Innovative Organization of School under the Office of the Basic Education (OBEC): A Second Order Confirmatory Factor Analysis

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ABSTRACT

This study aimed to develop and examine the Goodness-of-Fit Index of Confirmatory Factor Analysis (CFA) of innovative organization of school under the Office of the Basic Education Commission (OBEC). The result is based on the empirical data. The participants for this study were 84 school directors, 332 deputy school directors, and 84 heads of ICT department under the Office of the Basic Education Commission. The tool for data collection was approved questionnaire with high content validity at 0.97. The data analyzed by Confirmatory Factor Analysis (CFA). The study shows the innovative organization of school under the Office of the Basic Education Commission consists of six factors: Strategic Management, Organizational Culture, Human Resource Development, Innovative Leader, Information and Communications Technology, and Learning Organization. The results of examination of the Goodness-of-Fit Index of Confirmatory Factor Analysis (CFA) found the model fit indexes based on the empirical data. The factor loadings of six factors were from 0.77 – 0.95 and factor loadings of indicators were from 0.59 – 0.78.

Keywords: Innovative Organization, Strategic Management, Organizational Culture, Human Resource Development, Innovative Leader.

1. INTRODUCTION

Innovation is an important source of growth and a key determinant of competitive advantage for many organizations. Achieving innovation involves the coordinated efforts of many different actors and the integration of activities across specialist functions, knowledge domains and contexts of application. Thus, organizational creation is essential to the process of innovation [1]. The ability of an organization to innovate is a pre-condition for the successful utilization of inventive resources and new technologies. In the same way, the starter of new technology often presents complex opportunities and challenges for organizations, leading to changes in managerial practices and the emergence of new organizational forms. Organizational and technological innovations are intertwined [2]. The organization must always be ready to change and adapt. "Innovation" is a necessity in organizational management to solve original or new problems that arise. It is something that organizations in this era need to invent and practice, including process innovation and management innovation. The innovative organization is a new type of organization that has improved and changed the way of thinking to create new things that are different and useful [3] and it has been the subject

of much interest in society as it is suitable for the environment outside the organization that is both complex and dynamic. Innovation is a purposeful organized and risk-taking change introduced into any work organization [4]. Supporting the innovation of personnel within the organization will create the ability to compete in addition to long-term growth [5].

However, the innovative organization is the new choice for organizational development, especially in the education industry, which seeks to use innovation to drive management so that educational organizations can develop the whole system. The success of the educational organization and survival in such a fast-changing world depends on being creative, discovering new things and innovation [6] [7]. Education institutions should develop administrative systems, instill personnel with behaviors or actions that are consistent with the vision and goals [8] and describes innovation as a process in which new programmed or practices are put in place or injected into the operation of a system to replace old or ineffective ones.

Education organizations must learn to take advantage of innovations arising from technological developments rather than just teaching online. They must develop the people to have the potential for innovation, increase the ability to use ICT by integrating teaching, research and institution management as well as developing knowledge management and innovation management [9] by setting up a framework for strategic innovation management, scheduling management according to local characteristics in accordance with the local context, culture, economic and social structure and should implement innovation to cover all dimensions [10]. Institution administrators need to bring innovation and strategies for use in management to meet the needs of parents and students, so innovation is a tool for developing educational processes [11]. Loaiza & Abarca [12] , who conducted a research study on the determination of the innovation capability of the University of Ecuador, found that after applying MIES (The Innovation Model of Higher Education), the model was able to explain the driving force in manufacturing innovation through MIES factors resulting in the ability to achieve innovation and create information that was useful for instructors at the university, especially for corporate executives. In addition, it was found that it helped to make significant changes for educational development. Executives had innovation as a management model, instructors could innovate in new ways for teaching and learning, and students had innovative skills. An innovative organization in education is considered a strategy for effective education development based on the process of driving the educational institutions to be a quality organization by defining educational management model that is suitable for the modern era, relying on the technology system as a base to develop innovation should be distributed to all parts of educational management services ranging from registration systems, courses, teaching management, teacher development as well as the development of administrative and educational management formats [13].

Though, the problem of productivity and efficiency in education is even more striking when education is compared with other public policy sectors, which have realized enormous productivity gains in the past decades. In sectors such as health, technology has been a major driver for increased productivity and efficiency with much improved outcomes even if the cost has also gone up. Many observers wonder why enormous advances in technology have not yet led to similar improvements in education governments have made substantial investments in bringing technology, mainly information and communications technology (ICT), to schools. However, following on from the analysis of PISA data, it has not yet been possible to innovate education and educate for innovation [14].

Therefore, the researcher is interested in studying the innovative organization of school under the Office of the Basic Education Commission in Thailand in order to apply the results of the study to create and develop the basic education institution administration model for development into an innovative organization, of which the institution administrators can apply the results of the study to in real use. Educational agencies, both in government and private sectors, can apply the results of the study to develop an organization development strategy for innovation in a basic education institution. Additionally, able to use the factors and indicators from the research as a tool for measuring and evaluating the school's innovative organization.

2. OBJECTIVE

This research aims to examine the Goodness-of-Fit Index of Confirmatory Factor Analysis (CFA) of innovative organization of school under the Office of the Basic Education Commission (OBEC).

3. METHODS AND MATERIALS

3.1 Research Design

This study used an exploratory descriptive research design centered primarily on a quantitative approach, which deployed a survey questionnaire technique, a convenience sampling method, and descriptive and inferential statistics. The research studied innovative organization of school from the concept of Christiansen [15], Tidd et al [16], Von Stamm [17], Wichitchanya, Durongwatana & Vadhanasindhu [18], Seyed [19], Akin [10], Van Lancker et al [20], Akpan [4], Guimaraes & Paranjape [21], Fernandes Rodrigues Alves et al [22], Sultana, Nigar and Mohammad Anisur Rahman [23]. It was found that an innovative organization of OBEC consists of six factors: Strategic Management, Organizational Culture, Human Resource Development, Innovative Leader, Information and Communications Technology, and Learning Organization.

3.2 Variables

The variables used to study an innovative organization of school under the OBEC, consist of:

1) Strategic Management
2) Organizational Culture
3) Human Resource Development
4) Innovative Leader
5) Information and Communications Technology
6) Learning Organization

3.3 Instrument

The instrument used in the research is questionnaire with five rating scales, divided into two sections. The first section is about general information of the respondents, and the second section is about qualification of an innovative organization of OBEC consist of six factors: 1) Strategic Management 2) Organizational Culture 3) Human Resource Development 4) Innovative Leader 5) Information and Communications Technology and 6) Learning Organization.

Research instrument was carefully assessed by the experts based on its validity and reliability, and it achieved a 0.97 Cronbach's alpha (α) coefficient value (considered "good" in most social sciences and humanities research studies) [24].

3.4 Populations and Sample group

Populations are 353 school directors, 1,012 deputy school directors and 353 heads of ICT department under the Office of the Basic Education Commission (OBEC)

Sample groups are 84 school directors, 332 deputy school directors, and 84 heads of ICT department under the Office of the Basic Education Commission. The sample groups are from stratified random sampling. The sample represented various ethnic and academic backgrounds.

3.5 Data Collection

The questionnaires were sent through post to the respondents. Then, the questionnaires were examined by added numbering on the questionnaires paper, which were specified. The questionnaires were examined whether they were completely answered and how many questionnaires were returned.

The returned completed questionnaires are 100.00 % of all sent questionnaires.

3.6 Methods of Analysis

The research analyzed mean, standard division and second order confirmatory factor analysis, in order to examine the item objective congruence and Goodness-of-Fit Index.

4. FINDINGS

The results of the data analysis show the following:

Innovative organization of school under the Office of the Basic Education Commission consists of six main factors: Strategic Management, with four indicators, Organizational Culture with four indicators, Human Resource Development with four indicators, Innovative Leader with four indicators, Information and Communications Technology with four indicators, and Learning Organization with four indicators. The results of examination of the Goodness-of-Fit Index of Confirmatory Factor Analysis (CFA) found the model fit indexes based on the empirical data were =108.12; df=248; P-value=0.10007; Relative =1.00; RMSEA=0.033; NFI=1.00; RMR=0.001; SRMR=0.014; GFI=0.99; AGFI=0.97; NIF=1.00; IFI=1.00; CFI=1.00; CN=754.61. The detail of data analysis result can be showed as Table 1.

TABLE 1. Result of second confirmatory factor model analysis innovative organization of school under the Office of the Basic Education Commission (OBEC).

Innovative organization of under the OBEC	$\overline{X}$	S.D.	Factor Loading	Standardize Error	t	R^2
Strategic Management	**4.63**	**0.50**	**0.77**	**0.04**	**18.08**	**0.58**
The analysis on environs that facilitate the creation of innovations of the school (X1)	4.64	0.57	0.78	-	-	0.65
The making of visions, missions, goals and orientations for thinking, inventing and using innovations for working (X2)	4.61	0.60	0.68	0.02	13.43	0.59
The consistent review of management strategies for adjusting and updating the strategies in accordance with the advancement of technologies (X3)	4.58	0.66	0.77	0.02	15.31	0.47
The assessment of management strategies in order to apply the outcomes to the analysis on the profile of the success of the school management (X4)	4.63	0.40	0.74	0.02	12.26	0.67
Organizational Culture	**4.40**	**0.40**	**0.86**	**0.04**	**19.25**	**0.72**

TABLE 1. Continued from previous page

Innovative organization of under the OBEC	$\overline{X}$	S.D.	Factor Loading	Standardize Error	t	R^2
The establishment of cross-profession team to invent innovations continuously (X5)	4.51	0.68	0.68	-	-	0.46
To give to teachers and personnel the chances to express their opinions (X6)	4.49	0.67	0.76	0.02	11.53	0.69
To promote creativity (X7)	4.22	0.72	0.70	0.02	13.53	0.58
To recognize teachers and personnel who invent innovations (X8)	4.36	0.61	0.59	0.02	14.03	0.54
Human Resource Development	**4.35**	**0.32**	**0.95**	**0.04**	**17.95**	**0.88**
The estimation of requirement necessary for knowing the directions for improving teachers and personnel (X9)	4.26	0.56	0.66	-	-	0.52
Teachers and personnel's participation to training courses and seminars for inventing and developing innovations (X10)	3.95	0.59	0.69	0.02	13.57	0.63
The use of multiple personnel improvement programs, such as online training systems, seminars, meetings and knowledge exchanges in Professional Learning Community (X11)	4.58	0.62	0.62	0.02	14.35	0.56
Praise and incentives for teachers succeeding in creating innovations (X12)	4.62	0.52	0.69	0.02	14.05	0.59
Information and Communications Technology	**4.58**	**0.42**	**0.94**	**0.05**	**18.81**	**0.89**
Teachers and personnel's abilities to access sources of knowledge, to exchange and transfer knowledge, and to apply knowledge consistently (X13)	4.58	0.63	0.67	-	-	0.56
The use of information and telecommunication systems for the administrators' decision making (MIS) (X14)	4.50	0.54	0.70	0.02	13.94	0.60
The availability of modern spaces and domains for storing data and information such as I-Cloud, Google Drive (X15)	4.73	0.49	0.66	0.02	14.51	0.55
The establishment of the Innovation and Technology Administration Center to disseminate knowledge and guidelines (X16)	4.58	0.887	0.42	0.02	13.83	0.61
Innovative Leader	**4.57**	**0.35**	**0.87**	**0.05**	**20.18**	**0.87**
The Leaders acting as role models in term of creativity for their personnel (X17)	4.79	0.41	0.65	-	-	0.63
The Leaders' skills of the dissemination of knowledge, opinions and visions that are related to innovations (X18)	4.71	0.54	0.78	0.02	13.21	0.64
The Leaders' capability of the development of up to date management strategies that concur with situations and changes inside and out reside the schools (X19)	4.36	0.64	0.74	0.01	14.43	0.69
The Leaders' rationality and confidence in the potentials of teachers and personnel (X20)	4.41	0.52	0.67	0.02	14.24	0.59
Learning Organization	**4.61**	**0.37**	**0.91**	**0.05**	**17.79**	**0.83**

TABLE 1.

Innovative organization of under the OBEC	$\overline{X}$	S.D.	Factor Loading	Standardize Error	t	R^2
Innovative organization of under the OBEC	$\overline{X}$	S.D.	Factor Loading	Standardize Error	t	R2
The provision of software and hardware equipment with high speed and modernity, which can facilitate the creation of innovations (X21)	4.57	0.56	0.73	-	-	0.54
The provision of spaces for personnel to have activities together such as meeting rooms, creative corners and innovation learning centers (X22)	4.59	0.56	0.75	0.02	14.11	0.56
The establishment of the innovation development network that consists of members with a diversity of expertise (X23)	4.62	0.60	0.61	0.01	13.04	0.64
The arrangement of knowledge exchange forums for managing educational innovations, and contests of technologies, innovations and inventions (X24)	4.64	0.54	0.61	0.02	14.45	0.52

χ2=108.12; df=248; P-value=0.10007; Relative =1.00; RMSEA=0.033; NFI=1.00; RMR=0.001; SRMR=0.014; GFI=0.99; AGFI=0.97; NIF=1.00; IFI=1.00; CFI=1.00; CN=754.61.

The results of second confirmatory factor model analysis innovative organization of school under the OBEC found that the factor loadings of six factors were from 0.77 – 0.95, the reliability was at 0.58 – 0.89. Human Resource Development has highest reliability and factor loadings of indicators were from 0.62-0.69, the reliability was at 0.52-0.63. Information and Communications Technology has factor loadings of indicators were from 0.64-0.70, the reliability was at 0.55-0.84. Learning Organization has factor loadings of indicators were from 0.61-0.75, the reliability was at 0.52-0.64. Innovative Leader has factor loadings of indicators were from 0.65-0.78, the reliability was at 0.59-0.69. Organizational Culture has factor loadings of indicators were from 0.59-0.70, the reliability was at 0.46-0.69. Strategic Management has factor loadings of indicators were from 0.74-0.78, the reliability was at 0.47-0.67. The result of the analysis can be showed as Figure 1.

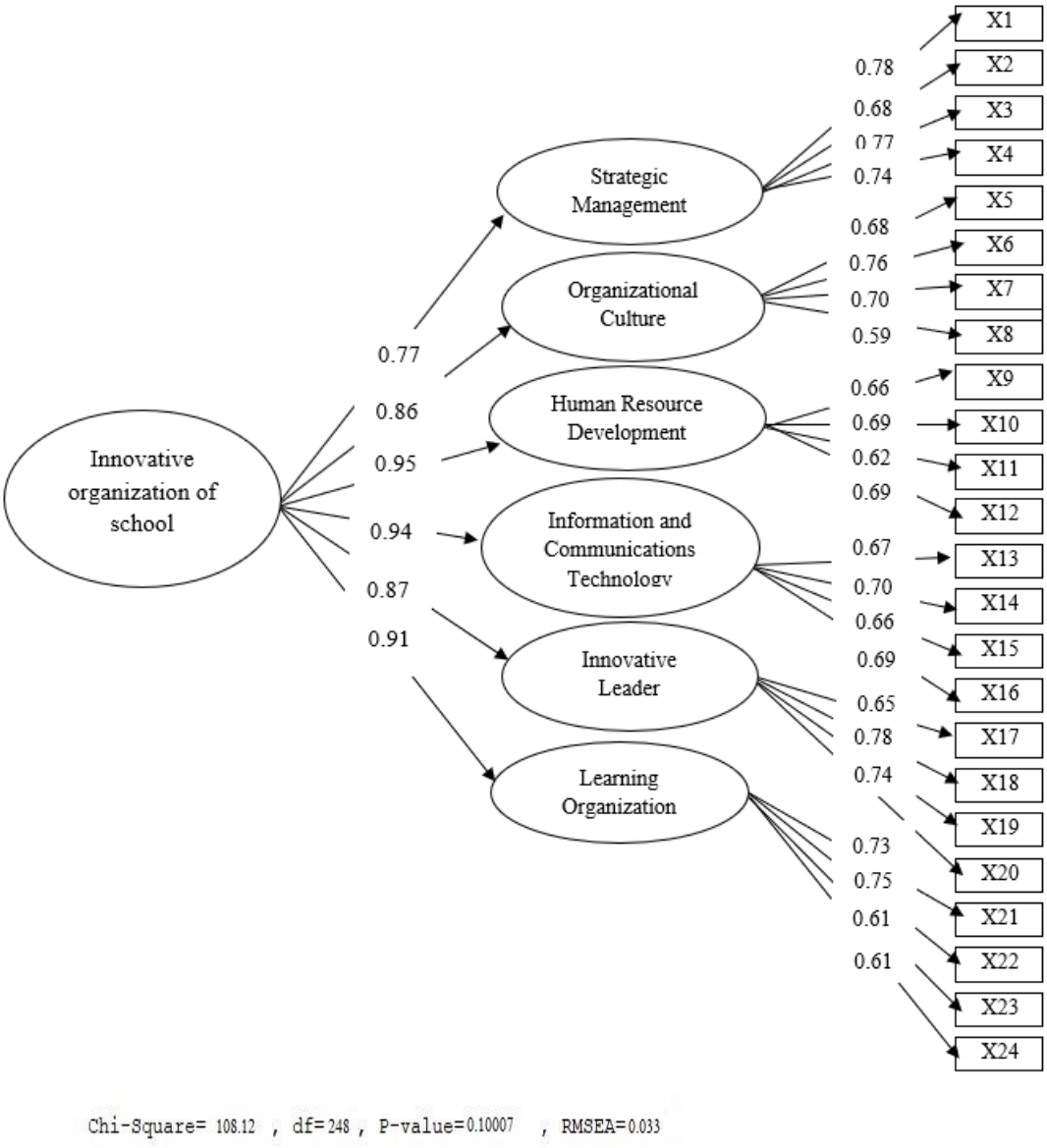

Figure 1 Result of second confirmatory factor model analysis innovative organization of school under the OBEC.

5. CONCLUSION AND DISCUSSION

The research of confirmatory factor model analysis innovative organization of school under the Office of the Basic Education Commission consists of six factors. The results of examination of the Goodness-of-Fit Index of Confirmatory Factor Analysis (CFA) found the model fit indexes based on the empirical data were =108.12; df=248; P-value=0.10007; Relative =1.00; RMSEA=0.033; NFI=1.00; RMR=0.001; SRMR=0.014; GFI=0.99; AGFI=0.97; NIF=1.00; IFI=1.00; CFI=1.00; CN=754.61. The factor loadings of six factors were from 0.77 – 0.95 and factor loadings of indicators were from 0.58 – 0.89.

The researcher specified the indicator of the six factors from many researches. Then, there was analysis of content accuracy by experts in order to examine the reliability of the instrument, and finally found the acceptable. It was ensured before collecting information that variable in each factor can be exactly

measured. This is consistent with indicator development process of Johnstone [25], who specified that there must be searching and examining the document strictly in order to specify effective indicators. After collecting information, that information must be analyzed in order to measure accuracy or the variable, or indicators used to measure the variable. There must be consideration of factor loading in the matrix LX or LY. Factor loading must be high and have statistical significance, t-value is more than 1.96 [26]. Moreover, there must be Construct Reliability and Average Variance Extracted [27]. The reliability of latent variable should be more than 0.60 (Construct Reliability >0.60) and mean of variance of latent variable should be more than 0.50 (Average Variance Extracted>0.50) The analysis result of factor Strategic Management, Construct Reliability is at 0.97 and Average Variance Extracted is at 0.87. The analysis result of the factor Organizational Culture, Construct Reliability is at 0.97 and Average Variance Extracted is at 0.87. The analysis result of factor Human Resource Development, Construct Reliability is at 0.97 and Average Variance Extracted is at 0.88. The analysis result of factor Information and Communications Technology, Construct Reliability is at 0.96 and Average Variance Extracted is at 0.87. The analysis result of factor Innovative Leader, Construct Reliability is at 0.96 and Average Variance Extracted is at 0.87. The analysis result of factor Learning Organization, Construct Reliability is at 0.97 and Average Variance Extracted is at 0.88. It showed that all factors passed the criteria. Hence, it can reflect the Goodness-of-Fit Index of Confirmatory Factor Analysis (CFA). This research showed that the innovative organizations of school under the Office of the OBEC consist of six factors: Strategic Management, Organizational Culture, Human Resource Development, Innovative Leader, Information and Communications Technology, and Learning Organization.

In addition to the above, the important factor of innovative organization of school under the Office of the Basic Education Commission is that of human resource development. Because, human resources are considered valuable for the organization, especially in educational institutions, which are organizations that drive the knowledge management of people which consists of personnel as executives, teachers, and students. If the educational organization wants to improve its ability to advance to become an innovative organization, it needs to rely on innovation to drive personnel development by recruitment, appointment, personnel maintenance and by considering human resources as human capital which influences innovation. They need to be consulted through the participation process to encourage innovation [4]. The research results are consistent with the study of Sitthisomjin, Somprach, & Phuseeorn [11] whose findings showed human resource management was the factor with the highest effect on organizational learning and school innovation and had the second highest total effect on school performance. In addition, the school institutions should organize training programs to develop skills collaboration alongside wide-open awareness and providing experts with the ability to share experiences, accessing information communication technologies. Teachers and students the opportunities to learn and develop the required skills.

Since the National Education Policy states that schools in Thailand must change to become innovative organizations, the implications from this study could be that ministry of Education should provide guideline or framework as a strong foundation to create and develop the administration model of basic educational institutions. Moreover, the Office of the Basic Education Commission of Thailand can use the research results to formulate a strategic framework for the development of educational institutions.

Finally, when institution management focuses on innovation throughout the organization, from communication in administration, teaching management or even exam management by using the process of learning exchange in innovation to develop the school management process, this will result in an organizational culture using technology as a base to develop and encourage endless research and innovation development.

Based on the findings, the following suggestions are offered to develop the innovative organization of school under the Office of the Basic Education Commission:

School directors, deputy school directors, and heads of ICT department support staff are proficient in the use of technology in support of information communication and technology for school management.

Teachers and educational personnel should be developed to have the knowledge and ability in using technology and to develop innovation for teaching and learning management.

Further research, covering more government schools and private schools, should be conducted to confirm the findings of the current study and support its contribution towards the development of research data.

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