



The Mediating Impact of New Product Innovativeness on the Relationship between Learning Orientation and New Product Performance in Thailand ISO 1900 Industry

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ABSTRACT

This research examined the mediating impact of new product innovativeness on the relationship between learning orientation and new product performance. A survey questionnaire form was used to collect data from 62 firms in Thailand. The results indicated that new product innovativeness fully mediates the relationship between learning orientation and new product performance. This finding suggests that manufacturing should develop learning orientation as a competitive factor for new product innovativeness and new product performance. Finally, the study provides a discussion on the academics and practitioners for future research.

Keywords: Learning Orientation, New Product Innovativeness, New Product Performance

JEL Classifications: D1, L2

1. INTRODUCTION

Current literature focuses on process management of innovation such as ISO which can drive innovative changes in organization to sustainability development (Zeng et al., 2015). The ISO system is a conducive system to stabilise organisations. Thus, organization should design factors that influence production process management. The factors of learning enhance an organization capacity which links to achieve business performance. Choo et al. (2007) suggested that organisational learning affects performance by creating knowledge. Firms with learning contribute to new knowledge and new product development.

New product development is an important topic for firm to gain competitive advantage which firms can create innovation efforts. In recent years, a firm's learning orientation which impacts on innovation have become important for sustainable competition (Tho and Trang, 2015; Hardley and Mavondo, 2000). Han et al. (1998), who demonstrated that learning orientation

influences on innovativeness. However, most of the previous studies agreed that learning orientation have positive impact on organizational innovation. Thus, as firms have accumulation of learning their innovation increases. Mullen and Lyles (1993), who suggested that organization's efficiency and effectiveness will effect learning of innovation activities. Furthermore, employee's new knowledge enhances innovative activities (Drucker, 1993).

New product innovativeness and organizational learning are key important of new product performance. Akgun et al. (2007) who suggested that new product project's openness, experimentation and new product performance of firm are the results of focusing on product innovativeness as a mediating. Therefore, the firms that focus on new product performance should increase learning orientation of employee's ability and skill to create new ideas. This is consistent with the finding of Lau et al. (2011) who reported that firm innovative ability will have new product which come from product innovativeness.

Taken together, this study demonstrated that new product performance resulted from learning orientation lead to increase product innovativeness. This study provided the point of view for good management, in term of productivity of innovation related to learning factors.

The purpose of this research was to develop and to test a theoretical framework for explaining the relationship between learning orientation and new product performance with the mediator role of new product innovativeness. The focus of this research was to answer how the mediating effect of new product innovativeness have a relationship with learning orientation and new product performance. The study was aimed to a better understanding of the production process management of learning orientation which lead to innovation and having impact on the performance of new product.

In the following sections, a literature review is explained first. Next, description of the methodology for testing of hypotheses framework is described. Finally, a summary of the research finding is discussed and managerial implication suggested.

2. LITERATURE REVIEW AND RESEARCH HYPOTHESES

The concept model is shown in Figure 1. The model shows the relationship of (1) Learning orientation and new product performance (2) New product innovativeness mediates the relationship between learning orientation and new product performance. Figure 1. The conceptual model.

2.1. Learning Orientation and New Product Innovativeness

The concept of learning orientation is an activity associated with knowledge creation for innovation. Several researchers reported that capability to learn is an important factor for innovation to build a competitive advantage (Jiménez-Jiménez and Sanz-Valle, 2011; Liao et al., 2008). Sheng and Chien (2016) claimed that learning orientation of organization effectively influences innovative processes. The effective organizational learning led to systematic innovation process (Crawford and Di Benedetto, 2010).

However, previous research has shown that the success of firm’s product innovation is organizational learning (Chan et al., 2012). When firms deeply concerned in managerial learning, this will lead to an increase in ability to innovate. Therefore, a high level of learning orientation may influence new product innovativeness.

2.2. Learning Orientation and New Product Performance

There was a study indicated that an organizations need to develop skill and knowledge to improve competitive advantage. (Teece et al., 1997). Baker and Sinkula, (1999) also reported that learning orientation has a direct effect on firm performance. Zheng et al., (2010) confirmed that knowledge management have positive role in the relationship among organization culture, structure, strategy and organization effectiveness.

Thus, organizations can investment in training which will lead to organizational outcomes (Delaney and Huselid, 1996). In addition, organization learning is an important factor for new product success (Li and Atuahene-Gima, 2001). Furthermore, the level of learning (individual, group, organization) is an ability to support performance (Marsick and Watkins, 2003).

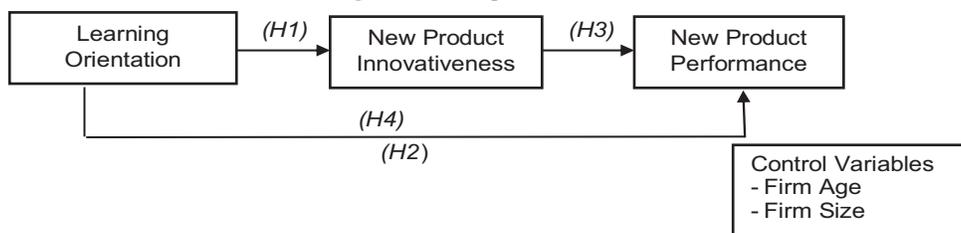
2.3. New Product Innovativeness and New Product Performance

According to Hurley and Hult (1998) “innovativeness is the notion of openness to new ideas as an aspects of a firm’s culture.” Hult et al., (2004) suggested that firm’s innovativeness capability can impact business performance. Camison and Lopez (2010) also demonstrated that organizations can develop innovation capabilities to achieve success in organization performance. Therefore, the achievement goal of firms is efficiency and effectiveness. Robbins and Coulter (2002); Akgun et al. (2007) demonstrated that product innovativeness is a strategy to develop a new product. However, recent literature indicated that organizations that have a stronger capability of innovation tend to provide a better new product performance.

2.4. The Mediating Effect of New Product Innovativeness

The hypotheses 4 shows linkage of new product innovativeness and new product performance. The analysis for a mediating effect following the concept of Liu and Chen (2015) showed that the relationship between technology orientation and new product development performance has product innovativeness as a mediator variable. In this study, the mediate role of new product innovativeness on the relationships between learning orientation and new product performance were analyzed based on the four-step idea proposed by Baron and Kenny (1986). In addition, the dynamic capability perspective suggests that innovation projects gained from external knowledge by firms can lead to superior performance in the market. Based on the above discussion the following research hypotheses are developed.

Figure 1: Conceptual framework



Hypothesis 1 (H_1): Learning orientation relates positively to new product innovativeness.
 Hypothesis 2 (H_2): Learning orientation relates positively to new product performance.
 Hypothesis 3 (H_3): New product innovativeness relates positively to new product performance.
 Hypothesis 4 (H_4): New product innovativeness mediates the relationship between learning orientation and new product performance.

3. METHODOLOGY

The sampling frame consisted of the ISO 1900 companies in Thailand. Mail survey was used for data collection and sent to 500 manufacturing industries. A cover letter, stamped reply envelope and copies of the questionnaire were sent to chief executive officers, directing managers or general manager in a sample. A total of 500 surveys were received and 62 usable responses resulted in response rates of 12.84%. Furthermore, a test for non-response bias (Armstrong and Overton, 1977) in mail surveys was assessed by comparing between earliest and latest response is used.

The calculated t-statistics indicated that there were no significant differences between for the early and late respondents in term of firm size ($t = -0.664, P > 0.05$) and firm age ($t = 1.541, P > 0.05$). Thus, the analysis suggested that there was no evidence of non-response bias in the data and it did not affect the results.

This research developed new items based on previous research. Learning orientation ($p_c^{SCR} = 0.910, p_c^{AVE} = 0.669$) structured instrument was adopted from Sheng and Chien (2016). New product innovativeness ($p_c^{SCR} = 0.955, p_c^{AVE} = 0.842$) was measured using five items adapted from Li and Huang (2012). The dependent variable, new product performance ($p_c^{SCR} = 0.942, p_c^{AVE} = 0.805$) assesses were adopted from Yuan and Chen (2015). Each item was utilized by a five-point Likert-type scales, ranging from 1 = Strongly disagree to 5 = Strongly agree rate.

Before analyze data, the Kaiser-Meyer-Olkin test was sufficient at 0.797 to predict whether the factor analysis was perfectly suited to the processing of the variable constructs. The minimum reference value for this test was 0.50 (Hair et al., 2006). Table 1 displays the variable means, standard deviations and zero-correlation matrix for all variables.

The correlations among the variables are absent of multi-collinearity. VIF of 1.0 indicates the absence of multi-collinearity and maximum VIF in excess of 10.0 indicated multi-collinearity, in this study ranged from 1.000 to 1.624 (Hair et al., 2010). Table 2 shows the Cronbach' alpha and composite reliability for each research construct which were higher than the cut-off points of 0.7 and 0.7 respectively (Bagozzi et al., 1991). As shown in Table 3, all the average variance extracted indexes were higher than 0.50, suggesting that confirming level of convergent validity was fulfilled. The discriminant validity means were evaluated by values of the square of the inter construct correlations (Bagozzi et al., 1991), as shown in Table 3.

Table 1: Zero-order correlation matrix, means and standard deviations

Measure	1	2	3
Mean	4.21	3.58	3.56
Standard deviation	0.55	0.93	0.82
Learning orientation			
New product innovativeness	0.620**		
New product performance	0.607**	0.779**	

** $P < 0.01$

Table 2: Factor loadings, reliability

Items	Factor loadings	Cronbach's alpha
LO (Sheng and Chien, 2016)		
1	LO1	0.835
2	LO2	0.879
3	LO3	0.829
4	LO4	0.994
5	LO5	0.779
NPI (Li and Huang, 2012)		
1	NPI1	0.919
2	NPI2	0.908
3	NPI3	0.863
4	NPI4	0.917
5	NPI5	0.903
NPP (Yuan and Chen, 2015)		
1	NPP1	0.907
2	NPP2	0.936
3	NPP3	0.899
4	NPP4	0.773
5	NPP5	0.812

LO: Learning orientation, NPI: New product innovativeness, NPP: New product performance

Table 3: Convergent and discriminant validity of variables (main diagonal = \sqrt{AVE})

Construct	Composite reliability	Average variance extracted	Construct		
			LO	NPI	NPP
LO	0.910	0.669	0.818		
NPI	0.955	0.842	0.620**	0.918	
NPP	0.942	0.805	0.607**	0.779**	0.897

LO: Learning orientation, NPI: New product innovativeness, NPP: New product performance

4. RESULTS AND DISCUSSION

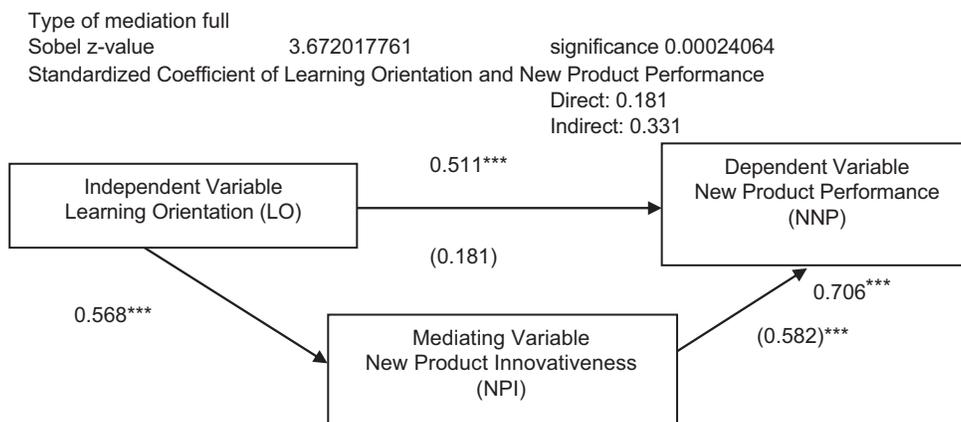
The results are shown in Table 4. Model 1 was the base model that included the control variables. Model 2 supported H_1 of the study, learning orientation significantly related with new product innovativeness ($P < 0.001$). These findings indicated that firms will enhance their learning orientation. Model 3 to 6 in Table 4 represented the result analysis for new product performance. Model 3 was the best model that included the control variables. Model 4 showed the relationship between learning orientation and new product performance with positive coefficient ($P < 0.001$), thus hypothesis 2 was supported. This indicated that firms will achieve high performance if firms focus on learning orientation. Model 5 depicted that new product innovativeness significantly affected new product performance ($P < 0.001$), hypothesis 3 was supported. In addition, firms will get high new product performance when firms develop innovation activities for new product innovativeness.

Table 4: Mediating effect of new product innovativeness in learning orientation and new product performance relationship

Variable	Mediating variable new product innovativeness		Dependent variable			
	Model 1	Model 2	New product performance			
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Firm size	0.097	0.006	0.103	0.021	0.023	0.017
Firm age	0.755*	0.476	1.077***	0.826*	0.586**	0.549**
Learning orientation		0.568***		0.511***		0.181
New product innovativeness					0.706***	0.582***
R ²	0.141	0.422	0.256	0.484	0.687	0.680
F	4.175	12.184	8.772	15.642	36.518	26.020

n=62; ***P<0.001, **P<0.01, *P<0.05

Figure 2: Relationship of new product innovativeness mediating and learning orientation and new product performance



The condition of mediation tests were adopted from Baron and Kenny (1986). MedGraph excel programme was used to compute the sobel Z-value of variable mediator, new product innovativeness in learning orientation and new product performance relationship. Table 4 shows four conditions based on Baron and Kenny (1986) which were the linear regression as described below.

- Step 1. There was a significant relationship between learning orientation and new product innovativeness ($\beta = 0.568$, $P < 0.001$). Results are shown in Model 2
- Step 2. There was a significant relationship between learning orientation and new product innovativeness (mediator) ($\beta = 0.511$, $P < 0.001$). Results are shown in Model 4
- Step 3. The coefficient of mediator of new product innovativeness was significant in regression Model 5 ($\beta = 0.706$, $P < 0.001$), both learning orientation and new product innovativeness as predictor variables
- Step 4. The standardized coefficient of relationship between learning orientation and new product innovativeness for new product performance was significant in regression in Model 6 (standardized $\beta = 0.181$, $P > 0.05$ to $\beta = 0.582$, $P < 0.001$ respectively).

Model 6 shows that the effect of learning orientation on new product performance had to reduce within the model because the inclusion of new product innovativeness and learning orientation create a greater impact on new product performance. This means that new product innovativeness fully mediates between learning orientation on new product performance, therefore hypothesis 4 was supported. Conclusively, the ratio index of 64.58% was registered as derived by $0.331/0.511 \times 100$, which explained that

new product innovativeness as a full mediation in the relationship between learning orientation on new product performance. Thus, 35.42% was the other mediating factors in the model.

These results confirmed the findings of previous research. The objective was to examine the mediating effect of new product innovativeness on the relationship between learning orientation and new product performance. The regression statistical test showed that mediating role of new product innovativeness has a full significance for learning orientation influence new product performance. This study illustrated that new product performance can be achieved by learning orientation and new product performance. Thus, the finding supported the previous research which demonstrated that high innovation requires high organizational leaning capability (Ho, 2011). Learning orientation was a positive factor for new product innovativeness as can be seen in Table 4 (Model 2) which indicated that the determinant coefficient was 0.42 or 42%. This meant that learning orientation and new product innovativeness influenced new product performance as much as 42%. Thus, innovation is an important factor for any organizations including learning and knowledge which are beneficial for organizational survive. Table 4 and model 4 and 5 shows that level the influence of two independent variables on the dependent variable was considerably large. The determinate coefficient was 0.48 or 48% and 0.68 or 68%. This finding supported the finding of Hsu and Fang (2009) who proposed that organizational learning capability positively affect new product development performance. New product innovativeness also supported the finding of Sun and Zhou (2014) who indicated that creativity and innovation in any firms are its success performance.

Interestingly, the finding of Model 6 shows learning orientation has positively effect to new product performance. Moreover, if new product innovativeness is added as a mediator, the results relationship between learning orientation and new product performance will decrease. As a result of this, the model has a good predictive power. In addition to following these four steps, the results of the Sobel test suggested that new product innovativeness plays a mediating role in the relationships learning orientation and new product performance (Figure 2; $Z = 3.672$; $P = 0.000$). The results of the relationship analysis of the learning orientation in Thai ISO 1900 industry is to have high quality production. This finding indicated that if the organization have developed for innovation, the company will set up a production process management by focusing on specific learning. Wright (1936) studied the learning curve in production and operation management. The benefit of applying the learning curve concept, also known as “experience curve” can be applied to production management such as production innovations (Abernathy and Wayne, 1974). The companies were able to take the learning and apply to their employees for ongoing work on the innovation process. Learning-by-doing is the method to improve human performance. This helps to support management, new product performance planning, goal setting, and implementation for product process management.

5. CONCLUSIONS

In conclusion, the study findings have some contributions to the literature, which provide understanding of the effect of new product innovativeness on relationship between learning orientation and new product. The results also showed that, firms have more needs to develop learning that could be useful to support for production process of innovation. In addition, this study provided several advantages for implementations. First, learning orientation is a management strategy to improve firm ability to create knowledge by using new techniques and methodologies. Nonaka and Takeuchi (1995) suggested that the knowledge, creative capability and techniques of learning lead firm to success. Arora (2002) reported that firm learning on the new product process enhances knowledge innovation and further encourages new product performance. Therefore, a firm with high capability in creation will lead to its better performance. However, manager should be aware of management systems to support managerial learning by providing training to employee’s cognitive acceptance of new ideas which lead to innovativeness and new product performance. Second, this study discusses the mediating effect of new product innovativeness which manager should manage learning of employees to absorb and assimilate new ideas to enhance their new product innovativeness. Zheng et al., (2004) suggested that learning orientation is the key factor of innovativeness. Third, the management environment is the dynamic capability which firms attempt to focus managerial strategies on flexibility and faster response. Furthermore, this study guides researchers about knowledge related to learning and finding standing points for innovation of production management.

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