia is made refer to "overarching concept that encompasses personal commitments, financial investment sand institutional mechanisms supporting the current ways of doing things" by Huff et al. (1992). Applying the concept of inertia to human behavior, individuals use their prior knowledge and experience to solve problems, that is, knowledge inertia (Liao et al, 2002, 2008). KI would result in lack of creative thinking and innovative behavior and has negative impact to learning and utilize knowledge efficiently and effectively.

According to Liao et al (2008), KI is provided the empirical evidence to support that is comprised of two dimensions: experience and learning inertia. Experience inertia is defined as individuals solve problems with prior experience and knowledge. Learning inertia is referred as individual learn knowledge from the same source. However, Adams et al. (1998) found that inertia hindered organization capability to learn. In the other words, inertia could be considered as a barrier for organizational learning. For individuals, KI obstructed learning ability, and then affects organizational learning. Therefore, we expect the KI will moderate the relationship between OLC and OI and then made the following hypothesis:

H_2: KI will moderate the relationship between OLC and OI.

RESEARCH DESIGN

This work developed and contrasted ''OLC–KI–OI" frames. Figure 1 illustrates the conceptual framework.

Sample and procedure

This study conducted a cross-sectional design and collect data in

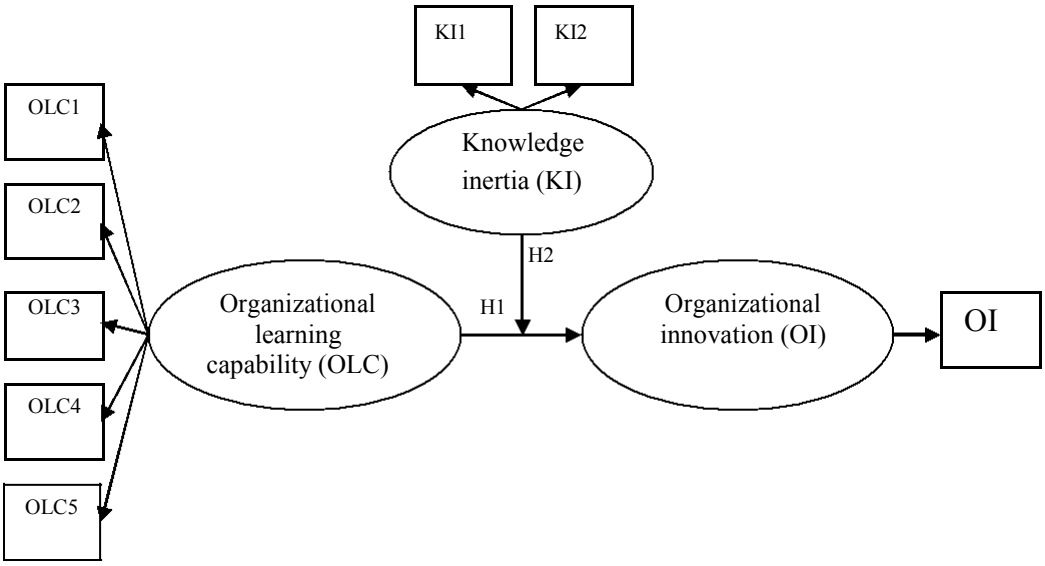

Figure 1. Conceptual framework.

order to test our hypotheses. The target population of this study is consisted of nurses who worked at a regional hospital in middle Taiwan. The respondents are included nurses, supervisors and managers. The workers are asked to answer the OLC, KI, and OI questionnaire in hospital time. Our study received 563 valid questionnaires. The sample obtained represents about 63% of our study population. The response rate and the number of responses are satisfactory (Janssen and Van Yperen, 2004). The respondents averaged 31.5 years in age, 7.13 years in tenure, and 81.8% had completed university degree, 10% had 5-year Junior College.

Measurement

The parallel-translation method is conducted to assure the meanings of question items were correctly transformed from English to Chinese. Question items are adopted from the literature were first translated into Chinese by one person and then retranslated into English by a second person. Below we described the measurement and the source for study constructs.

OLC

According to relevant researches (Sharma, 1996; Uriel and Alda's, 2005; Alegre and Chiva; 2008; Chiva and Alegr, 2009), OLC is comprised 5 dimensions: experimentation, risk taking, interaction with the external environment, dialogue and participative decision making. We adopted OLC measurement instrument with 14 items which developed by Alegre and Chiva (2008). The measurement instrument is developed from literature, and provided empirical evidence to support the convergence and discriminant validity (c.f. Alegre and Chiva, 2008; Chiva and Alegre, 2009). The sample items include "People here receive support and encouragement when presenting new ideas", "People are encouraged to take risks in this organization", "It is part of the work of all staff to collect, bring back and report information about what is going on outside the company". The OLC measurement instrument is rated by a seven-point Likert scale, where 1 represented total disagreement and 7 total agreement. The Cronbach's α is conducted to analyze the reliability of scales. The result showed that the construct is 0.892, above 0.7 (Nunnally, 1978).

In addition, CFA was conducted to validate measures. The composite reliability was 0.84 and the standardized factor loadings are significantly 0.56 to 0.85 (t values are13.52 to 20.22). AVE indices are 0.59, also exceed the minimum standard of 0.5 (Hair et al., 1998; Iglesias, 2004). The model fit adequately: NFI = 0.941, NNFI= 0.886, CFI= 0.943, SRMR= 0.0526, GFI= 0.918. As mention above, Cronbach's α coefficients are highly satisfactory, all above 0.7 (Nunnally, 1978; Hair et al., 1998; Iglesias, 2004); the AVE indices also exceed the minimum standard of 0.5 (Hair et al., 1998; Iglesias, 2004). Our analyses support the reliability of the measurement scales. Results showed that t values are greater than 2; the construct was revealing good convergent validity. The square root of AVE are greater than the correlation coefficients, the construct was also revealing good discriminant validity (Table 1), according to Fornell and Larcker (1981).

KI

According to Liao (2008), KI involves the extent of solving problem with prior knowledge and experience, and is consisted of 2 dimensions: learning inertia and experience inertia. We adopted 14-items scale developed by Liao (2008) to measure the construct of KI. The sample items include "I will not use new approaches to solve new problems", "I am used to resorting to the same source for new knowledge". The measurement instrument is rated by a seven-point Likert scale, where 1 represented total disagreement and 7 total agreement. The Cronbach's α is conducted to analyze the reliability of scales. The result showed that the construct is 0.796, above 0.7 (Nunnally, 1978).

The standardized factor loadings are significant and the values are 0.49 to 0.88 greater than 0.4, besides no.12 (λ_{12}= 0.033), and no. 13 (λ_{13}= 0.145). The results showed that the model is unsuitable with data, NFI = 0.758, NNFI= 0.710, CFI= 0.765, SRMR= 0.145, GFI= 0.925. According to Fornell and Larcker's (1981) suggestion, the items which do not meet the standards are deleted. And then, we conducted CFA to verify the validity of measure again. The com-posite reliability was 0.88 and the standardized factor loadings are significantly 0.40 to 0.91 (t values are 9.13 to 26.13). The result also showed that the model fit adequately: NFI = 0.90, NNFI= 0.90, CFI= 0.90, SRMR= 0.10, GFI= 0.96.

As mentioned above, Cronbach's α coefficients are highly

Table 1. Descriptive statistics, alpha coefficients and correlations among study variables.

	Mean	St. Deviation	(1)	(2)	(3)
(1) OLC	3.258	0.66	(0.77)		
(2) Knowledge Inertia	4.173	0.63	0.16*	(0.72)	
(3) Organizational Innovation	3.389	0.675	0.60*	0.21*	(0.84)

1: *p-value<0.05, N=563. 2: Numbers in parentheses indicate the AVE.

satisfactory, all above 0.7 (Nunnally, 1978; Hair et al., 1998; Iglesias, 2004); the AVE indicator is 0.52, also exceed the minimum standard of 0.5 (Hair et al., 1998; Iglesias, 2004). Our analyses support the reliability of the measurement scales. Results showed that t values are greater than 2; the construct was revealing good convergent validity. The square root of AVE are greater than the correlation coefficients (Table 1), the construct was also revealing good discriminant validity, according to Fornell and Larcker (1981).

OI

This study conducted the instrument which developed by Miller and Friesen (1983) to measure OI. This instrument is provided empirical evidence to support the construct validity, including convergence validity and discriminant validity by García-Morales, Ruiz-Moreno, and Llorens-Montes (2007). The sample items "The relative rate of introduction of new products or services in the organization has been very high", "The relative rate of introduction of new innovations in the organization has grown rapidly", "and the relative rate of introduction of new changes in internal operating practices in the organization has grown rapidly". The Cronbach'sαis conducted to analyze the reliability of scales. The result showed that the construct is 0.783, above 0.7 (Nunnally, 1978).

The standardized factor loadings are significant and the values are 0.76 to 0.85 greater than 0.4, besides no.5 (t= 0.46). The results showed that the model is unsuitable with data, NFI = 0.993, NNFI= 0.994, CFI= 0.997, SRMR= 0.032, GFI= 0.997. According to Fornell and Larcker's (1981) suggestion, the items which do not meet the standards are deleted. And then, we conducted CFA to verify the validity of measure again. The composite reliability was 0.65 and the standardized factor loadings are significantly 0.40 to 0.91 (t values are 15.101 to 15.123). The result also showed that the model fit adequately: NFI = 0.996, NNFI= 0.992, CFI= 0.997, SRMR= 0.032, GFI= 0.998.

As mentioned above, Cronbach'sαcoefficients and composite reliability are highly satisfactory, all above 0.7 (Nunnally, 1978; Hair et al., 1998; Iglesias, 2004); the AVE indicator is 0.70, also exceed the minimum standard of 0.5 (Hair et al., 1998; Iglesias, 2004). Our analyses therefore support the reliability of the measurement scales. Results showed that t values are greater than 2; the construct was revealing good convergent validity. The square root of AVE are greater than the square of correlation coefficients (Table 1), the construct was also revealing good discriminant validity, according to Fornell and Larcker (1981).

CONTROL VARIABLES

The target population of this study is consisted of Taiwanese nurses who worked in a regional hospital. Thus, for the respon-dents, gender and ethnic origin are the same. In order to prevent respondents' identification, we designed the control variables, for example, gender, age, and education (Ganzach, 1998), and then improve the response rate.

RESULTS

This study employed correlation analysis and hierarchical regression analysis to understand the relationship between OLC and OI, and the moderating effect of KI. Following are descriptions of results.

Descriptive statistics

Table 1 displays the mean, standard deviation, and the correlation coefficients among study variables. The results reflected in Table 1 indicate that OLC is significantly and positively related to KI and OI (γ=0.16, 0.60, p<.05), KI is significantly and positively related to OI (γ=0.21, p<0.05).

Test hypotheses

To test the hypotheses, this study conducted hierarchical regression analysis with using centered variables and pair-wise deletion (Aiken and West, 1991). In the first step, the control variables were entered. OLC were added in the second step. Subsequently, KI was added. In the final step the interaction terms of KI with OLC were added to test our hypotheses. Table 2 shows the results of the hierarchical analyses (Figure 2). Results showed that individual variables, such as age, education, and tenure, had no relationship with organization innovation before taking the interactions into account. H_1, we predict that OLC will relate to OI (Figure 2). The result showed that OLC was positively and significantly related to OI (β=0.613, p<0.05). The result showed that higher degree of OLC is enabling improve OI. KI was positively and significantly related to OI (β=0.12, p<0.05).

In line with H_2, a negative interaction between OLC and KI has been found (β=-0.656, p<0.05) (Figure 2). In order to understand the moderating effect, we divided the sample into 2 groups by score of KI (Aiken and West, 1991), as can be seen in Figure 1. The result showed that when KI was lower, a strong, positive relationship between OLC and OI is found (simple slope estimate=0.603, p<0.05), supporting H_2.

DISCUSSION

This study is aimed to examine and provide the empirical

Table 2. Result of the regression analysis for OI.

Variable	Step 1		Step 2		Step 3		Step 4	
	b	β	b	β	b	β	b	β
Age	-0.112	-0.085	-0.092	-0.070	-0.102	-0.077	-0.094	-0.071
Education	0.026	0.020	-0.042	-0.032	-0.018	-0.014	-0.010	-0.008
Tenure	0.052	0.070	0.043	0.058	0.034	0.046	0.031	0.042
OLC			0.613	0.613*	0.592	0.592*	1.10	1.10*
KI					0.120	0.120*	0.442	0.441*
OLC*KI							-0.657	-0.656*
R		0.005		0.374*		0.013*		0.016*
R2		0.005		0.378		0.392		0.407
Adjusted R2		0.000		0.374		0.386		0.401
F value		0.978		84.126		71.100		63.138

Note: *p<0.05, N=563.

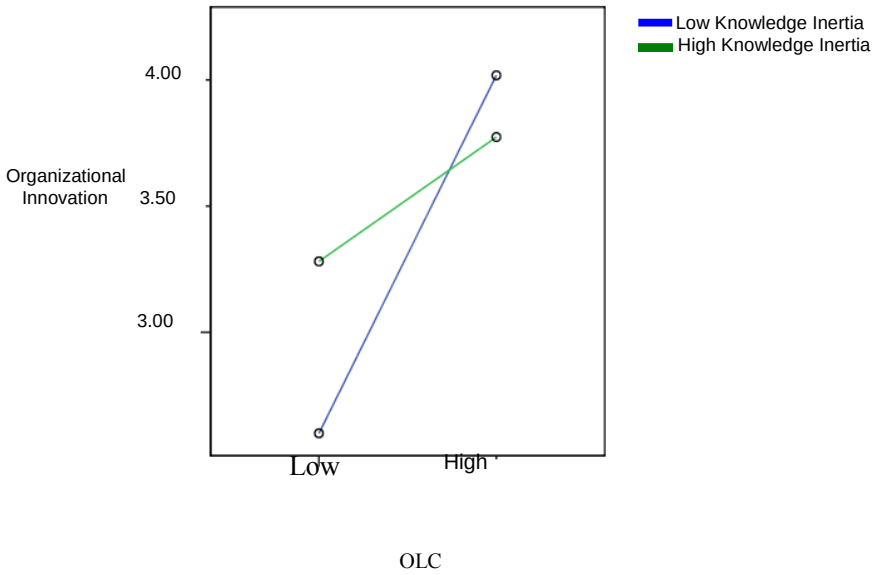

Figure 2. The interaction between OLC and KI on OI.

evidence to support the relationship between the OLC, KI and OI. The hypotheses are supported by the empirical evidence. First, OLC refers to the organizational characteristics to facilitate organizational learning or allows an organization to learn (Dibella et al., 1996; Goh and Richards, 1997; Hult and Ferrell, 1997; Yeung et al., 1999; Chiva et al., 2007). Innovation can be considered as a result of individual and organizational learning and as the source of competitive advantage for organizations (Stata, 1989). We expected that OLC positively related to OI based on the literature. The result showed that OLC positively related to OI. Chipika and Wilson (2006) found that firms can innovate if they have the competencies and capabilities and to make use of their learning. Akgun, Keskin, Byrne, and Arena (2007) selected by the criterion which develop new products and export them to other countries, and consisted of 250 firms in the industrial area of Turkey, nearby Istanbul. This study provided empirical evidences to support the relationship between learning capability and product innovativeness. The result in this study consisted with relevant studies (Alegre and Ricardo, 2008; Arago´N-Correa, Garcı´A-Morales, and Cordo´N-pozo, 2007).

Second, Inertia would result in lack of creative thinking and innovative behavior and has negative impact to learning and utilize knowledge efficiently and effectively. We expected that KI moderate the relationship between OLC and OI. The result showed that KI has moderating effect on the relationship. Adams et al. (1998) found that inertia hindered organization capability to learn. In the other words, inertia could be considered as a barrier for organizational learning. For individuals, KI obstructed

learning ability, and then lack of innovation (Lioa, Fei, and Liu, 2008).

Conclusion

Over the past decade, organizational learning and knowledge have been received attention (Cegarra-Navarro and Dewhurst, 2007).This study aims to examine and provide the empirical evidence to support the relationship between the OLC, KI and OI. The hypotheses are supported by the empirical evidence.

Managerial Implications

The role of OLC is an important to enables product development successful and improves firms' performance (Lynn and Akgun, 2000; Hult et al., 2004). OLC is consisted with five essential facilitating factors: experimentation, risk taking, interaction with the external environment, dialogue and participative decision making. Experimentation be considered the key dimension in the organizational learning literature (Goh and Richards, 1997; Hedberg, 1981; Nevis, DiBella and Gould, 1995; Pedler, Burgoyne and Boydell, 1997; Tannenbaum, 1997; Ulrich, Jick and Von Glinow, 1993; Weick and Westley, 1996), is the essential component for company to innovate (Alegre and Chiva, 2008). Sitkin (1996, p. 541) pointed that failure is a key condition for effective organizational learning. Risk taking can be considered as tolerate the uncertainty and errors for organizational innovation. Managers could to create the environments which can be taking risk and to accept mistakes facilitate to individuals to be curious and trying new idea to improve the working process and then enable organization learning according to learning from problem and mistakes solving is the key to help the business (Kouzes and Posner, 1987).

Therefore, environmental characteristics are an essential role in learning (Bapuji and Crossan, 2004, p. 407). Interaction with the external environment making refers to the relationships with the organizational external environment, such as customers, alliances, networks and technologies development. Relationship and connection is an importance factor for improve organizations to innovate (Brown and Eisenhardt, 1995).

Dialogue is considered as an essential process to develop common understanding for organizations, could help individuals to understand the hidden meanings in the communications. To develop the communication channel for dialogue may facilitate individuals exchange idea and information. Implementing participative decision making is to enhance employees' motivation, result in higher employee involvement, job satisfaction and organizational commitment (Daniels and Bailey, 1999; Latham, Winters and Locke, 1994; Scott- Ladd and Chan, 2004; Witt, Andrews and Kacmar, 2000).

Knowledge is valuable asset for individuals and organizations. Knowledge management has become a crucial issue for organizational innovation (Liao, Fei, and Liu, 2008). However, people solve problem with their prior experience and knowledge as facing problems, naming KI. Knowledge structure will be inherited by inertia and result in obstruct organization innovation (Huff and Huff, 2000). In order to reduce the degree of KI, managers may decrease the level of standard operation procedure (Gilson, Mathieu, Shalley, and Ruddy, 2005) and encourage employees to adopt new idea to solve problem. Knowledge is the major source of organization innovation. Multiple channels for individual learning will enable employees to obtain knowledge from multiple sources (Cavusgil, Calantone, and Zhao, 2003), and the facilitate individuals and organization to innovate.

LIMITATIONS AND FURTHER RESEARCH

Some limitation should be recognized in this paper. First, the responses in this study are worker in Taiwanese medical industry. The other stakeholders are not included in this study. Due to the data from the same source, common method variance may exist in the study. Second, the questionnaires are completed by the workers who work in the same industry. The result in this study is appropriate to explain the phenomenon, but limited to nursing personnel**.** Third, the sample and the sample size limit our conclusions to Taiwanese medical industry. Thus, the external validity has been limited. For future research, other industries can be taken in to account to understand the relationship between OLC, KI and OI. Further research can take in to account investigation in other context of industries to assess the generalizability of our finding. Finally, Self-report measurement instrument for data collection results in subjectivity problems. Measurement scales have both advantage and disadvantage (Fineman, 2004; Spector, 1992; Sharma, 1996; Hair et al., 1998).

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