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The effects of innovation management on school performance of secondary schools in Thailand

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Abstract

This study aimed to shed light on the effect of innovation management factors in promoting high-performance on the part of 800 secondary schools in Thailand. A sample of 2,400 educationalists was selected according to the ratio of one school director to two teachers from the respective schools using multi-stage sampling. The research sample number of 800 schools was determined as being 10 times the parameters required in the model. The researchers utilized a quantitative survey design using a questionnaire as the instrument for data collection. The findings revealed that the innovation management factors, namely transformational leadership, organizational learning, resource management, and school innovation, affected school performance and were found to be consistent with the empirical data ($\chi^2 = 184.948$, df = 159, $\chi^2/df = 1.163$, $p = .0779$, RMSEA = .016, SRMR = .012, CFI = .888, TLI = .998).

Introduction

Current education systems need school directors who have a high level of competence and exhibit strong leadership practices so schools are effectively and intensively led (Zahari & Abd Latif, 2016). As a result, school directors need to be prepared with regard to introducing innovative ideas and strategies to ensure the success of their schools, especially in terms of meeting the demands of parents and students. In other words, school directors need to be acutely sensitive to changes and innovation in the field of education. This is further supported by Sagnak (2012) who emphasized the challenging task currently facing school directors and teachers who must produce students who possess creativity and innovativeness rather than just mastering the basic literacy skills. A preference for educational innovation has been emphasized in place of the traditional schooling system, as the latter cannot respond to society's increasing needs (Prasertcharoensuk & Tang, 2016, 2017; Somprach, Prasertcharoensuk, & Tang, 2016). Every country has struggled to introduce educational innovations that are deemed appropriate and compatible in terms of meeting the needs of the nation (Hsiao & Chang, 2011). Thailand is no exception. Therefore, a new challenge for the Thai school system is to equip students with adequate skills to cope with the rapidly changing global situation.

According to Chang, Yen, and Hsu (2011), the concept of the high-performance school (HPS) has been set as a new educational target. The principles of the associated new education system are grounded in learning achievement, collective goal setting, collaboration, and shared values and visions, with the school's working processes based on strong teamwork, and on teaching and learning processes that are associated with evaluation. The results from either the national (O-net tests) or the international (Program for

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International Student Assessment, PISA) educational tests in Thailand showed that the Thai education system is facing severe problems in terms of its academic achievements. The major problems are caused by educational gaps resulting from economic differences between schools, a lack of access to quality education, problems in educational management, ineffective budget management, teaching problems, a lack of resources, a lack of professional development, corruption, the production of graduates whose skills are mismatched with employers' needs, and a lack of social networking in educational development (Chiengkul, 2010; Choochart & Inpim, 2015; Office of the Minister Newlines 107/2554, 2011; Prasertcharoensuk & Tang, 2016; 2017; Somprach et al., 2016).

The Thai National Education Bill issued in 1999 (and its edited version of 2002) prescribed educational reform and supported the decentralization of educational administration (Ministry of Education, 2003). This led to tremendous changes in educational management, under which the administration of academies, budgeting, and human resources and general administration were bestowed on the schools. In addition, marketing techniques were also introduced to the school system with the goal of helping schools to meet international standards. These efforts were in vain, with unsatisfactory results. Educational reform in the following decade was introduced in order to rectify the educational problems, lifting educational standards, promoting life-long learning, extending opportunities in education, and creating social integrity in educational development.

According to Nonaka (1991), innovation management factors consist of transformational leadership, resource management, organizational learning, and school innovation, and relate to the improvement of school performance. Grant (2015) studied innovation management in high performing schools and found that transformational leadership affected school performance, and that resource management conducted by transformational directors helped to increase learning and innovation. In addition, Gumusluoglu and Ilsev (2009) revealed that transformational leadership influenced organizational innovation and collaboration within organizations. This result was found to be in accordance with several pieces of past research (Aragón-Correa, García-Morales, & Cordón-Pozo, 2007; García-Morales, Jiménez-Barríonuevo, & Gutiérrez-Gutiérrez, 2012; McDonough, 2000). Furthermore, previous research has shown that resource management has positive effects on organizational innovation (Robbins & Judge, 2013; Uzkurt, Kumar, Kimzan, & Eminoğlu, 2013). It is observed that resource management is associated with vision and organizational learning.

According to the problems stated and the literature reviewed above, it cannot be denied that many secondary schools, in particular, are now developing in terms of becoming high-performance schools. However, currently there are relatively few references or models to help them to innovate in order to improve school performance (Prasertcharoensuk & Tang, 2016, 2017; Somprach et al., 2016). Therefore, it is important to develop structural equation modeling (SEM) to highlight how school leaders can ground their innovation management factors development. SEM can be utilized to evaluate the multiple interrelated variables of innovation management that promote school performance. A statistical analysis of the variables' relationships reveals those that are significant (Jöreskog, 1967), confirming that the variables within the model are applicable to real school practices (Mittal & Kassim, 2007).

Literature Review

According to Hsiao, Chang, and Chen (2014), current school directors have to be creative and innovative so that their schools can compete and grow. In addition, ChanLin, Hong, Horng, Chang, and Chu (2006) revealed that changes in both educational policy and teaching practices can help students accomplish in the realm of creative behavior. Therefore, school directors have inspired and motivated teachers to introduce innovative classroom activities (Hsiao & Chang, 2011). With regard to the literature noted above, the authors revealed that innovation in schools is based on multiple factors such as transformational leadership, resource management, and organizational learning, and have indicated that school innovation relates to the improvement of school performance.

Chang et al. (2011) indicated that school performance has been attributed to organizational learning and that organizational learning also enhances innovation. An organization that is committed to learning tends to have higher levels of innovation, as an emphasis on learning helps the organization to create more innovation (Aragón-Correa et al., 2007; Calantone, Cavusgil, & Zhao, 2002; García-Morales et al., 2012; Jiménez-Jiménez & Sanz-Valle, 2011). Organizational learning is crucial for innovation as well as for organizational production (Chang et al., 2011; García-Morales et al., 2012; Jiménez-Jiménez & Sanz-Valle, 2011; Noruzy, Dalfard, Azhdari, Nazari-Shirkouhi, & Rezazadeh, 2013). In addition, school innovation is positively related to school performance levels, and innovation increases work efficiency in an educational organization (Aragón-Correa et al., 2007; Chang et al., 2011; García-Morales et al., 2012; Jiménez-Jiménez & Sanz-Valle, 2011; Noruzy et al., 2013).

Research Objectives

Based on the literature reviewed above, this research aimed to study the effect of innovation management factors in promoting high-performance within Thai secondary schools. Furthermore, the researchers evaluated the direct, indirect, and overall effects of the relevant variables on innovation management.

Methods

In total, 2,400 participants including one school director and two teachers from each school were selected from 800 secondary schools in Thailand utilizing a multi-stage sampling technique. The number of participating schools was 10 times the parameter required in the model. A survey questionnaire in the Thai language was employed and

administered to ensure that the respondents would understand the statements. Innovation management itself consisted of one external variable and three internal variables. The questionnaire consisted of 92 items including demographic items. Section A of the questionnaire was created to collect details of the demographic features of the respondents including information relating to their individual background, namely gender, educational level, and work experience. Section B was specifically adapted from a school performance framework initiated by Shanon and Bylsma (2007). Sections C to F of the instrument were used to assess the existing performance of the schools in terms of their degree of innovation management.

In terms of validating the quality of the instrument based on the content validity by finding the index of the item according to objective congruence (IOC) $\geq$ .6, it was found that the IOC value ranged from .78 to 1.00, indicating that all the items in the questionnaire were suitable. Based on the feedback from the experts, some of the items in the questionnaire were merged. Subsequently, the total number of items from the original version of the questionnaire was reduced from 110 items to 89 items. Pilot testing for reliability was carried out with the help of 10 school directors and 20 teachers. The instrument was considered to be reliable and good to use, as Cronbach alpha testing indicated that all the research variables had relatively high Cronbach alpha values ranging from .93 to .97, giving an overall Cronbach alpha value of .99. Structural equation modeling (SEM) was utilized to assess the fit of the prior model to the sample data.

SEM relating to innovation management was created by the researchers based on in-depth interview data from scholars as well as from a review of the literature. The researchers conceptualized the innovation management constructs according to Lubienski's (2003) innovation concept. Other than transformational leadership which acts as an external variable, there were four internal variables—high school performance, resource management, organizational learning, and school innovation. Transformational leadership (TL) was an external variable and was measured according to the following six observed variables: idealized influence (TL1), aspiration motivation (TL2), intellectual stimulation (TL3), individual consideration (TL4), responsiveness to rapid changes (TL5), and the creation of distinct performance (TL6). With regard to the high school performance (HSP), nine observed variables are taken into consideration: focus on students' learning (HSP1), academic and learning standards (HSP2), effective leadership (HSP3), teamwork and effective communication (HSP4), curriculum-oriented teaching and evaluation (HSP5), monitoring teaching and learning (HSP6), support for teachers' professional development (HSP7), the learning environment (HSP8), and family and community cooperation for learning development (HSP9). Consequently, resource management (RM) was considered as another internal variable consisting of three observed variables: physical capital (RM1), human resources (RM2), and organizational capital (RM3). The next internal variable was organizational learning (OL), comprised of four observed variables: learning commitment (OL1), shared vision (OL2), open-mindedness (OL3), and knowledge exchange (OL4). The last internal variable was school innovation (INNO) consisting of four observed variables: academic management (INNO1), budget management (INNO2), personnel management (INNO3), and general management (INNO4).

Results

The researchers distributed 2,400 questionnaires to the 800 participating schools although 10 times the 64 parameters required in the model was only 640. The additional surveys were anticipated to allow for a 20 percent non-response. A total of 654 schools responded to the mailed questionnaires, giving a response rate of 81.63 percent.

Investigation of the Co-linear Force Polynomial

The result of Bartlett's Test of Sphericity showed a value of 21,971.370, df = 325, p = .000, which corresponded with the Kaiser-Meyer-Olkin Measure of Sampling Adequacy (KMO = .980) which is approximately 1.00. This revealed that the designed questionnaire was highly acceptable because the investigated variables applying to the items were well interrelated. As a result, they were deemed effective for use in explaining the causes of the problems. Table 1 shows that all the tolerance values were higher than .10. In addition, the VIF value was below the possible maximum of 10.00. These two values (tolerance and VIF) showed that there was no correlation among the independent variables in terms of multicollinearity (Wiratchai, 1999).

Factor Loading and Validity of the Observable Variables in the Relationship Model

Table 2 shows the factor loading values for all the observed variables of the relationship model. The researchers concluded that all the observed independent variables (factors) were important. The results of this study showed that the relationship model of innovation management in high performance schools had a good fit with the empirical data, with χ^2 = 184.948, df = 159, χ^2/df = 1.163, p-value = .0779, CFI = .999, TLI = .998, RMSEA = .016, SRMR = .012, as illustrated in Figure 1.

Chi-square was used to test the validity of the model's structure, and to verify whether or not the included variables correlated with existing practice. The p-value was higher than .05 (χ^2 = 184.948, df = 159, p-value = .0779), the ratio between χ^2/df did not exceed 2 (χ^2/df = 1.163), the harmonized index was .90−1.00 (CFI = .999, TLI = .998), RMSEA = .016, and SRMR (.012) was lower than .05.

Table 1
Investigation of the co-linear force polynomial

Factor (Independent variables)	Collinearity statistics	
	Tolerance	VIF
Transformational leadership	.246	4.065
Resource management	.207	4.822
Organizational learning	.178	5.619
School innovation	.231	4.703

Table 2
Component weight and validity of the observed variables

Latent variable	Observed variable	Factor loading matrix				
		B	SE	t	β	R^2
High performing school	HPS1	1.000	.000	999.000	.815**	.664
	HPS2	1.047	.040	26.484	.817**	.668
	HPS3	1.186	.045	26.636	.829**	.688
	HPS4	1.129	.045	25.296	.842**	.709
	HPS5	1.138	.042	27.044	.877**	.769
	HPS6	1.089	.042	25.670	.849**	.721
	HPS7	1.155	.047	24.607	.828**	.686
	HPS8	1.033	.044	23.542	.815**	.664
	HPS9	1.121	.045	25.119	.842**	.709
Transformational leadership	TL1	1.000	.000	999.000	.924**	.853
	TL2	1.072	.027	39.267	.914**	.836
	TL3	.979	.026	36.956	.926**	.858
	TL4	1.043	.028	37.905	.903**	.815
	TL5	1.056	.031	34.621	.903**	.815
	TL6	1.066	.031	34.702	.926**	.857
Resource management	RM1	1.000	.000	999.000	.746**	.557
	RM2	1.080	.039	27.546	.879**	.772
	RM3	1.086	.041	26.668	.938**	.880
Organizational learning	OL1	1.000	.000	999.000	.899**	.808
	OL2	1.111	.028	39.108	.934**	.873
	OL3	1.059	.031	33.882	.857**	.735
	OL4	1.039	.030	34.809	.888**	.788
School innovation	INNO1	1.000	.000	999.000	.911**	.829
	INNO2	1.044	.028	37.565	.923**	.853
	INNO3	1.074	.028	37.988	.927**	.860
	INNO4	1.068	.033	32.304	.910**	.828

**$p < .001$

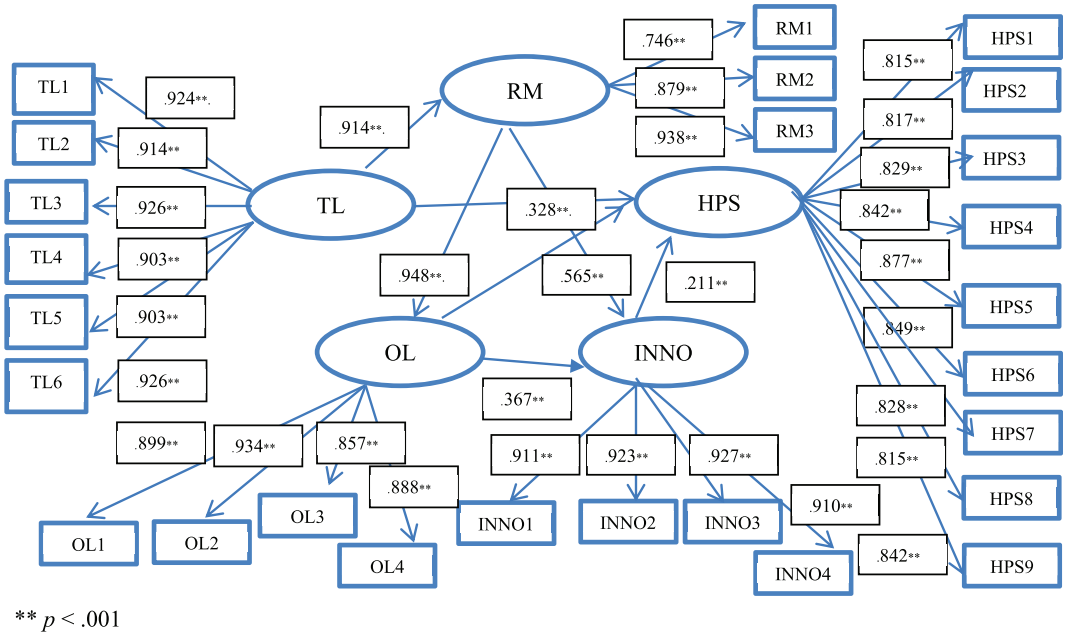

Figure 1 Coefficient of standard factor loading of the relationship model

Direct, Indirect, and Total Effects of the Investigated Variables

The results revealed that the innovation management variables had different levels of impact on school performance. Additionally, the results indicated that the variables with direct effects on innovation management in terms of school performance were organizational learning (β = .455), transformational leadership (β = .328), and school innovation (β = .211) (see Table 3).

Those variables with indirect effects, with their impact listed in descending order, were resource management (β = .624), transformational leadership (β = .570), and

Table 3
Direct, indirect, and total effects of the investigated variables

Variables	HSP			INNO			OL			RM		
	DE	IE	TE	DE	IE	TE	DE	IE	TE	DE	IE	TE
TL	.328**	.570**	.890**	–	.834	.834	–	.866**	.866**	.914**	–	.914**
RM	–	.624**	.624**	.565**	.348**	.910**	.948**	–	.948**	–	–	–
OL	.455**	.078*	.530*	.367**	–	.367**	–	–	–	–	–	–
INNO	.211**	–	.211**	–	–	–	–	–	–	–	–	–

*$p < .05$, **$p < .001$

organizational learning (β = .078). Finally, the findings indicated those variables that had an overall effect on innovation management, as (listed in descending order) transformational leadership (β = .890), resource management (β = .530), and school innovation (β = .211).

Discussion and Conclusion

Transformational leadership was found to be an enormous factor with regard to school performance. This implies that transformational directors were not only able to promote teachers' working capacity and make them aware of the school's mission and aims, but also provided incentives for organizational contribution (Somprach, 2014, 2016). This finding paralleled past studies (García-Morales et al., 2012; Noruzy et al., 2013). In addition, transformational leadership indirectly assisted school performance via school innovation, organizational learning, and resource management. This result was supported by Zhang (2016) who postulated that the capacities of school directors to direct aims, learning outcomes, learning and teaching processes, and professional development, enabled them to inspire teachers to be innovative.

Organizational learning was found to have a strong indirect effect on school innovation after factors pertaining to resource management and transformational leadership, hence directly influencing high school performance. This result indicated that organizational learning was a crucial factor when it comes to improving school performance and was supported by Senge (2006)who stated that an organization with good learning was able to create strategies that provided the organization with an advantage in the competitive market. This implies that schools should develop their particular capability to cope with proactive visions and unique learning environments, in order to improve the organization's manageability which impacts on organizational success (Kwong & Kwai, 2009).

Resource management was the factor with the highest indirect effect on organizational learning and school innovation, and had the second highest total effect on school performance. This result was consistent with previous researchers' findings that implied proper resource sharing (Hunter, Bedell, & Mumford, 2007), innovation development on asset management (Graeme, 2010), and the provision of learning opportunities and rewards for successful innovation (Wuthirong, 2014), were necessary for upgrading school performance.

Although school innovation was the third factor with a direct effect but with the least overall effect on school performance, school innovation is vital in terms of assisting the school director to manage academic, budget, personnel and other school functions effectively (Chang et al., 2011; García-Morales et al., 2012; Noruzy et al., 2013; Zhang, 2016). According to these researchers, school innovation helped to increase school efficiency and its competitive ability. As a result, academic development and administrative innovations were shown to contribute to school performance (Back & Sunyoung, 2010).

The current study explored the relationship among innovation management factors in the form of transformational leadership, organizational learning, resource management, and school innovation in terms of affecting school performance. The results indicated that all the investigated factors supported school performance practices. The overall results should be beneficial to policy makers, educational administrators, educators, and practitioners. Hence, this study offered empirical support for the view that innovation management, and predominantly transformational leadership, is a critical factor. The richness of the data and the reasoning it allowed offers a cherished contribution in terms of understanding from an academic standpoint. In conclusion, school directors should utilize transformational leadership, organizational learning, resource management, and school innovation as revealed by the relationship model in their administration, in order to improve school performance. The researchers would like to recommend to the National Office of Basic Education and to educational service areas that they should provide related training to school directors in the use of this model to promote school performance.

Conflict of interest

There is no conflict of interest between researchers and respondents.

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