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A Second Order Confirmatory Factor Analysis of Composite Indicators of Sufficiency Economy Integration of Knowledge Management for Basic Education Principals

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Abstract
The purpose of this study to develop composite indicators of Sufficiency Economy (SE) integration of knowledge management for basic education Principals, and verify the fit of the indicators with empirical data. The basic education principals of Phitsanulok province service area in the year 2011 were collect to the research samples by stratified random sampling , 120 units answer Likert's 5 scale of questionnaire, but only 110 units that answer completely information were used for analysis by the second order confirmatory factor analysis (CFA). The research results shown that, Composite Indicator from development consisted of 5 main components and 21 indicators were fitted with the empirical data, determined from the Chi-square values = 107.13, and not statistical significance (p = 0.98224) at zero degrees of freedom (df = 140) indicated that model not different from the empirical data. Goodness of fit index (GFI = 0.91), Standardized RMR = 0.048, and Q-plot curve steeper than the diagonal. The main elements that have the highest priority consisted the knowledge acquisition that focused on participation of indicate issue of the SE philosophy into action of school, as with the main elements of knowledge usage/utilization that have the highest priority an focused on indicators to enhance the links between the knowledge of the same type in school.
Keywords: Composite indicators, Sufficiency Economy, Knowledge Management

1. Introduction

The purpose of National Education Act was to reform the administration that decentralization to areas of education with an emphasis on decentralization from the center to districts and schools in Thailand, comprise the academic affair, personnel, budget administration and general management that resulted in the authority of school administrators and school administrators need to change and may be said, school administrators must develop themselves prepare for the influence of the educational reform (Office of the Education Council. 2005) . If they applied the knowledge of the sufficiency economy (SE) philosophy bestowed by His Majesty the King of Thailand, that affect to school more efficiency. However, some findings indicate the lack of clarity of SE integration into the schools management (National Economic and Social Development Board. 2006) , such as philosophy means stresses the middle path as an clarity principle for appropriate conduct at all levels of society, moderation, reasonableness, and the need for self-immunity to gain sufficient protection school from impacts arising from internal and external changes. So Researchers have been interested to develop Indicator of the SE focus on composite index, core elements and indicators, should have a clear understanding in order to facilitate the principals access to the knowledge of the sufficiency economy (SE) quickly enough, that can lead to applications for school effectiveness .

2. Research Approach

This descriptive research aims to develop the composite indicators of Sufficiency Economy (SE) integration of knowledge management for basic education Principals, and verify the fit of the indicators with empirical data, was conducted by the four step of research follows;

2.1 Defining components and indicators

Theoretical study of the development indicators reviewed from educational texts, academic papers and research results, and take ideas to synthetic approach for the development of components and indicators related to knowledge management of sufficiency economy (SE).Then create a basic framework for research based on a second order confirmatory factor analysis model.

2.2 Development and check quality of research instrument

The data from step 1 used to develop questionnaire comprise the 35 items by ratting scale ranging between 1 to 5 , then proposed specialists for deliver judgments by the index of precision-oriented content (Content Validity Index: CVI) (Wisalaporn. 2005; according to Waltz; & Bausell. 1981; Lynn. 1986) . If find that the CVI available from 0.80, continued to questions. If lower than 0.80, will be eliminate from the questionnaire. CVI values result find that 21 items passed, witch were analyzed to determine the reliability. The value of Alpha reliability equal 0.8839 , indicates that confidence will be used for collect data, then completed a questionnaire provided by the five main components and 21 indicators (items) consisted Knowledge Acquisition 6 items, Knowledge Storage and Retrieval 4 items, Knowledge Usage/Utilization 4 items, Knowledge Transfer/Distribution 4 items and New Knowledge Creation 3 items.

2.3 Gathering data

The populations of the research were 487 principals under Education Service Area of Phitsanulok province in 2011. The sample size, criteria used in determining the sample size for analysis must be equal to or more than 100 people, which make the data analysis by using LISREL more consistency with the empirical data (Wiratchai.1998: 54; according to Anderson; & Gerbing. 1984: 115 - 173) , but the researchers used a total of 120 samples that more suitable, and used stratified random Sampling by classifying target into three areas and determine the proportion (Quota Sampling) and using simple random sampling for samples located in each school by random number table. The researcher collected the data manually. The results of data collection, query returned 113 (94.16 percent) but only 110 units (91.66 percent) that answer completely information were use for analysis.

2.4 Manipulation and data analysis

Preliminary analysis of the respondents were analyzed by frequency and percentage, and analyze the suitability of the identified knowledge management of sufficiency economy (SE) by mean and standard deviation, and used interpretation criteria follows , average from 4.50 to 5.00 meaning indicators are most appropriate , average from 3.50 to 4.49 to indicate a good suitable, average from 2.50 to 3.49 to indicate a suitable medium, average from 1.50 to 2.49 meaning the indicator are less suitable, and average from 1.00 to 1.49 to indicate a suitable minimum. To determine the suitability of the correlation matrix considering the statistics of the Bartlett, which the Barlett's test of sphericity should be statistically significant at 0.05 and the index of the current Kaiser -Meyer -All Kin (Kaiser - Meyer - Olkin Measures of Sampling Adequacy = MSA) as proposed by Kim and Mueller (Nak Ai. 2005:160; according to Kim; & Mueller. 1978) must greater than 0.50 and 0.80 was good value.The results of Barlett's test of sphericity was significant at the 0.01 level which was appropriate, and the MSA index was 0.860, which was a much better value than 0.80, and summarized the correlation matrix between 21 variables were indicate appropriate for analyze the Composite indicators of Sufficiency Economy in the next step.

Fit analysis of Composite indicators with empirical data by second order confirmatory factor analysis (CFA) with LISREL version 8.72 (the copyright of the Pibulsongkram Rajabhat University) based on the coexistence of the criteria follows;

- The Chi-square statistics will be reduced, while a statistically significant will be increased ($p > 0.05$), indicating that the model was fitted to the empirical data, but the degrees of freedom was greater than zero ($df > 0$).
- The ratio of Chi-square / df (relative chi-square) was less than 2.
- Goodness of fit index (GFI) was between 0 and 1, if GFI values greater than 0.90 was generally considered to be acceptable.
- The Standardized RMR (Root Mean square Residual) near 0 (<0.05).
- Q-Plot Curve steeper than the diagonal.

3. Result

The analysis result of Composite indicators with empirical data by second order confirmatory factor analysis (CFA) with LISREL shown in figure 1.

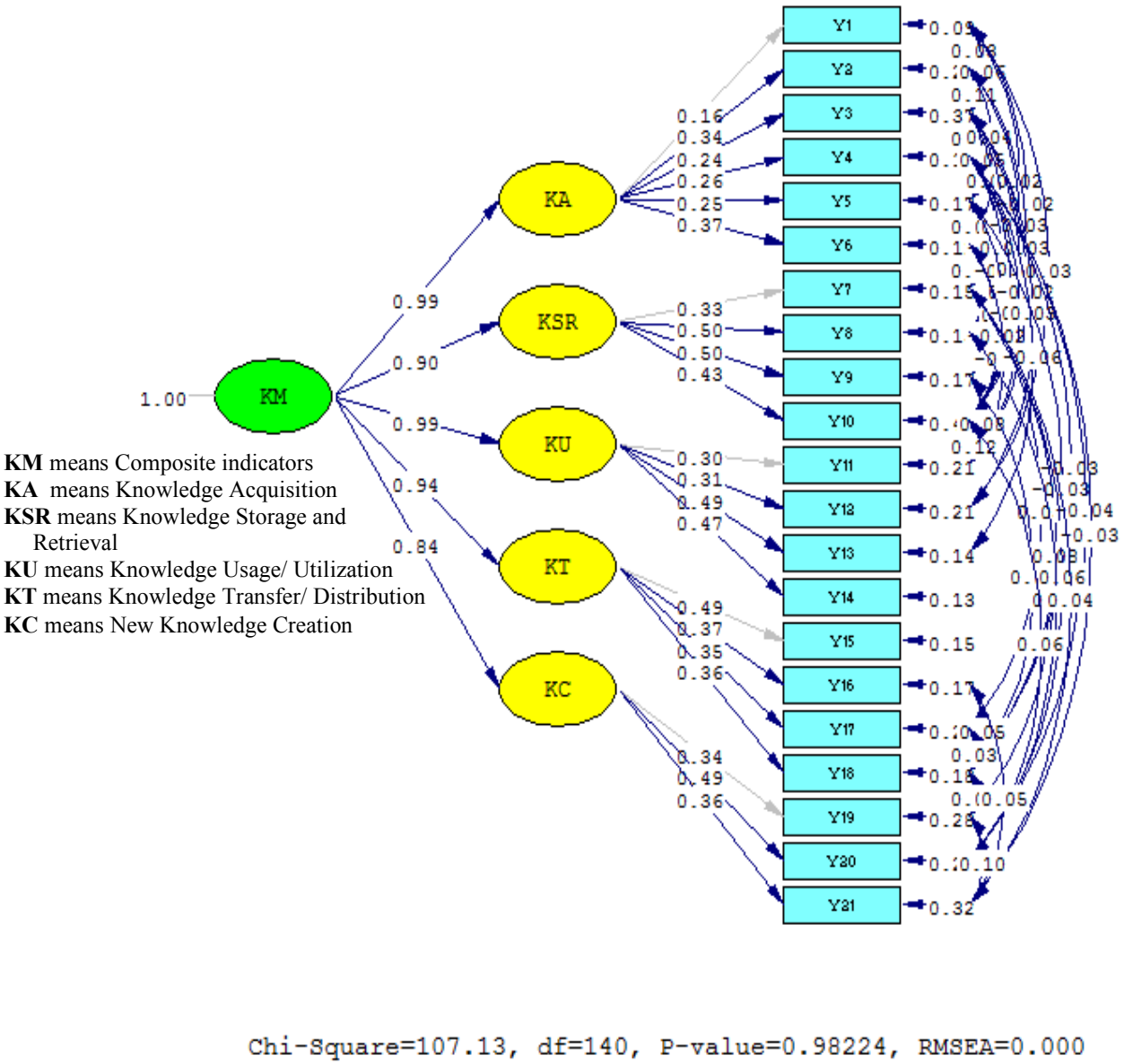

Figure 1.The final model of composite indicators of Sufficiency Economy (SE) integration of knowledge management for basic education Principals

From Figure 1, the fit's statistics showed that after adjusting the parameters of the relationship between the measurement errors in model, the final model was fitted with the empirical data determined from all values obtained were accordance with the harmonized indices, such as Chi-square statistics = 107.13, and not significance (p = .98224) tat zero degrees of freedom (df = 140).In addition found the relative chi-square was 0.76, GFI = 0.91 , Standardized RMR = 0.048 and Q-plot curve steeper than the diagonal, indicated that Composite indicators model not different from the empirical data.

The results of first order confirmatory factor analysis also indicate the weight of 21 indicator as follows, the main component of the knowledge Acquisition (KA) focused on indicators of participation in the issue of the sufficiency economy philosophy into action of school (factor loading of y6 = 0.37). The main component of Knowledge Storage and Retrieval (KSR) focused on indicator of commitment to helping to support, and accept each other in finding and storing knowledge quickly and effectively (factor loading of y8 y9 = 0.50).The main elements of Knowledge Usage/Utilization (KU) focused on indicators of promote linkages between the knowledge of the same type (factor loading of y13 = 0.49).The main component of the Knowledge Transfer/Distribution (KT) focused on indicators of promote and encourage the exchange of knowledge of sufficiency economy network within the school based on motivation process more than take influence or use of position power (factor loading of y15 = 0.49). Finally, the main component of the New Knowledge Creation (KC) focused on indicators of facilitate the creation of innovation from knowledge of philosophy of sufficiency economy, which used to work in school (factor loading of y20 = 0.49).

At the same time, the results of second order confirmatory factor analysis also indicate 5 components confirming the composite indicators of Sufficiency Economy (SE) integration of knowledge management for basic education principals (KM), as well as Knowledge Acquisition (KA: factor loading = 0.99) and Knowledge Usage/ Utilization (KU: factor loading = 0.99) have the highest priority.

4. Discussion

From the results of second order confirmatory factor analysis also indicate 5 components confirming the composite indicators of Sufficiency Economy (SE) integration of knowledge management for basic education Principals (KM), Knowledge Acquisition (KA) have the highest priority, because of Knowledge Acquisition (KA) were determination or specify any knowledge that administrators and teachers need to learn with regard to the need for the type of work achievement required, conformable of the vision, mission, values and goals of the organization that consistent with the concept of (Grundstein. 2001: 261–287) stated that the knowledge not vignettes if have personnel with mastery people and new ideas focused to learn. The new knowledge that will contribute to the success of the organization. It was called knowledge producer, responsible for the creation of knowledge or knowledge holder, who apply their knowledge to the job directly.

As well as the factors loading of Knowledge Usage/ Utilization (KU) that have the highest priority because of it was the skills in ways that school principals and teachers retrieved from stored of database system such as courses on literature, textbooks, manuals, etc (Panich. 2004 : 16-31) to useful in planning doing checking and acting and make benefits to individuals or organizations, including the process of learning. As a result of the use of knowledge will be helpful in increasing the capacity and skills of employees.

5. Recommendation

Some key indicators should be selected to perform, such as participation in the issue of the sufficiency economy philosophy into action of school from the main components of the Knowledge Acquisition that can be applied early, as well as indicators of promote and encourage the exchange of knowledge of sufficiency economy network within the school based on motivation process more than take influence or use of position power from the main components of the Knowledge Transfer/Distribution.

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