



Research Journal of
**Business
Management**

ISSN 1819-1932



Academic
Journals Inc.

www.academicjournals.com

Structural Equation Modeling of Determinants on Management Effectiveness of Thai Private Vocational College Education

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ABSTRACT

Education is the key to progress and it follows that education is a principal contributor to the development of human resources for national economic and social improvement. In Thailand, private vocational schools have become a focal point in economic development strategies and with the economic union of the 10 southeast nations in 2015; education has been identified as a key regional strategy for economic growth. With global higher education enrolment increasing from 32.6 million in 1970 to 182.2 million students in 2011, 46% of which was in the East and South Asia region in 2011, Thailand has taken a central role in these discussions. Vocational education in Thailand is particularly important for the high percentage of contribution from the private sectors which accounts for almost 37% of the total educational system. This study therefore, analyzed the factors affecting administrator management effectiveness of Thai private vocational colleges by studying the learning environment, management innovation techniques and management strategies as well as their 18 related factors. A multi-stage random sampling was used to collect the sample from 614 Thai college administrators. The questionnaire was employed as the instrument for data collecting and PLS Graph was used for model verification. Results illustrated from the structural equation modeling that confirmatory factors of management innovation, management strategy and learning environment had a direct and positive effect on administrator management effectiveness.

Key words: Vocational colleges, management innovation, strategy, learning environment, management effectiveness

INTRODUCTION

Modern economies are increasingly based on knowledge and information. Knowledge is now recognized as the driver of productivity and economic growth, leading to a new focus on the role of information, technology and learning in economic performance. The term "Knowledge-Based Economy" (KBE) stems from this fuller recognition of the place of knowledge and technology in modern economies (OECD, 1996) with human capital being identified as a key stimulus of economic development (Ogunade, 2011).

Asia's spectacular rise in enrolment rates in higher education over the past 20 years has been the subject of many reports with the process of expansion demanding innovation in terms of policy and reform and not just greater financial investment. There needs to be a larger goal of improving the livelihood of individuals and the socio-economic development of their societies. Some of these

policies are considered controversial, such as the growing reliance on the private sector which raises issues of equity in access to higher education.

Due to the result of high birth rates, increasing school participation rates and the perceived importance of advanced education in subsequent life opportunities, institutional enrollment both across Asia and Thailand has exploded. To accommodate these enrolment increases, higher education systems have had to 'expand out' by constructing new universities, hiring new faculty members and allowing and encouraging the entry of private higher education providers. Faced with escalating demand for instructional staff to serve the expanding number of public universities and the fast-emerging private universities, many countries across the region have needed to 'expand up' by introducing graduate programmes to prepare future instructors (UIS, 2014).

With the convergence of these pressures has come the dramatic enrolment increases in undergraduate education over the last 20 years which has put a financial strain on many governments. In response, governments have sought ways to lower the cost of instruction in public universities and shift more of the cost of higher education to students, their families and private institutions.

In the Thai National Education Act (NEA, 1999), education was stated to be provided in universities, institutes, colleges or those under other names in accordance with the laws on higher education institutions, as well as those on the establishment of such institutions and other relevant laws. Vocational education and occupational training was to be provided in educational institutions belonging to the State or the private sector, enterprises or those organized through co-operation of educational institutions and enterprises (NEA, 1999). Today, vocational education in Thailand is particularly important for the high percentage of contribution from the private sectors which accounts for almost 37% of the total educational system (StudyLands, 2014).

At the same time, to reduce student demand for access to public universities, as stated above, Thailand as well as many other ASEAN (Association of Southeast Asian Nations) governments around the region changed legislation to allow and encourage the growth of private higher education, now the fastest-growing segment of higher education in the region (UIS, 2014). This, however, has set up hurdles for government support in the involvement of private institutions as well as contributing to the lack of executive and technical support for teachers and other educational personnel.

Over the past four decades, global higher education enrolment increased from 32.6 million in 1970 to 182.2 million students in 2011, 46% of which was in the East and South Asia region in 2011. This phenomenal expansion was fueled by a convergence of demographic trends, public preferences, policy decisions and external economic circumstances (ADB, 2011). Among the key factors driving this growth were higher participation rates in basic education and higher progression rates in primary and secondary schools. More students were entering and graduating from secondary school and seeking to continue their education.

Trow (2006) describes higher education system growth as following three phases-elite, mass and universal access phases based on the proportion of the relevant age group enrolled in higher education. Success in expanding access triggered a series of challenges in serving the increased number of students. It put considerable financial pressure on higher education systems and many countries were hard-pressed to accommodate the rapidly-increasing numbers of students. University budgets did not increase to keep up with enrolment. This led to erosion in faculty salaries, the hiring of less-qualified instructional staff and a decline in conditions of service (ADB, 2011).

To counter these problems across the region, many governments allowed and encouraged the expansion of private higher education in an effort to shift students away from the heavily-subsidized public sector. The advantage to government was that private colleges and universities could charge tuition, thereby providing greater postsecondary access without increasing the demand for public funds. In 2011, nearly four-fifths of the students in the Republic of Korea and Japan, nearly three-fifths of the students in Cambodia, Indonesia and the Philippines were enrolled in private institutions (Fig. 1). Private universities however were not permitted in the ASEAN countries until Cambodia opened the doors to it in 1997 (Chealy, 2006) with the Lao People’s Democratic Republic legalizing private universities in 1995, Malaysia in 1996, Thailand in 2003 and Viet Nam in 2005.

Over the last 15 years, private higher education has been the fastest-growing sector of higher education. Government promotion of private providers in higher education and the growth of private higher education are much more significant in Asia than in other regions of the world (Levy, 2010). Across Asia, nearly 40% of higher education students are enrolled in private institutions.

A widely-used classification system categorizes private higher education institutions into elite and semi-elite, religious/cultural and non-elite and demand-absorbing (Bjarnason *et al.*, 2009). The non-elite and demand-absorbing institutions are the largest and the fastest-growing segment of private higher education in Asia. Private colleges and universities across Asia tend to be small, non-elite and demand-absorbing. Most rely on student fees as the major source of income.

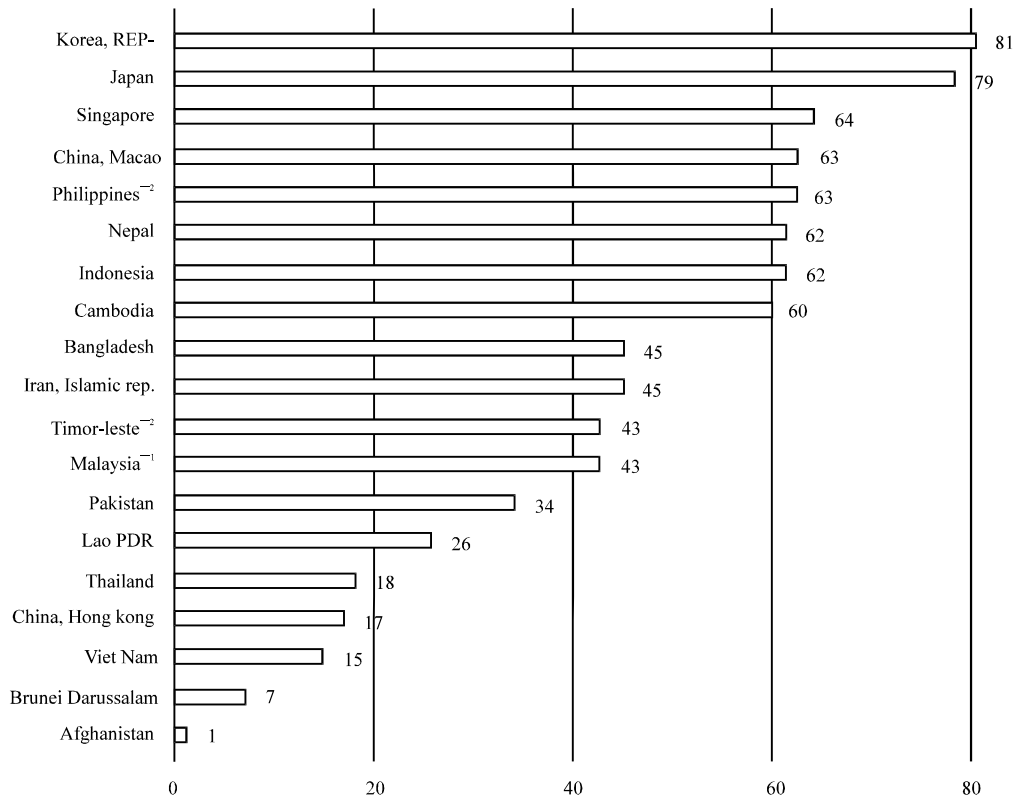


Fig. 1: Enrolment in private higher education institutions as a percentage of total higher education enrollment by country or territory (2011) or most recent year available (UIS, 2014)

Higher education in Thailand has undergone dramatic changes in the past four decades, reflecting three major global trends: Massification, privatization and internationalization. The country now has a total of 150 higher education institutions and 19 community colleges with approximately 2 million students in 2010 (UNESCO, 2011). There are 80 public higher education institutions consisting of 14 autonomous universities, 16 traditional universities, 40 Rajabhat universities, 9 Rajamangala Technical universities and 1 Pathumwan Institute of Technology. Besides, there are 71 private higher education institutions and 19 community colleges. Rajabhat universities are traditional teacher training colleges in most provinces. Rajamangala universities are educational institutions which accept the holders of a diploma/certificate in vocational or technical education. It provides two-year programme leading to the higher diploma in technical education (UNESCO, 2011).

TVET (Technical Vocational Education and Training) in Thailand is provided in three forms: The normal programme; the Dual-Vocational Training (DVT) programme and non-formal programme. Three levels of vocational education are offered: The Certificate in Vocational Education (Por Wor Chor) which is taken during the upper secondary period; the Technical Diploma (Por Wor Sor), taken after the Certificate and the Higher Diploma upon completion which can be used as admission to a university for a Bachelor degree programme. As of 2010, the OVEC of the Ministry of Education administers 415 public colleges, 427 private vocational schools and colleges around Thailand (UNESCO, 2011).

In this environment, the Thai vocational schools and colleges struggle. In 2010, nearly 0.7 million students enrolled in TVET colleges governed by OVEC (Office of the Vocational Education Commission, formerly DOVE) of the Ministry of Education and approximately 0.4 million students were studying in private vocational schools and colleges. This, however requires support and quality teachers and staff and as Glickman *et al.* (1995) stated in their study, "Instructional supervision is the function in educational systems that draws together the discrete elements of instructional effectiveness into a whole educational action". The study further suggested that blame for lack of student learning could be placed on teachers and their teaching techniques because the teacher cannot learn for the student; learning essentially becomes the responsibility of the learner (student). Therefore, the teacher's role is to facilitate and promote learning.

In 2013, three ASEAN countries including Thailand have embarked on a plan to develop a vocational-education programme that will prepare graduates for work in any of their territories (The Nation, 2013) with the degrees and skills to be officially recognized in Thailand, Laos and Vietnam alike. Thailand and Laos have already been working quite closely together in the area of vocational education with at least 12 of their vocational colleges having now become sister colleges.

Given the explosive growth in educational requirements and the nature of the system and problems from the above literature review, this study's researchers were therefore interested in researching the factors affecting the Thai vocational education system. These included management innovation, management strategy, learning environment and management effectiveness. It is therefore hoped that this research helps guide the future development and management of vocational colleges.

CONCEPTUAL DEVELOPMENT

Management innovation: The role of management innovation is not about producing innovative solutions but about the provisioning of a creative environment in which solutions can be conceived, developed and applied (Goyal and Pitt, 2007).

Inauen and Schenker-Wicki (2011) developed innovative measures that deal better with day-to-day activities of the OECD (Organization for Economic Co-operation and Development) and its ability to develop new knowledge and innovation. The group has implemented new and innovative ways for employees to be better involved in projects including research and development, innovation, projects and communication technologies (OECD, 2002).

Wong and Chin (2007) studied 'Organizational Innovation Management' (OIM) and developed measures which included the following (1) Organizational culture and beliefs, (2) Dimensional structure of innovative corporate structure is flexible, simple, uncomplicated emphasize decentralization, (3) Human Resource (HR) competency is a component of organizational commitment and leadership management including attitudes and abilities of employees, (4) Strategies for innovation must include the development of innovation strategies for the organization, (5) Innovation support mechanisms should be used as a resource management tool to help acknowledge the opinions of others which help achieve continuous improvement, (6) The development of cognitive skills which helps with the development of knowledge in the organization, including the exchange of knowledge with external organizations and (7) Growth of cumulative knowledge which is a mechanism of organizational learning, communication skills and knowledge utilization across the organizational structure.

Scarborough and Swan (2001) argue that the rise and growth of knowledge management, is one of the managerial responses to the empirical trends associated with globalization and post industrialism. These trends include the growth of knowledge worker occupations and technological advances created by ICT. In organizational terms, they argue, this new era is characterized by flatter structures, de-bureaucratization and 'virtual' or networked organizational forms.

Thus, Scarborough (2003) points out that in innovative organizations the selection of individuals with both appropriate skills and appropriate attitudes has been identified as crucial to the project team's ability to integrate knowledge from diverse sources. He stresses that conventional approaches to selection may need to be revised in the light of the unpredictable knowledge flows involved in innovation projects. In such settings, it may simply be too difficult to specify the requisite knowledge and expertise in advance.

Learning technology strategy can affect the environment and context of the organization as well as production technology which affects the creative process and organizational knowledge and competitiveness (Ahmad and Schroeder, 2011). The key factor causing the rapid development within organizations is how to practice teamwork (Anderson and West, 1998).

Bain *et al.* (2001) stated that a team's climate for innovation has been shown to be important for innovation in management and work teams. It is argued that the relationship between team climate and innovation will be stronger for research teams than development teams as research teams have greater scope for creating novel and innovative ideas. However, the relationships between team climate and individual and team innovation were stronger for research teams than development teams.

Studies by Amabile (1996), showed that organizational creativity and innovation in the workplace can lead to action which creates new ideas and can be utilized to achieve new business and new programs in order to deliver products and services to customers. In discussing the structure of creativity and innovation or the psychological processes of organizations need to be promoted as well as their characteristics of the innovation. As a result, focusing on the team and create the conditions necessary for them is a way of innovation (Panuwatwanich *et al.*, 2008).

Ju *et al.* (2006) developed a strategic contingency model to identify interrelationships among knowledge characteristics, knowledge management strategy, knowledge integration organizational

learning, Knowledge Management (KM) capability and innovation. They explored that knowledge characteristics with higher modularity and explosiveness could enhance organizational learning and knowledge integration. Furthermore, they found that levels of organizational learning, knowledge integration and knowledge management capability have significant impact on firm's innovation.

Rhodes *et al.* (2008) discussed the influence of particular organizational factors (IT systems, structured learning strategies, innovative organizational culture and flexible structure and design) on knowledge transfer. It was discovered that of the particular organizational factors considered, IT systems had the most significant impact on organizational knowledge transfer followed by a structured learning strategy and an innovative organizational culture. Personalized (tacit) knowledge transfer had a strong influence on innovative capabilities development and process innovation had a greater impact on organizational performance than product innovation.

Learning environment: According to a survey instrument from professors Garvin and Edmondson of the Harvard Business School and assistant professor Gino of Carnegie Mellon University (Garvin *et al.*, 2008), an organization with a strong learning culture faces the unpredictable deftly and there are three building blocks of a learning organization. The first, a supportive learning environment, comprises psychological safety, appreciation of differences, openness to new ideas and time for reflection. The second, concrete learning processes and practices includes experimentation, information collection and analysis and education and training. These two complementary elements are fortified by the final building block: leadership that reinforces learning.

At a University of Oxford discussion about the 'learning environment', it was suggested that traditionally the learning environment has been thought about in two dominant forms: The physical and the socio-cultural. The physical environment includes things like: Chairs arranged in a circle or around a square table, provisioning of residential colleges, access to libraries and other information resources, access to laboratory or other discipline-specialist environments and so forth. Others debated the idea that it can also be virtual and held anywhere (Oxford, n/d).

Communication helps with inter-agency coordination within the organization and enables employees to work under a common vision with the ability to comment frequently. Promoting learning means to encourage openness and creativity, learning to work as a team and the self-development of every person in the organization (Garvin *et al.*, 2008; Hult, 1998; Pedler *et al.*, 1991).

A UK (United Kingdom) study (James and Holmes, 2012) on Vocational Education and Training (VET) studied skills competitions to better understand what vocational excellence looks like and how it is developed, focusing particularly on the learning environment at work. The findings showed that the more 'expansive' the workplace environment, the more likely the competitor is going to have the necessary and sufficient skill base to begin working towards meeting standards in that skill.

School leadership plays an important role in creating effective schools with retaining and developing effective teachers a priority in all school systems (OECD, 2009). Across countries, the aspects of teachers' work with greatest development need are: "Teaching special learning needs students", followed by "ICT teaching skills" and "Student discipline and behaviour" (OECD, 2009).

The flexibility and freedom to work means giving employees the freedom to plan their own which achieves the objectives of the organization and the power to run (Garvin *et al.*, 2008; Hult, 1998; Pedler *et al.*, 1991).

Management strategy: Studies consistently find that the most effective leaders are strategic thinkers but what makes a leader strategic and how can an aspiring leader learn to act strategically? Strategic leaders take a broad, long-range approach to problem-solving and decision-making through objective analysis, thinking ahead and planning (Kabacoff, 2009). That means being able to think in multiple time frames, identifying what they are trying to accomplish over time and what has to happen now, in six months, in a year, in three years, to get there. It also means thinking systemically. That is, identifying the impact of their decisions on various segments of the organization including internal departments, personnel, suppliers and customers. The ability to maintain a focus on long-range objectives, the process of how to achieve them over time and an understanding of the implications of decisions for all involved is the hallmark of a strategic leader.

In many organizations, strategic innovation faces many obstacles. A typical scenario is one in which companies are very successful in their existing markets and do not feel any urge to change. Under other circumstances, companies have already recognized the need to change but do not have the capabilities of managing the change or executives hesitate to take risks due to uncertainty of change (Markides, 1998).

Nuntamanop *et al.* (2013) presented new insights into strategic thinking, proposing a model of strategic thinking competency with the study identifying seven characteristics of strategic thinking that impacts strategy formulation, strategic actions and business performance. These were conceptual thinking ability, visionary thinking, analytical thinking ability, synthesizing ability, objectivity, creativity and learning ability. This set of abilities and skills were termed as “strategic thinking competency”.

An American study by McGhee (2001) concluded that the duties and responsibilities of opening and running a school can be divided into 5 main themes which included:

- Parental issues
- Construction or building issues
- Staffing issues
- School organization issues and
- Time management issues

There were also five skills, characteristics or personal traits categories which included:

- Interpersonal skills
- Organizational and planning skills
- Professional knowledge
- Vision and
- Flexibility

Although, a lack of ability in any one of the categories could be detrimental, the categories that mitigate deficiencies in other categories are strong interpersonal skills and flexibility.

Management effectiveness: It is the principal who binds together the various threads of “values, leadership, vision and culture” (Campbell-Evans, 1993). For most school communities there are competing goals, a wide spectrum of expectations and a range of values that register almost all the possible points of view (Stewart, 2000). The principal, in an effective school, acts as a filter and

conduit for establishing the “core” values that the school will honor. Dimmock (1993) argues that we are yet to identify the variables that will allow us to identify which principals made a difference to student learning and why this might be so. He states that, “some do [make a difference] but most do not”.

At the reins of today’s new schools will be not one but many leaders who believe in creating the conditions that enable staffs to find their own directions (Leithwood, 1992). Elements contributing to the decision making process according to Spaedy (1990) are “persons wishing to impact society as school leaders must be motivated by a set of deep personal values and beliefs” and they must “bring to their enterprise a certain passion that affects others deeply” (Sergiovanni, 1991). School leaders, need to develop their capacity for critical self-reflection on practice and promote self-inquiry among other members of the school community. In developing democratic, professional communities, leaders must operate from moral authority based on ability, professional expertise and moral imperative rather than line authority (Fullan, 2003). Their behavior should model commitment to the values of the school (Sergiovanni, 1991) and to serving the best interests of the children in their school (Greenfield, 1990).

In research conducted by Fritz and Miller (2003), it was suggested that as the instructional leader and teacher develop in the supervisory process, it is proposed that the approach of supervision used should change. As professional readiness increases and as the circumstances dictate, the instructional leader should progress in an upward direction on the continuum and facilitate more teacher-directed approaches of supervision. With teacher-directed approaches of supervision, instructional leaders and teachers may experience greater reward from the supervisory process.

Additionally, few topics in education have captured as much attention from policymakers and practitioners as the connection between teaching quality and student achievement. The research has clearly shown that quality teaching matters to student learning. Teacher quality has been consistently identified as the most important school-based factor in student achievement (McCaffrey *et al.*, 2003) and teacher effects on student learning have been found to be cumulative and long-lasting (Anderson and West, 1998).

From the above conceptual review and development, the researchers have developed the following hypotheses for the present study.

- H1:** Management strategy influences management innovation
- H2:** Management innovation influences management effectiveness
- H3:** Management strategy influences management effectiveness
- H4:** Management strategy influences learning environment
- H5:** Learning environment influences management effectiveness

METERIALS AND METHODS

The sample group for this research includes 614 Thai vocational school college administrators selected from stratified random sampling from 4 Thai provinces which were given questionnaires using simple random sampling and a 7-point Likert scale (Likert, 1972) with 1 being the lowest and 7 the highest.

Questionnaire design: Quality and content was monitored with tools used in the research and as a measurement of quality. Both content validity and reliability was assured by 5 experts in their

respective fields with an evaluation index consistent with the content and the purpose of the research. Additionally, the index of Item-Objective Congruence (IOC) developed by Rovinelli and Hambleton (1977) was employed to carry out the screening of questions to a group of 30 initially in the pilot study. The IOC is a procedure used in test development for evaluating content validity at the item development stage. This measure is limited to the assessment of unidimensional items or items that measure specified composites of skills. The method prescribed by Rovinelli and Hambleton (1977) results in indices of item congruence in which experts rate the match between an item and several constructs assuming that the item taps only one of the constructs which is unbeknownst to the experts. The research then proceeded to select items that with an IOC index higher than 0.5 which were considered acceptable.

Questionnaires were constructed to be a tool to measure concept definition and practice. The instrument or questionnaire used the 7-point (Likert, 1972) as the measurement scale and the conceptual framework for determining the internal consistency measured by coefficient alpha (α -coefficient) of Akron BAC (Cronbach) to calculate the average value of the correlation coefficient which ranged from 0.886 to 0.895 which is considered quite reliable after all values lower than 0.50 were eliminated from the measurement.

Confirmatory Factor Analysis (CFA) and the Structural Equation Modeling (SEM) was undertaken with PLS Version 8.72 and used a technique for the measurement of attitudes (Likert, 1932) on (1) Management innovation (2) Management strategy (3) Learning environment and (4) Management effectiveness.

Data analysis: The analysis was conducted following two steps. In the first stage, all items generated were included in the first-order measurement model for management effectiveness. The initial model fitness was assessed and subjected to re-specification. In the second stage, a second order confirmatory factor analysis was performed based on the re-specified model. To produce an over-identified model, the first regression path in each measurement component was fixed at 1. The criteria used to evaluate the items were each item's error variance estimate; evidence of items needing to cross-load on more than one component factor as indicated by large modification indices; the extent to which items give rise to significant residual covariance; parsimony purpose; regression coefficient of each item; reliability of the item and the reliability of the whole construct. Additionally, the logic and consistency of data with the theoretical framework was considered when evaluating each item.

Quantitative measurement: Analysis of Thai vocational colleges' management effectiveness used a measurement instrument or questionnaires utilizing a 7-point Likert scale (Likert, 1972).

Dependent variable: Management Effectiveness (ADE) of Thai vocational college's analysis used as a measurement instrument or questionnaire a 7-point (Likert, 1972) and was constructed with the scales developed enabling measurement of Customer (C), Internal Processes (IP), Learning (L) and Solutions (S). There is a high-reliability factor as the Cronbach's alpha was 0.886 with the mean at 5.54 (Campbell-Evans, 1993; Stewart, 2000; Dimmock, 1993; Leithwood, 1992; Spaedy, 1990; Sergiovanni, 1991; Fullan, 2003; Greenfield, 1990; McCaffrey *et al.*, 2003; Mendro *et al.*, 1998).

Independent variables: Management innovation (IAD) analysis used as a measurement instrument or questionnaire a 7-point (Likert, 1972) and was constructed with the scales developed

enabling measurement of organization (OC), quality (QMS), market (MD) and resource (RM). There is a high-reliability factor as the Cronbach's alpha was 0.890 with the mean at 6.01 (Goyal and Pitt, 2007; Inauen and Schenker-Wicki, 2011; OECD, 2002; Wong and Chin, 2007; Scarbrough and Swan, 2001; Scarbrough, 2003; Ahmad and Schroeder, 2011; Anderson and West, 1998; Bain *et al.*, 2001; Amabile, 1996; Panuwatwanich *et al.*, 2008; Ju *et al.*, 2006; Rhodes *et al.*, 2008).

Management Strategy (ST) analysis used as a measurement instrument or questionnaire a 7-point (Likert, 1972) and was constructed with the scales developed enabling measurement of raise (Re), innovation Development (Di), Promotion (Pe), System Development (Ds), Management Development (Dm) and Network Development (Ne). There is a high-reliability factor as the Cronbach's alpha was 0.891 with the mean at 5.66 (Kabacoff, 2009; Markides, 1998; Nuntamanop *et al.*, 2013; McGhee, 2001).

Learning Environment (LC) analysis used as a measurement instrument or questionnaire a 7-point (Likert, 1972) and was constructed with the scales developed enabling measurement of Continuous learning (CLP), Promoting Learning (PL), Communications (CO) and Flexibility/Freedom (FF). There is a high-reliability factor as the Cronbach's alpha was 0.895 with the mean at 5.64 (OECD, 2009; James and Holmes, 2012; Oxford, n/d).

RESULTS AND DISCUSSION

Partial least squares has been applied for analysis of quantitative data by the researcher. It is data analysis for Confirmatory Factor Analysis (CFA) relating to the determination of manifest variable and latent variable and testing of research hypothesis exhibiting in structural model analyzed by using the applications of PLS-Graph (Chin, 2001).

According to the analysis result of scale validity and reliability, scale investigation has been conducted using internal consistency measurement coefficient alpha (α -coefficient) of Akron BAC (Cronbach) to calculate the average value of the correlation coefficient was found that alpha coefficients ranged from 0.886-0.895 which is considered to have high reliability.

In case of measure variables with reflective analysis, convergent validity has been conducted. Loading is used as consideration criteria and must be positive quantity and indicator loading has been more than 0.707 and all values have been statistically significant ($|t| \geq 1.96$) representing convergent validity of scales (Lauro *et al.*, 2005; Henseler and Fassott, 2010) and analysis results as shown in Table 1 below.

Management Innovation (IAD) factors underlying the external variables are influenced by organization (OC), quality (QMS), market (MD) and resource (RM) with values loading from 0.707 and a significant level of confidence percentage 95% ($t\text{-stat} > 1.96$) which considers such factors highly reliable. These factors have a direct and positive impact on management effectiveness as shown in Table 1 and in the final model in Fig. 2.

Table 1: Summary of hypothesis tests

Hypothesis path	Path coefficient	t-test	p-value	Results
H1: Management strategy - Management innovation	0.790**	43.303	<0.001	Supported
H2: Management innovation - Management effectiveness	0.107**	50.007	<0.006	Supported
H3: Management strategy - Management effectiveness	0.217*	59.007	<0.001	Supported
H4: Management strategy - Learning environment	0.839*	50.261	<0.001	Supported
H5: Learning environment - Management effectiveness	0.510*	50.007	<0.001	Supported

Signs for path coefficients have been changed appropriately to account for negative signs for partial least squares weights. * $p < 0.05$; ** $p < 0.01$

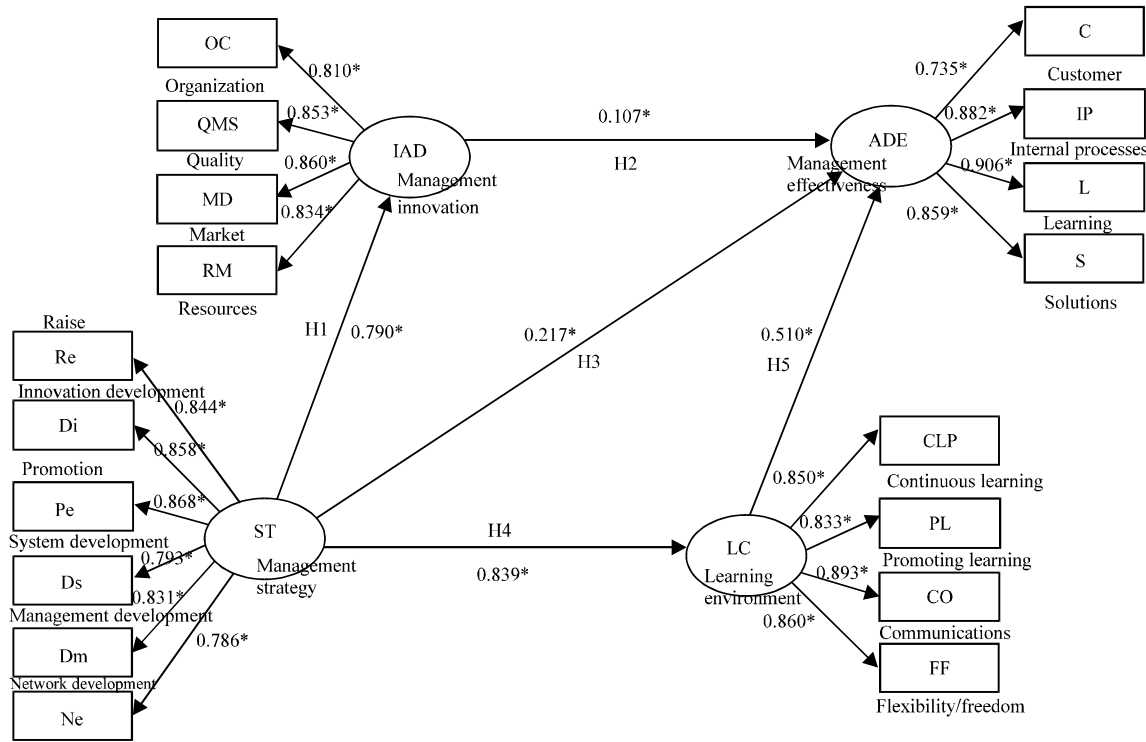


Fig. 2: Final model of Thai vocational colleges' management effectiveness

Management Strategy (ST) factors underlying the external variables are influenced by Raise (Re), Innovation Development (Di), Promotion (Pe), System Development (Ds), Management Development (Dm) and Network Development (Ne) with values loading from 0.707 and a significant level of confidence percentage 95% ($t\text{-stat} > 1.96$), which considers such factors highly reliable. These factors have a direct and positive impact on both the Learning Environment and Management Effectiveness as shown in Table 1 and in the final model in Fig. 2.

Learning Environment (LC) factors underlying the external variables are influenced by Continuous Learning (CLP), Promoting Learning (PL), Communications (CO) and Flexibility and Freedom (FF) with values loading from 0.707 and a significant level of confidence percentage 95% ($t\text{-stat} > 1.96$), which considers such factors highly reliable. These factors have a direct and positive impact on Management Effectiveness as shown in Table 1 and in the final model in Fig. 2.

Table 1 shows the results of hypotheses testing were as follows:

- **Hypothesis 1 (H1):** Management strategy in private Thai vocational schools has a direct and positive influence on Management Innovation. Hypothesis testing found that the management strategies of private Thai vocational college administrators have a direct and positive influence on the management of the college as witnessed by the coefficient = 0.790, the fact that the hypothesis significance is $p < 0.01$
- **Hypothesis 2 (H2):** Management innovation of private Thai vocational schools has a direct and positive influence on Management Effectiveness. Hypothesis testing found that the Management Innovation of private Thai vocational schools has a direct and positive influence on Management Effectiveness as witnessed by the coefficient = 0.107, the fact that the hypothesis significance is $p < 0.01$

- **Hypothesis 3 (H3):** Management strategy of private Thai vocational schools has a direct and positive influence on Management Effectiveness. Hypothesis testing found that the Management Strategy of private Thai vocational schools has a direct and positive influence on Management Effectiveness as witnessed by the coefficient = 0.217, the fact under the assumption that significant is $p \leq 0.05$
- **Hypothesis 4 (H4):** Management strategy of private Thai vocational schools has a direct and positive influence on Learning Environment. Hypothesis testing found that the Management Strategy of private Thai vocational schools has a direct and positive influence on Learning Environment as witnessed by the coefficient = 0.839, the fact that under the assumption that significant is $p \leq 0.05$
- **Hypothesis 5 (H5):** Learning environment of private Thai vocational schools has a direct and positive influence on Management Effectiveness. Hypothesis testing found that the Learning Environment of private Thai vocational schools has a direct and positive influence on Management Effectiveness as witnessed by the coefficient = 0.510, the fact that the hypothesis significance is $p \leq 0.05$

The reflective model in Table 2 shows the discriminant validity of the internal latent variables and the correlation of variables. It also depicts the scale reliability which has been analyzed from Composite Reliability (CR) as well as the Average Variance Extracted (AVE). The CR value should not go below 0.60 and the AVE values should also drop below 0.50 and R^2 values should not be under 0.20 (Lauro *et al.*, 2005; Henseler and Fassott, 2010).

Table 3 shows the results of factor analysis affecting management effectiveness of Thai vocational college administrators. The data also shows the CR values are higher than 0.60 with all AVE values higher than 0.50 for all values and R^2 values higher than 0.20, representing the

Table 2: Reflective statistical values indicating convergent validity of the latent variables

Construct/item	Loading	AVE	t-stat
Innovative (IAD)			
Organization (OC)	10.810	0.705	33.429
Quality (QMS)	0.853		43.444
Market (MD)	0.860		59.007
Resources (RM)	0.834		59.007
Strategy (ST)			
Raise (Re)	0.844	0.690	13.624
Innovation development (Di)	0.858		50.261
Promotion (Pe)	0.868		72.373
System development (Ds)	0.793		60.736
Management development (Dm)	0.831		28.028
Network development (Ne)	0.786		44.416
Learning environment (LC)			
Continuous learning (CLP)	0.850	0.723	20.463
Promoting learning (PL)	0.833		28.028
Communications (CO)	0.893		44.416
Flexibility/freedom (FF)	0.860		60.736
Management effectiveness (ADE)			
Customer (C)	0.735	0.606	25.076
Internal processes (IP)	0.882		28.028
Learning (L)	0.906		23.732
Solutions (S)	0.859		72.373

Latent and observed variables

Table 3: Confirmatory Factor Analysis (CFA) of the independent variables of management innovation, management strategy and learning environment and their effects on the dependent variable of management effectiveness

Construct	CR	AVE	Cross construct correlation			
			Management innovation	Management strategy	Learning environment	Management effectiveness
Management innovation	0.905	0.705	0.840			
Management strategy	0.930	0.690	0.786	0.831		
Learning environment	0.919	0.738	0.759	0.828	0.859	
Management effectiveness	0.911	0.719	0.662	0.723	0.773	0.848

CR: Composite reliability, AVE: Average variance extracted. Note that there are statistically significant at the 0.01 level as shown by the numbers in the diagonal

Table 4: Results of hypotheses testing on management effectiveness of Thai vocational college administrators

Study of latent variables (n = 400)	Cronbach's alpha	Mean	SD	Results
Management innovation	0.890	6.01	3.46	Supported
Management strategy	0.891	5.66	2.89	Supported
Learning environment	0.895	5.64	2.93	Supported
Management effectiveness	0.886	5.54	3.19	Supported

SD: Standard deviation

reliability of the measurement. It found that data sets in the \sqrt{AVE} have higher values than all of the corresponding values in the 'cross construct correlation' in the same column, representing discriminant validity of the measure in each construct and with a greater value than 0.50 of AVE as shown in Table 3. The samples were analyzed to answer the research hypotheses criteria in the three assumptions presented in Table 4.

Furthermore, the structural analysis model framework was used to research the t-test coefficients and their relationship of each path of the t-test hypothesis with significance greater than 1.96. This explains the results obtained from analysis as shown in Table 2 and 3 as well as the test results presented in Table 4.

In structural equation modeling, the fit indices establish whether, overall, the model is acceptable. The fit indices can be classified into several classes. Many researchers such as Marsh and Hau (1996), recommend that individuals utilize a range of fit indices. Indeed, Jaccard and Wan (1996) recommend using indices from different classes as well; this strategy overcomes the limitations of each index. The following scholars regards a model to be acceptable if the following criteria has been established:

- The Normed Fit Index (NFI) exceeds 0.90 (Byrne, 1994) or 0.95 (Schumacker and Lomax, 2004)
- The Goodness of Fit Index exceeds 0.90 (Byrne, 1994)
- The Comparative Fit Index exceeds 0.93 (Byrne, 1994)
- RMS is less than 0.08 (Browne and Cudeck, 1993) and ideally less than 0.05 (Steiger, 1990). Alternatively, the upper confidence interval of the RMS should not exceed 0.08 (Hu and Bentler, 1995)

The relative chi-square should be less than 2 or 3 (Kline, 1998; Ullman, 2001). These criteria are merely guidelines. To illustrate, in a field in which previous models generate CFI values of 0.70 only, a CFI value of 0.85 represents progress and thus should be acceptable (Bollen and Long, 1993).

Based on the research subject, 'Structural equation modeling of deerminants on management effectiveness of Thai private vocational college education' issues to be discussed are as follows:

Over the past four decades, global higher education enrolment increased from 32.6 million in 1970-182.2 million students in 2011, 46% of which was in the East and South Asia region in 2011 (UIS, 2014). The pressure on administrators and the state to deal with this vast expansion is immense but often times the resources have been limited but in Thailand's case, private education facilities stepped in to pick up the slack (NEA, 1999).

Leadership is a critical aspect to the success of an organization and the leader has the obligation and is directly responsible for planning, directing and controlling the operations and personnel of the organization to achieve the organizations goals and objectives.

An American study (McGhee, 2001) concluded that the duties and responsibilities of opening and running a school can be divided into 5 main themes which included parental issues, construction or building issues, staffing issues, school organizational issues and time management issues. There were also five skills, characteristics or personal traits categories which included interpersonal skills organizational and planning skills, professional knowledge, vision and flexibility. Although, a lack of ability in any one of the categories could be detrimental, the categories that mitigate deficiencies in other categories are strong interpersonal skills and flexibility.

Schools constantly encounter forces driving them to change. Because change means doing something new and unknown, the natural reaction is to resist change in Thailand. Vocational college administrators must overcome this resistance and adopt innovative and efficient management techniques to remain high performers. They must improve their personal, team and cultural management skills if they hope to adapt themselves to a changing world.

There is still considerable discussion as to whether management is an art or a science, a philosophy or a skill. No one sustainable model can holistically encompass all management situations and environments. Management can be defined as the rational assessment of a situation and the systematic selection of goals and purposes; the systematic development of strategies to achieve these goals; the marshaling of the required resources, the rational design organization, direction and control of the activities required to attain the selected procedures (Clemmer and McNeil, 1988). Managers typically engage in a large number of discrete activities each day and the average number of activities appears to increase at lower levels of management. The activities, however, are usually very brief in duration (Mintzberg, 1989).

Given these factors, the researchers undertook this study to analyze the elements involved in administrator management effectiveness of Thai vocational schools. Factors studied included the learning environment, management innovation and management strategy. Selection efficiency affects private college directors in Thailand so processes and criteria must be effectively implemented to maintain and develop a fruitful and sustainable educational environment. Elements involved in promoting the management of private vocational colleges include (1) Determining and encouraging private and public sector organizations strategy in understanding the learning process through every stage of the administrative process, (2) Using innovation management within private colleges by providing a learning source for management as well as better incentives to achieve a positive image for the sustainable management of private colleges and (3) Having an environment in which the government wishes to learn about the issues and listens to suggestions and recommendations concerning private vocational colleges.

Feedback policy

- It is recommended that all parties involved in the decision making process be involved at every point and understand the beneficiaries of the determined policies. There should also be a clear delineation of private sector organizations and government agencies involved in the decision making process so that there is an effective management process which is sustainable
- Effective strategies with Thai private vocational colleges have three identified aspects. These include innovation management and the learning environment with management strategy having a direct effect on a private vocational college's image and reputation

Suggested follow-on research

- Follow-on research on Thai private vocational college's management is suggested along with what drives and motivates individuals to learn. Further investigation is suggested on related management theory that would assist administrators in their personal development as executives at private vocational college in Thailand
- Additional research is suggested on the management of private vocational colleges where comparisons are drawn to identify factors helping with these organizations helping to adopt good management styles

REFERENCES

- ADB, 2011. Higher education across Asia: An overview of issues and strategies. Asian Development Bank (ADB), November 2011. <http://www.perpustakaan.depkeu.go.id/FOLDEREBOOK/higher-education-across-asia.pdf>
- Ahmad, S. and R.G. Schroeder, 2011. Dimensions of competitive priorities: Are they clear, communicated and consistent? *J. Applied Bus. Res.*, 18: 77-86.
- Amabile, T.M., 1996. *Creativity in Context*. West View Press, Boulder, CO., USA., ISBN-13: 9780813330341, Pages: 317.
- Anderson, N.R. and M.A. West, 1998. Measuring climate for work group innovation: Development and validation of the team climate inventory. *J. Organiz. Behav.*, 19: 235-258.
- Bain, P.G., L. Mann and A. Pirola-Merlo, 2001. The innovation imperative: The relationships between team climate, innovation and performance in research and development teams. *Small Group Res.*, 32: 55-73.
- Bjarnason, S., K. Cheng, J. Fielden, M. Lemaitre, D. Levy and N.V. Varghese, 2009. A new dynamic: Private higher education. ED.2009/Conf.402/inf.4, United Nations Educational, Scientific and Cultural Organization (UNESCO), Paris, France.
- Bollen, K.A. and J.S. Long, 1993. *Testing Structural Equation Models*. Sage Publications, Newbury Park, CA., pp: 136-162.
- Browne, M.W. and R. Cudeck, 1993. Alternative Ways of Assessing Model Fit. In: *Testing Structural Equation Models*, Bollen, K.A. and J.S. Long (Eds.). SAGE Publication, Newbury Park, USA., pp: 136-162.
- Byrne, B.M., 1994. *Structural Equation Modeling with EQS and EQS/WINDOWS: Basic Concepts, Applications and Programming*. 3rd Edn., SAGE Publications, Thousand Oaks, CA., ISBN: 9780803950917, Pages: 288.
- Campbell-Evans, G., 1993. A Values Perspective on School-Based Management. In: *School-Based Management and School Effectiveness*, Dimmock, C. (Ed.). Routledge, London.

- Chealy, C., 2006. Cambodia. In: Higher Education in South-East Asia, UNESCO (Ed.). UNESCO Asia and Pacific Regional Bureau for Education, Bangkok, Thailand, ISBN: 92-9223-084-0, pp: 13-34.
- Chin, W.W., 2001. PLS-Graph User's Guide. Version 3.0, Soft Modeling Inc., Houston, TX., USA.
- Clemmer, J. and A. McNeil, 1988. The VIP Strategy: Leadership Skills for Exceptional Performance. Key Porter Books, Toronto, ISBN: 9781550130805, Pages: 280.
- Dimmock, C., 1993. School-Based Management and School Effectiveness. Routledge, London.
- Fritz, C. and G. Miller, 2003. Supervisory options for instructional leaders in education. *J. Leadership Educ.*, 2: 13-27.
- Fullan, M., 2003. The Moral Imperative of School Leadership. SAGE Publications, California, ISBN: 9780761938736, Pages: 88.
- Garvin, D.A., A.C. Edmondson and F. Gino, 2008. Is yours a learning organization? *Harvard Bus. Rev.*, 86: 109-116.
- Glickman, C.D., S.P. Gordon and J.M. Ross-Gordon, 1995. Supervision of Instruction: A Developmental Approach. 3rd Edn., Allyn and Bacon, USA., ISBN: 9780205163892, Pages: 471.
- Goyal, S. and M. Pitt, 2007. Determining the role of innovation management in facilities management. *Facilities*, 25: 48-60.
- Greenfield, W.D., 1990. Five standards of good practice for the ethical administrator. *NASSP Bulletin*, No. 74, pp: 32-37.
- Henseler, J. and G. Fassott, 2010. Testing Moderating Effects in PLS Path Models: An Illustration of Available Procedures. In: *Handbook of Partial Least Squares: Concepts, Methods and Applications*, Vinzi, V.E., W.W. Chin, J. Henseler and H. Wang (Eds.). Springer-Verlag, Berlin, Germany, ISBN-13: 9783540328254, pp: 713-736.
- Hu, L. and P.M. Bentler, 1995. Evaluating Model Fit. In: *Structural Equation Modeling Concepts Issues and Applications*, Hoyle, R.H. (Ed.). Sage Publication, Thousand Oaks, CA, pp: 76-99.
- Hult, G.T.M., 1998. Managing the international strategic sourcing process as a market-driven organizational learning system. *Decis. Sci.*, 29: 193-216.
- Inauen, M. and A. Schenker-Wicki, 2011. The impact of outside-in open innovation on innovation performance. *Eur. J. Innovat. Manage.*, 14: 496-520.
- Jaccard, J. and C.K. Wan, 1996. LISREL Approaches to Interaction Effects in Multiple Regression. Vol. 114, Sage Publications, Thousand Oaks, CA., Pages: 98.
- James, S. and C. Holmes, 2012. Developing vocational excellence: Learning environments within work environments. SKOPE Research Paper No. 112, November 2012.
- Ju, T.L., C.Y. Li and T.S. Lee, 2006. A contingency model for knowledge management capability and innovation. *Ind. Manage. Data Syst.*, 106: 855-877.
- Kabacoff, R., 2009. Sorting out strategic leadership. *The Wall Street Journal*, September 16, 2009. <http://online.wsj.com/news/articles/SB125311230836315997>.
- Kline, R.B., 1998. Principles and Practice of Structural Equation Modeling. Guilford Press, New York, ISBN: 9781572303379, Pages: 354.
- Lauro, C., V.E. Vinzi and S. Amato, 2005. PLS Typological Regression: Algorithmic, Classification and Validation Issues. In: *New Developments in Classification and Data Analysis*, Vichi, M., P. Monari, S. Mignani and A. Montanari (Eds.). Springer-Verlag, Berlin, Germany, ISBN-13: 9783540238096, pp: 133-140.
- Leithwood, K.A., 1992. The move toward transformational leadership. *Educ. Leadership*, 49: 8-12.

- Levy, D., 2010. East Asian private higher education: Reality and policy. February, 2010. <http://siteresources.worldbank.org/INTEASTASIAPACIFIC/Resources/EastAsianPrivateHigherEducation.pdf>
- Likert, R., 1932. A technique for the measurement of attitudes. *Arch. Psychol.*, 140: 1-55.
- Likert, R., 1972. Likert Technique for Attitude Measurement. In: *Social Psychology: Experimentation, Theory, Research*, Sahakian, W.S. (Ed.). Intext Educational Publishers, Scranton, USA., ISBN-13: 9780700223879, pp: 101-119.
- Markides, C.C., 1998. Strategic innovation in established companies. *Sloan Manage. Rev.*, 39: 31-42.
- Marsh, H.W. and K.T. Hau, 1996. Assessing goodness of fit: Is parsimony always desirable? *J. Exp. Educ.*, 64: 364-390.
- McCaffrey, D.F., J.R. Lockwood, D.M. Koretz and L.S. Hamilton, 2003. Evaluating Value-Added Models for Teacher Accountability. RAND, Santa Monica, CA., ISBN: 9780833035424, Pages: 131.
- McGhee, M.V., 2001. A principal's role in opening a new school. Ph.D. Thesis, Graduate Faculty of the University of Georgia, Athens, GA., USA.
- Mendro, R.L., H.R. Jordan, E. Gomez, M.C. Anderson and K.L. Bembry, 1998. An application of multiple linear regression in determining longitudinal teacher effectiveness. *Proceedings of the Annual Meeting of the American Educational Research Association*, April 1998, San Diego, CA., pp: 1-22.
- Mintzberg, H., 1989. *Mintzberg on Management: Inside our Strange World of Organizations*. Free Press, New York, USA., ISBN-10: 0824793196, Pages: 418.
- NEA, 1999. National education act B.E. 2542 (1999). National Education Act (NEA), Thailand. http://planipolis.iiep.unesco.org/upload/Thailand/Thailand_Education_Act_1999.pdf.
- Nuntamanop, P., I. Kauranen and B. Igel, 2013. A new model of strategic thinking competency. *J. Strategy Manage.*, 6: 242-264.
- OECD, 1996. The knowledge-based economy. Organization for Economic Co-operation and Development (OECD), Paris. <http://www.oecd.org/sti/sci-tech/1913021.pdf>.
- OECD, 2002. *Babies and bosses: Reconciling work and family life*, Volume 1: Australia, Denmark and the Netherlands. Organization for Economic Co-operation and Development (OECD), Paris, France.
- OECD, 2009. *Creating effective teaching and learning environments first results from TALIS*. Organization for Economic Co-operation and Development (OECD). <http://www.oecd.org/education/school/43023606.pdf>
- Ogunade, A.O., 2011. Human capital investment in the developing world: An analysis of praxis. University of Rhode Island. http://www.uri.edu/research/lrc/research/papers/Ogunade_Workforce_Development.pdf
- Panuwatwanich, K., R.A. Stewart and S. Mohamed, 2008. The role of climate for innovation in enhancing business performance: The case of design firms. *Eng. Constr. Architect. Manage.*, 15: 407-422.
- Pedler, M., J.G. Burgoyne and T. Boydell, 1991. *The Learning Organization: A Strategy for Sustainable Development*. McGraw-Hill, New York.
- Rhodes, J., R. Hung, P. Lok, B.Y.H. Lien and C.M. Wu, 2008. Factors influencing organizational knowledge transfer: Implication for corporate performance. *J. Knowledge Manage.*, 12: 84-100.
- Rovinelli, R.J. and R.K. Hambleton, 1977. On the use of content specialists in the assessment of criterion-referenced test item validity. *Dutch J. Educ. Res.*, 2: 49-60.

- Scarbrough, H. and J. Swan, 2001. Explaining the diffusion of knowledge management: The role of fashion. *Br. J. Manage.*, 12: 3-12.
- Scarbrough, H., 2003. Knowledge management, HRM and the innovation process. *Int. J. Manpower*, 24: 501-516.
- Schumacker, R.E. and R.G. Lomax, 2004. *A Beginner's Guide to Structural Equation Modeling*. 2nd Edn., Lawrence Erlbaum Associates, Mahwah, NJ.
- Sergiovanni, T.J., 1991. *The Principalship: A Reflective Practice Perspective*. 2nd Edn., Allyn and Bacon, Boston.
- Spaedy, M., 1990. Reinventing school leadership. *Proceedings of the Reinventing School Leadership Conference*, September 1990, Cambridge, MA., pp: 156-159.
- Steiger, J.H., 1990. Structural model evaluation and modification: An interval estimation approach. *Multivariate Behav. Res.*, 25: 173-180.
- Stewart, D., 2000. *Tomorrows Principals Today*. Kanuka Grove Press, Palmerston North, NZ., ISBN: 9781877249174, Pages: 307.
- StudyLands, 2014. Career colleges and vocational schools in Thailand. SAE Institute Bangkok Thailand, Wattana, Thailand. http://www.studylands.com/study-abroad/career_vocational2-TH-en-oc.htm
- The Nation, 2013. ASEAN countries join forces to boost vocational education programmes. *The Nation*, August 5, 2013. <http://www.nationmultimedia.com/national/Asean-countries-join-forces-to-boost-vocational-ed-30211884.html>
- Trow, M., 2006. Reflections on the Transition from Elite to Mass to Universal Access: Forms and Phases of Higher Education in Modern Societies Since WWII. In: *International Handbook of Higher Education*, Forest, J.J.F. and P.G. Altbach (Eds.). Springer Science and Business Media, New York, pp: 243-280.
- UIS, 2014. Higher education in Asia: Expanding out, expanding up: The rise of graduate education and university research. UNESCO Institute for Statistics (UIS), Quebec, Canada. <http://www.uis.unesco.org/Library/Documents/higher-education-asia-graduate-university-research-2014-en.pdf>
- UNESCO, 2011. *UNESCO National Education Support Strategy (UNESS): Thailand*. UNESCO Office Bangkok and Regional Bureau for Education in Asia and the Pacific, Thailand.
- Ullman, J.B., 2001. Structural Equation Modeling. In: *Using Multivariate Statistics*, Tabachnick, B.G. and L.S. Fidell (Eds.). 4th Edn., Allyn and Bacon, Needham Heights, MA., pp: 653-771.
- Wong, S.Y. and K.S. Chin, 2007. Organizational innovation management: An organization-wide perspective. *Ind. Manage. Data Syst.*, 107: 1290-1315.