

# Analytical study of Virtual Service Provider Office Management (VSPOM) Factors for Service Plan in the Regional Health Service in Thailand

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## Abstract

This research aims to analyze VSPOM factors for service plan in the regional health service in Thailand. The research is descriptive, which uses structural relationship models. The samples used in the study were the following two groups: (1) 274 (90.13%) executives from 304 were selected purposively as conclusion criteria; and (2) 664 (81.07%) executives and practitioners from 819 were selected by multistage random sampling. The research tools were (1) executive questionnaire and (2) a Virtual Service Provider Office questionnaire, data were statistically analyzed by exploratory factor analysis (EFA) and second order confirmatory factor analysis (2<sup>nd</sup> Order CFA).

The research found that the variables model was composed of 10 factors from 74 selected variables as follows: (1) Resources, operational support, health

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services; (2) Developing academic subject; (3) General administration; (4) Culture of the organization; (5) Budget administration; (6) Organization philosophy; (7) Establishing and administrative in the health service virtualization; (8) Academic administration; (9) Personnel administration; and (10) Professional staff.

It can be concluded that 10 factors of variables model of the VSPOM for Service Plan in the Regional Health Service in Thailand had high construct validity by both exploratory and second order confirmatory factor analysis.

**Keywords:** Regional Health Service / Virtual Office / Service Provider Office Management

### บทคัดย่อ

งานวิจัยนี้มีวัตถุประสงค์เพื่อวิเคราะห์องค์ประกอบของการบริหารสำนักงานเขตบริการสุขภาพเสมือนจริง สำหรับระบบบริการสุขภาพในเขตบริการสุขภาพของไทย เป็นงานวิจัยเชิงพรรณนาโดยใช้การสร้างโมเดลสมการเชิงโครงสร้าง (Structural Equation Modeling: SEM) ใช้กลุ่มตัวอย่าง 2 กลุ่ม คือ เก็บข้อมูลจากผู้บริหาร 274 คน (ร้อยละ 90.13) จาก 304 คน ที่สุ่มแบบเฉพาะเจาะจงตามเกณฑ์ และผู้บริหารและผู้ปฏิบัติงานในสำนักงานเขตบริการสุขภาพในระดับหัวหน้ากลุ่มงานของสำนักงานสาธารณสุขจังหวัดใน 12 เขตบริการสุขภาพของไทย จำนวน 664 (ร้อยละ 81.07) จาก 819 คน ที่ใช้วิธีสุ่มแบบหลายชั้นภูมิ เครื่องมือที่ใช้ประกอบไปด้วยแบบสอบถามสำหรับผู้บริหาร และแบบสอบถามสำหรับสำนักงานเขตบริการสุขภาพ ข้อมูลที่ได้จะถูกวิเคราะห์โดยสถิติการวิเคราะห์องค์ประกอบเชิงสำรวจ และการวิเคราะห์องค์ประกอบเชิงยืนยันอันดับสอง

ผลการวิจัยพบว่า โมเดลตัวแปรของการบริหารสำนักงานเขตบริการสุขภาพเสมือนจริงประกอบด้วย 10 องค์ประกอบย่อย จากตัวแปรคิดสรร 74 ตัว ประกอบด้วย

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สรุปได้ว่า 10 องค์ประกอบย่อย ของโมเดลตัวแปรของการบริหารสำนักงานเขตบริการสุขภาพเสมือนจริงสำหรับระบบบริการสุขภาพในเขตบริการสุขภาพของไทยมีความตรงเชิงโครงสร้างในระดับสูงโดยสถิติการวิเคราะห์หองค์ประกอบเชิงสำรวจและการวิเคราะห์องค์ประกอบเชิงยืนยันอันดับสอง

**Keywords:** เขตบริการสุขภาพ / องค์กรเสมือนจริง / การบริหารสำนักงานเขตบริการสุขภาพ

## Introduction

The current health system of Thailand is faced with several important issues that include performance and quality of services, fair access to health services, and overcrowding of patients in the high-level services. Other possible issues include inappropriate use of resources, inconsistent roles in the services, expanded competition, allocation of limited resources without proper planning, and organizing services with injustice in the development and accessibility of public services (Boonda et al., 2014).

In 2013, efforts to reform the health system started with the aim of optimizing the management of the health system of the country, improving the management style in the area providing health services in the 12 regions, and promoting solidarity in the management and services of the health services network (the Second Regional Health Service is one of the country's 12 service network zones,

which is responsible for Tak Province, Phitsanulok Province, Sukhothai Province, Uttaradit Province, and Phetchabun Province) (Boonda et al., 2014). "Regional Service Provider" is a key management mechanism created to realize the health service system development plans and also a mechanism established to bring about integration of all elements of the health system, which provides the advantage of resource sharing of services within the region to reduce the use of resources and budget, resulting in cost-effectiveness and efficiency. This mechanism also creates a scenario where making decision is quick because decision-making is done by the regional management and does not have to undergo centralization (Boonda et al., 2014).

In 2014, development of an operational infrastructure was initiated with the goal of establishing a Service Provider Board to respond to the needs of the public health system. The Ministry of Health has set the framework for the development of health care providers to have a clear and systematic health service system development plan aimed at improving the service levels from primary through secondary to tertiary and establishing excellent centers to be linked together into a network by geographical conditions and health care needs and communications. This provides the opportunity to use and share the limited resources among all sectors and to efficiently support complex medical and public health problems. In addition, the Regional Service Provider has a dimension of decentralization to deal with health problems in the area, including a mechanism for pastoral systems. At the same time, the Regional Service Provider only has the inspector general of public health, supervisors, and the Service Provider Board performing administration. However, a Service Provider Office to support the work of the executives has not yet been perfectly established and

operations practitioners deployed. This is similar to having a virtual enterprise that not clear model operates, not clear format appropriate to the context.

A virtual organization (VO) is an organization involving detached and disseminated entities (from employees to entire enterprises) and requiring information technology to support their work and communication (Gupta & Jatinder, 1997). Virtual organizations (VOs) do not represent a firm's attribute but can be considered as a different organizational form. Unfortunately, it is quite hard to find a precise and fixed definition of fundamental notions such as virtual organization or virtual company (Afsarmanes & Camarinha, 2004). Example, in terms virtual organization, virtual enterprise or virtual corporation were first utilized in the early 1990s as demonstrate the work of Jan Hopland, Roger N. Nagel, William H. Davidow and Malone (Isaca, 2001).Table 1 below allows us to understand more specifically their faintly distinctive theories:

**Table 1** Virtual organizations' views

Virtual organizations' views			
	Jan Hopland	Roger N. Nagel	William H. Davidow and Malone
Position	Digital Equipment Corp. executive	Management expert	Authors of The Virtual Corporation
Virtual organization's depiction	A company that knows how to utilise partnerships both inside and outside its boundaries in order to mobilise more assets than it presently has on its own	Take advantage of market openings thanks to technology which allow enterprises to form temporary partnerships	A broad and catch-all term comprising numerous management ideas and trendy terms

Virtual organization is a new form of organization challenged to bring the application, but not clear in the definition, that is generally accepted by the virtual organization as seen 15–20 years ago, when working from home was made possible by the use of technology (Olson, 1983; Venkatesh & Vitalari, 1992). Since then, terms such as virtual office, virtual classroom, and virtual corporation have appeared in the literature (Giuliano, 1982; Hiltz, 1986; Malone & Davidow, 1992). Nowadays, it is still not known exactly how Virtual Service Provider Office Management (VSPOM) factors for service plan in the regional health service in Thailand provides important elements by analyzing them. Therefore, researchers are interested in adopting VSPOM factors to analyze VSPOM factors for Service Plan in the Regional Health Service in Thailand to use (variables model) for development model in the future to capitalize on deployment as a conceptual framework for the study of the development of competencies of health personnel to work in the virtual service provider office, to address the abovementioned problems. They put into consideration the concept of virtual reality created by a computer to establish an organization, so it may be of no physical shape, which is a characteristic that is different from traditional organizations in general. However, the definition of virtual organizations in this research refers to the network of organizations linked by information technology in order to share operational skills and resources (Travica, 1997) through the use of telecommunications, technology, social, and community networks, which are interdependent cooperation, flexibility, trust, and self-organization (Faucheux, 1997). The scope of the organization has an unclear boundary and location, which is expected to be useful in the adoption of the VSPOM factors for service plan and in performing effectively.

## **Objectives**

The main objective of this study was to analyze VSPOM factors for service plan in the regional health service in Thailand, which includes the following two sub-purposes:

1. To analyze by using exploratory factor analysis (EFA)
2. To analyze by using the second order confirmatory factor analysis (2nd Order CFA).

## **Methodology**

### **Hypothesis**

The variables used in this study is appropriate at a good level can be analyzed for the 2<sup>nd</sup> Order CFA and variables model of the 2<sup>nd</sup> Order CFA of VSPOM factors for service plan in the regional health service in Thailand is appropriate at a good level to be used for development a VSPOM model.

### **Population**

The population used in the development of the components is as follows: (1) qualified member (executives) of the health services system in the VSPO of the regional health service in Thailand; and executives and practitioners in the Vice Chief of the Provincial Health Office in the health service virtualization of 12 regions of Thailand.

### **Sample**

The samples used in the study to analyze VSPOM factors for Service Plan in the Regional Health Service in Thailand were the following two groups:

1. A group of 304 highly skilled executives of nearby health services system in the VSPO of the regional health service in Thailand. In total, 274 executives were selected purposively as conclusion criteria.

2. A group of practitioners is required in the field of health services, VOs, since this research uses the query level 5, which is commonly used in estimation techniques that are aimed at providing the most accurate parameter estimation. The margin of error (error bound:  $e$ ) is small (between 0.01 and 0.25) and the other factors in the formula are constant. As a result, the sample is large. For population that is large, Equation (1) is used to yield a representative sample for proportions. The Cochran formula (Cochran, 1963) is used for determining the sample size:

$$n_0 = \frac{Z^2 pq}{e^2} \dots\dots\dots (1)$$

where  $n_0$  is the sample size,  $Z^2$  is the abscissa of the normal curve that cuts off an area  $\alpha$  at the tails [ $1-\alpha$  equals the desired confidence level, for example,  $Z$  is 2.576 for 99 percent confidence level (Godden, 2017);  $p$  is the estimated proportion of an attribute in the population that includes every individual from which it was drawn. It must have a known non-zero chance of being included in it. These chances should be equal. We would like the choices to be made independently; in other words, the choice of one region will not affect the chance of 11 regions being chosen; and  $q$  is  $1-p$ . ( $p$ )( $q$ ) are the estimate of variance (Cochran,1977);  $e$  is the desired level of precision with maximum error not more than 0.045 and a sample of 664 practitioners from 819 was selected by multistage random sampling that covered all geographical regions of Thailand,

i.e. nationwide practitioners present in the 12 regions of VSPO of the regional health service in Thailand (Siddiqui, 2013):

$$\therefore n = (2.576)^2 (.50) (1-.50) / (0.045)^2 = 819$$

### Instruments used in research

The instrument used for data collection is questionnaires that the researchers created. Two versions of the questionnaire that qualified to the query administrators and practitioners in the field offices of the virtual health services are as follows:

1. Questionnaire for luminaries used to collect information for analyzing the components. It was a survey of the executive's opinions on the list of 90 variables on the form of the VSPOM factors for service plan in the regional health service in Thailand, covering the four main components of the underlying core elements that include 21 classified elements, as shown in Table 2.

2. Query administrators and practitioners in the VSPO of Thailand. These are the tools used to collect information for the development of component-oriented confirmation. It is a survey of leaders' and practitioners' opinions in the VSPO of Thailand about VSPOM factors for service plan in the regional health service in Thailand in the condition that spam to the elements which can be used to study the VSPOM factors for service plan in the regional health service in Thailand is the precision of the structure as the structure of the development of the component is qualified in analyzing the components provided in Table 2. It includes 21 recruitment variables to cover the four capacities that are classified into components of ten elements, as shown in Table 3.

**Table 2** Master Structure of the VSPOM factors for service plan in the regional health service in Thailand

Side	Core Component
1) SETTING	1. ADMINISTRATION (participatory management)
	2. VIRTUAL OFFICE (management of applications in virtual offices)
	3. RESEARCH (research health system)
	4. MAN (preparation of virtual information)
	5. COLLABORATION (administration that established the Office of Health Services virtual participation)
	6. Clearing house (Administrative office area health services virtually free)
	7. CENTER (Academic administration by stakeholders at the center)
	8. CONTENT (Developed on the basis of academic cooperation)
	9. ELECTRONIC (Academic Administration on electronic databases)
2) MAN	10. MONEY (funding to build facilities from all sources)
	11. DECISION (collaboration decision freely)
	12. OFFICER (practitioners who access policy and guidelines online)
	13. SELECTION (emphasis on recruiting professionals)
	14. CULTURE (corporate culture)
3) ADMINISTRATION	15. MANAGEMENT (General Management Systems)
	16. COMMUNICATION (General network management by providing online information center)
	17. COMMITTEE (General management board, including an emphasis on decision-makers)
	18. SERVICE (Providing a one-stop service-oriented electronic format)
4) MATERIAL	19. EFFICIENCY (allocation and use a quality assessment which consists of SIPOC Model; S or suppliers, I or inputs, P or process, O or outputs, and C or customers)
	20. COMFORT (to facilitate communication in all forms)
	21. SUPPORT (The resources support the work of health services by the application of technology as a system)

**Table 3** Structure of the VSPOM factors for service plan in the regional health service in Thailand

Side	Core Component
1) SETTING	1. ADMINISTRATION (participatory management)
	2. VIRTUAL OFFICE (management of applications in virtual offices)
	3. RESEARCH (research health system)
	4. MAN (preparation of virtual information)
	5. COLLABORATION (administration that established the Office of Health Services virtual participation)
	6. Clearing house (Administrative office area health services virtually free)
	7. CENTER (Academic administration by stakeholders at the center)
	8. CONTENT (Developed on the basis of academic cooperation)
	9. ELECTRONIC (Academic Administration on electronic databases)
2) MAN	10. MONEY (funding to build facilities from all sources)
	11. DECISION (collaboration decision freely)
	12. OFFICER (practitioners who access policy and guidelines online)
	13. SELECTION (emphasis on recruiting professionals)
	14. CULTURE (corporate culture)
3) ADMINISTRATION	15. MANAGEMENT (General Management Systems)
	16. COMMUNICATION (General network management by providing online information center)
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	20. COMFORT (to facilitate communication in all forms)
	21. SUPPORT (The resources support the work of health services by the application of technology as a system)

### **Data collection**

The data was collected using two questionnaires for collecting information from executives and practitioners in the field offices of the virtual health services:

1. Data were collected from a sample of the executives. To obtain qualified answers, the questionnaires were sent and returned directly to get the query back from the 274 executives, representing 90.13 percent of qualified 304 target samples.

2. To collect data from a sample of practitioners from 12 VSPO in Thailand, questionnaires were sent and returned by post to get the query back from the 664 practitioners, representing 81.07 percent of 819 target samples.

### **Data Analysis**

Research data analysis was divided into two episodes according to the purpose of this research. They are as follows:

1. EFA, the composition extracted by principal component analysis method rotation axis and angle pattern elements with varimax rotation by using IBM SPSS statistics version 23 analysis.

2. CFA from the data of administrators and practitioners with the second confirmatory factor analysis using AMOS Program.

### **Results**

Analyzing with EFA to analyze 90 variables

The results for testing the suitability of the variables used in this study were obtained by conducting Kaiser-Meyer-Olkin in test to measure the sampling adequacy (MSA). KMO or MSA at 0.890, which is over 0.80, shows that the variable series is appropriate to be analyzed at a good level on the basis of the

work done by Wright (1934); and Bartlett's test of sphere city found the variables to be correlated significantly ( $p$ -value  $<0.001$ ), which shows that different variables can be used to analyze the elements.

Results of the extraction method of Principal Component Analysis showed communality of each variable used in the analysis of the VSPOM factors for service plan in the regional health service in Thailand. The total number of 90 characters ranged from 0.740 to 0.901 is a lot size - the most, tends to move in the composition of other components.

Orthogonal Rotation with varimax shown in Table 4.

**Table 4** Results of the orthogonal elements with varimax rotation

Component	Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total (Eigen value)	% of Variance	Cumulative %	Total (Eigen value)	% of Variance	Cumulative %
1	47.847	53.163	53.163	15.993	17.770	17.770
2	4.644	5.161	58.324	15.708	17.453	35.223
3	3.771	4.190	62.513	7.786	8.651	43.874
4	3.267	3.630	66.143	7.339	8.154	52.028
5	2.882	3.202	69.346	5.909	6.565	58.593
6	2.178	2.420	71.765	5.375	5.972	64.565
7	1.843	2.048	73.813	4.014	4.460	69.025
8	1.827	2.030	75.843	2.687	2.985	72.011
9	1.626	1.806	77.649	2.505	2.783	74.794
10	1.524	1.694	79.343	2.176	2.418	77.212
11	1.292	1.436	80.779	2.058	2.286	79.498
12	1.164	1.293	82.072	1.880	2.089	81.587
13	1.132	1.258	83.330	1.569	1.744	83.330

The results of the variable component in the restructuring and named the element.

Table 4 showed that the variables used in the analysis can be grouped into a total of 90 elements (component) has 13 elements with the Eigen value that exceeds 1.00, which means that each component can be explained by the variance of all 90 elements more than 1.00, features all 13 elements could explain the variance of all 90 characters, representing 83.33 percent.

Equipping each variable into the composition of any one element, only a single element that has a variable with maximum weight of the composition (factor loading) found that the components can be arranged into thirteen elements has all 90 characters and each component consisted 1 to 26 variables. Each variable element that is already in a composition has the weight of the composition in the following range:  $0.41 \leq \text{weight of the composition} \leq 0.86$ .

However, because researchers want to use only the variable that has the weight of the composition  $\geq 0.50$  a number of 74 elements with the weight of the composition 0.504 to 0.846, selected variables that make full use of the 74 elements in 11 components (For 16 variables with has the weight of the composition less than 0.50 and features a 12-13 with no variable component to weight 0.50 at all, researchers did not bring 16 variables and the 12-13 elements used).

Due to the effects of the input variables found in some of the elements, component consisted of variables up to 22 and the variable from different side. Researchers restructure the elements slightly so that each element consists of the same number of variables. The composition was reduced to 10 from 74 elements that were present initially. Ten modified elements were given a meaningful name, consistent and cover all the variables as shown in Table 5.

**Table 5** Structure of the VSPOM factors for service plan in the regional health service in Thailand

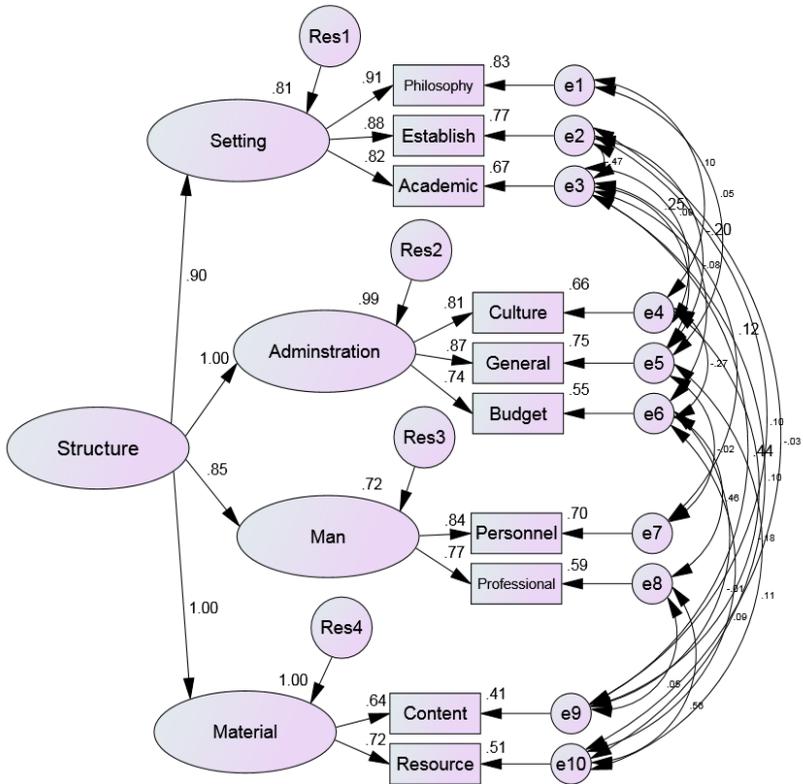
Side	Core Component
1) MATERIAL	1. RESOURCE (operating support resources management)
	2. CONTENT (developing academic subject)
	3. GENERAL (general administration)
2) ADMINISTRATION	4. CULTURE (building culture)
	5. BUDGET (budget administration)
	6. PHILOSOPHY (philosophy, methodology)
3) SETTING	7. ESTABLISH (Establishing an Office Management Model with virtualization)
	8. ACADEMIC (Academic Administration)
4) MAN	9. PERSONNEL (Personnel administration)
	10. PROFESSIONAL (Personnel who have a professional)

The results of the second-order CFA were analyzed to confirm that the ten elements listed above are the four aspects. The results indicated that the ten aspects are main elements. To obtain a model of the real overall VSPOM in the form of VSPOM with the help of main element is desirable, as detailed in Figure 1 and Table 6. The results of the second-order CFA in the VSPOM factors are desirable as shown in Table 6 and Figure 1.

**Table 6** Statistics measuring the harmony of the variables model with empirical data of the VSPOM factors service plan in the regional health service in Thailand

Fit Index	Criteria of Fit Index	Results of CFA	Consideration	Decision
- Chi-Square $\chi^2$	> 0.05	.363	Meet the criteria	Well
- CMIN/DF	< 2.00	1.093	Meet the criteria	Well
- GFI	> 0.90	.997	Meet the criteria	Well
- AGFI	> 0.90	.982	Meet the criteria	Well
- ECVI	<ECVI for Saturated Model (0.290)	0.166	Meet the criteria	Well
- Model AIC	<Saturated AIC (110.00)	110.00	Meet the criteria	Well
- NFI	> 0.90	.998	Meet the criteria	Well
- CFI	> 0.90	1.00	Meet the criteria	Well
- RMR	< 0.05	.003	Meet the criteria	Well
- RMSEA	< 0.05	.012	Meet the criteria	Well

AGFI, adjusted goodness-of-fit index; AIC, Akaike information criterion; CFI, comparative fit index; CMIN/DF,  $\chi^2$  statistics and degrees of freedom ratio; ECVI, expected cross-validation index; GFI, goodness-of-fit index; NFI, normed-fit index; RMR, root mean square residual; RMSEA, root mean square error of approximation.



Chi-square=10.926, Degrees of freedom (DF)=10, Probability level (p-value)=.363, RMSEA=.012

Figure 1 The second confirmatory factor of the VSPOM factors for service plan in the regional health service in Thailand

Table 6 and Figure 1 found that the elements model of VSPOM factors for service plan in the regional health service in Thailand is desirable and consistent with the empirical data of the administrators and practitioners due to a statistical measure of harmony through them. It shows that the variables model has good construct validity.

It can be seen that the VSPOM factors for service plan in the regional health service in Thailand is desirable since it includes the following four aspects: (1) Material: the tools to support the work of health services consists of two elements; (2) Administration: the general management includes three elements; (3) Setting: the framework for the establishment of the Health Service Virtual Office consists of three elements; and (4) Man: the administrative staff consists of two elements.

There were a total of ten components: (1) RESOURCE (The resources, operational support, health services); (2) CONTENT (Developing academic subject); (3) GENERAL (General administration); (4) CULTURE (Culture of the organization); (5) BUDGET (budget administration); (6) PHILOSOPHY (Organization philosophy); (7) ESTABLISH (Establishing and administrative in the health service virtualization); (8) ACADEMIC (Academic Administration); (9) PERSONNEL (Personnel administration); and (10) PROFESSIONAL (Professional staff).

## **Conclusions**

1. The results of the survey VSPOM factors for service plan in the regional health service in Thailand from the data of the administrators and practitioners in the Virtual Service Provider Office have found that the core VSPOM factors model of 4 aspects are as follows: (1) the framework for the establishment of the Virtual Service Provider Office consists of three elements; (2) general management includes three elements; (3) the administrative staff consists of two elements; and (4) the tools to support the work of health services consist of two elements. Element 10 is a component of the 74 selected variables.

2. Results of the second-order CFA from the data of the administrators and practitioners in the virtual service provider office in the regional health service in Thailand indicated that the elements of the VSPOM including four aspects are main elements and ten sub-elements have good construct validity. Because the model is consistent with the empirical data, it is in good shape. The statistics measure the harmony through all as follows: the resulting management desirable model fits with a chi-square of 10.926, 10 degrees of freedom (DF) and is not statistically significant with a p-value of 0.363 (A good model fit would provide an insignificant result at a 0.05 threshold [Barrett, 2007]), and chi-square statistics and degree of freedom ratio (CMIN/DF) is 1.093 (Although there is no consensus regarding an acceptable ratio for this statistic, recommendations range from as high as 5.0 [Wheaton et al., 1977] to as low as 2.0 [Tabachnick & Fidell, 2007]). The various goodness of fit indices are also acceptable : the goodness-of-fit index (GFI) is 0.997, and the adjusted goodness-of-fit index (AGFI) is 0.982 (Traditionally an omnibus cut-off point of 0.90 has been recommended for the GFI however, simulation studies have shown that when factor loadings and sample sizes are low a higher cut-off of 0.95 is more appropriate [Miles & Shevlin, 1998]), Expected Cross-Validation Index (ECVI) for Saturated Model is 0.166 (ECVI is a useful indicator of a model's overall fit. The model's ECVI is compared with the ECVI of independent model and the ECVI of saturated model, If the model has good overall fit, its ECVI value should be lower than both the ECVI values of the other 2 models [Byrne, 1998]), Saturated Akaike Information Criterion (AIC) is 110.00 (Probably the best known of these indices is the Akaike Information Criterion (AIC) or the Consistent Version of AIC (CAIC) which adjusts for sample size [Akaike, 1974]).

These statistics are generally used when comparing non-nested or non-hierarchical models estimated with the same data and indicates to the researcher which of the models is the most parsimonious. Smaller values suggest a good fitting, parsimonious model however because these indices are not normed to a 0-1 scale it is difficult to suggest a cut-off other than that the model that produces the lowest value is the most superior. It is also worth noting that these statistics need a sample size of 200 to make their use reliable [Diamantopoulos & Siguaw, 2000]), the normed-fit index (NFI) is 0.998 (More recent suggestions state that the cut-off criteria should be  $NFI \geq .95$  [Hu & Bentler, 1999]), the comparative fit index (CFI) is 1.00 (a value of  $CFI \geq 0.95$  is presently recognized as indicative of good fit [Hu & Bentler, 1999]), and the root mean square residual (RMR) is 0.003 (Values for the SMR range from zero to 1.0 with well fitting models obtaining values less than 0.05 [Byrne, 1998; Diamantopoulos & Siguaw, 2000]) while the root mean square error of approximation (RMSEA) is 0.012 (more recently, a cut-off value close to .06 [Hu & Bentler, 1999] or a stringent upper limit of 0.07 [Steiger, 2007]).

On prioritizing the core elements of the descending is: (1) RESOURCE (The resources, operational support, health services); (2) CONTENT (Developing academic subject); (3) GENERAL (General administration); (4) CULTURE (Culture of the organization); (5) BUDGET (budget administration); (6) PHILOSOPHY (Organization philosophy); (7) ESTABLISH (Establishing and administrative in the health service virtualization); (8) ACADEMIC (Academic Administration); (9) PERSONNEL (Personnel administration); and (10) PROFESSIONAL (Professional staff).

## Discussions

1. As the first hypothesis of this study, the variables used in this study is appropriate at a good level can be analyzed for the 2<sup>nd</sup> Order CFA, the results of the survey of the VSPOM factors for service plan in the regional health service in Thailand found that the 90 variables studied can be grouped into elements to have 13 elements per group. Each element has an Eigen value more than 1.00 and all elements can explain the variance of all the variables that were 83.330 in weight, the composition of each variable with values ranging from 0.412 to 0.846 show that the variables is appropriate at a good level can be analyzed for the 2<sup>nd</sup> Order CFA and can be used to study VSPOM factors for service plan in the regional health service in Thailand, since these parameters varied with the documents and research support by the study of related documents and research widely. The 90 variables grouped into the 13 elements, which the researchers chose to use variables with the weight in excess 0.50, ranging from 0.504 to 0.846, which is 74 variables in the 11 elements and restructure elements slightly to an increase of 10 elements from the selected 74 original variables covering the big four sides. Then, check the validity again by a second confirmatory factor analysis.

2. And as the second hypothesis, variables model of the 2<sup>nd</sup> Order CFA of VSPOM factors for service plan in the regional health service in Thailand is appropriate at a good level to be used for development a VSPOM model, the results of the 2<sup>nd</sup> Order CFA of VSPOM factors for service plan in the regional health service in Thailand found that variables model of the 2<sup>nd</sup> Order CFA of VSPOM factors for service plan in the regional health service in Thailand is appropriate at a good level that are consistent with the empirical data of the

administrators and practitioners in the field offices of the Health Service Virtual. The statistics measure the harmony of all in the form of administration office. The 2<sup>nd</sup> Order CFA that was developed has construct validity which can be used to study the management of desirable characteristics, indicating that the model has good precision, since the variables and elements, such as related documents and research support, are analyzed through EFA and CFA.

### **Suggestions**

1. Suggestions for bringing research results to the user. Variables model of VSPOM factors for service plan in the regional health service in Thailand developed related to documentation and research support have been checked for accuracy by analyzing it two times with EFA and the 2<sup>nd</sup> Order CFA, and were found have a good construct validity. It can be used to study the VSPOM factors and development in the management model of VSPO in the future of Research and development; R&D

2. Suggestions for further research. Elements of VSPOM factors for service plan in the regional health service in Thailand were analyzed and developed to suit the job responsibilities of personnel as practitioners in the Virtual Service Provider Office. They may use these elements in considering the responsibilities, be it extensive or complex, of the personnel. Such elements can be used in training courses, research, on-the-job training, etc. Moreover, these should also be consistent with the responsibilities of the personnel, the higher academic standing, the higher the responsibility they may get as analyzed and determined by the validity of the new structure by EFA and/or CFA. Elements of VSPOM factors for service plan in the regional health service

in Thailand were analyzed and developed to study other offices that need to improve variable and elements to suit the context of that office. In particular, factors and elements of knowledge and skills in information technology which will vary according to the administrative structure of the office and the responsibility of the personnel; then, the composition is adjusted and varied to determine the validity of new structure by EFA and/or CFA likewise.

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### **References**

- Akaike, H. (1974) A new look at the statistical model identification, *IEE Transactions on Automatic Control*, vol. 19, no. 6, pp. 716-723.
- Afsarmanes, H., & Camarinha, M. (2004) *Processes and foundations for virtual organizations*, Boston: Kluwer Academic Publisher.
- Barrett, P. (2007) Structural equation modeling: Adjudging model fit, *Personality and Individual Differences*, vol. 42, no. 5, pp. 815-824.
- Byrne, B. M. (1998) Structural equation modeling with LISREL, *PRELIS and SIMPLIS: Basic concepts, applications and programming*, Mahwah, NJ: Lawrence Erlbaum Associates.

- Boonda, P., et al. (2014) 'Developing an appropriate Virtual Service Provider Office Management Model for Service Plan in the Second Regional Health Service of Ministry of Public Health in Thailand', in *Proceedings of Second International Conference on Global Public Health 2014*, pp. 54-59, 3-4 July 2014, Negombo, Sri Lanka.
- Cochran, W. G. (1963) *Sampling techniques*, 2<sup>nd</sup> edition, New York: John Wiley & Sons.
- Cochran, W. G. (1977) *Sampling techniques*, 3<sup>rd</sup> edition, New York: John Wiley & Sons.
- Diamantopoulos, A. & Siguaaw, J. A. (2000) *Introducing LISREL*, London: Sage Publications.
- Faucheux, C. (1997) How virtual organizing is transforming management science, *Communication of the ACM*, vol. 40, no. 9, pp. 50–55.
- Giuliano, V. E. (1982) The mechanization of office work, *Scientific American*, vol. 247, pp. 149–164.
- Godden B. (2017) *Sample size formulas*, Available: <http://williamgodden.com/samplesizeformula.pdf> [26 May 2017]
- Gupta & Jatinder, N. D. (1997) Association for Information Systems, *Proceedings of the Americas Conference on Information Systems*, pp. 417-419, 15–17 August 1997, Indianapolis.
- Hiltz, S. (1986) The virtual classroom: Using computer mediated communication for university teaching, *Journal of Communication*, vol. 36, pp. 95–104.

- Miles, J. & Shevlin, M. (1998) Effects of sample size, model specification and factor loadings on the GFI in confirmatory factor analysis, *Personality and Individual Differences*, vol. 25, pp. 85-90.
- Hu, L. T. & Bentler, P. M. (1999) Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives, *Structural Equation Modeling*, vol. 6, no. 1, pp. 1-55.
- Isaca. (2001) *Understanding virtual organizations*, Available: <http://www.isaca.org/Journal/archives/2001/Volume-6/Pages/Understanding-Virtual-Organizations.aspx> [10 October 2014]
- Kim, J.-O., & Mueller, C. W. (1978) *Introduction to factor analysis: What it is and how to do it*, Beverly Hills, CA: Sage Publications.
- Malone, M. & Davidow, W. (1992) Virtual corporation, *Forbes*, vol. 150, pp. 102–107.
- Olson, M. H. (1983) Remote office work: Changing work patterns in space and time, *Communications of the ACM*, vol. 26, no. 3, pp. 182–187.
- Siddiqui, K. (2013) Heuristics for sample size determination in multivariate statistical techniques, *World Applied Sciences Journal*, vol. 27, no. 2, pp. 285–287. doi: 10.5829/idosi.wasj.2013.27.02.889
- Steiger, J. H. (2007) Understanding the limitations of global fit assessment in structural equation modeling, *Personality and Individual Differences*, vol. 42, no. 5, pp. 893-898.
- Tabachnick, B. G. & Fidell, L. S. (2007) *Using multivariate statistics*, 5<sup>th</sup> edition, New York: Allyn and Bacon.

- Travica, B. (1997) 'The design of the virtual organization: A research model', in *Proceedings of the American Conference on Information Systems*, pp. 417-419, 15-17 August 1997, Indianapolis.
- Venkatesh, A. & Vitalari, N. (1992) An emerging distributed work arrangement: An investigation of computer-based supplemental work at home, *Management Science*, vol. 38, no. 12, pp. 1687–1706.
- Wheaton, B., et al. (1977) Assessing reliability and stability in panel models, *Sociological Methodology*, vol. 8, no. 1, pp. 84-136.
- Wright, S. (1934) The method of path coefficients. *Ann. Math. Statist.*, vol. 5, no. 3, pp. 161-215. doi:10.1214/aoms/1177732676