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Factors Affecting Information System Management and Organizational Assessment Criteria related to Information System Management of Thai State Enterprises

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Abstract

This research aimed at finding factors affecting IS/ IT management and factors affecting organizational assessment criteria related to IS/IT management of Thai state enterprises. The sample group of this research was composed of 340 persons in 3 state enterprises. The data was collected through questionnaire. The statistical methods for this research were percentage, mean, standard deviation and multiple linear regressions. It was found that the support from executives, the management, the personnel competency, the communication and the participation affect IS/IT management and affecting organizational assessment criteria related to IS/IT management of Thai state enterprises at significant levels of 0.01 and 0.05. This can predict the IS/IT management of Thai state enterprises by 66.10% and the organizational assessment criteria related to IS/IT management of Thai state enterprises by 69.00%.

Keywords: Factor, Information system management, Organizational assessment criteria, State enterprises

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1. Introduction

A State Enterprise is a business enterprise of government which plays a key role in country development, due to the fact that State Enterprises provide the country with many primary infrastructures, such as energy, water supply, transportation, communication and telecommunication, agriculture and industry. These things are counted as importance governmental instrument for country development [1]. However, after the studies, we have founded that the operation process of State Enterprise encountered many problems for the reason that State Enterprises' operations shall be in accordance with the government policies and central regulating policies. This results in many restrictions of business size, value and establishment, including the competitiveness and production and service monopolies. Because of the difference of State Enterprises' background and conditions the State Enterprises take advantages and disadvantages also in different ways. [2] Thereby, the State Enterprise Policy Office (SEPO) has issued the principle of evaluation system for State Enterprise operation, which is used as instrument to control the effectiveness of State Enterprise operations. And after the consideration of evaluated operation effectiveness of 55 State Enterprises it is found that 22 State Enterprises has effectiveness in average of 3 years lower than 3.00 points and these 22 State Enterprises have also the points within the framework of IS/IT management at the 22 last positions of all State Enterprises [3]

This situation emphasized that the IS/IT management is very important to the effectiveness of organization's operations and can be an effective course of organization's operations in overview [4]. Even more, the world of any kind of businesses expands and develops gradually. With this reason The Information Technologies (IT) were brought in the operation system for the purpose of potency development [5]. Therefore, if the State Enterprises can conduct the IS/IT management effectively, the quality of organizations will be enhanced at the same time.

Thus, the researcher aimed to find and analyze the factors, resulting in the IS/IT management and the evaluation of Thailand's State Enterprises Information System Management. The researcher presumes that the found factors will be useful instrument, which the government can apply to the determination of plans and strategies or to any operation processes and finally it will help to improve the IS/IT management effectively.

The researcher has done with the literature reviews, so that in this research the corresponding factors to the IS/IT management will be found and it will be trustable and appropriated. After that, the researcher has found that the factors, resulting in the IS/IT management and the evaluation of Thailand's State Enterprises Information System Management, consisted of:

The support from the executive general and other taking responsibility directors. These persons are connected to the activities of IT

organizations [6] [7] [8] [9] [10] [11] [12] [13] [14] [15], including the budget support [7] [11] [13] [16]

The process of operation, which related to the determination of vision and IT and communication strategies [7] [8] [11] [12] [13] [16] [17] [18] so that the organizations develop the effective structure of more appropriated [6] [8] [12] [13] [16] [19] and vivid Information System [7] [20] and course establishment for organization [6] [10]

The capacity of performing persons. The strength of IS/IT management requires the capable performing staffs and therefore an advanced training for staffs [7] [8] [12] [18] is a factor for IT knowledge and skill development. [7] [9] [10] [11] [12] [13] [14] Moreover, the skill of general director or other performing directors is another factor which enhances the IS/IT management and takes the organization to the defined goal. [8] [11] [12] [13]

The effective communication. If the organization has well established the primary infrastructures [16] [17] [18] and effective communication channel, the IS/IT management will be also productively conducted and the organization will gain more benefits. [6] [7] [8] [12] [13] [14]

The participation. The participation in the IS/IT management shall cover the participation of performing staffs [6] [8] [13] [15] [17], stakeholders [7] [12] [13] [14] [15] and users [12] [15].

Addressing the process of Information System Management, it comprises of process of operation [21] [22] [23] process of skill development for performing staffs [24] [25] [26] process of supporting from CEO and other performing directors [21] [22] [23] [26] process of team working development [21] [22] and process of IS/IT management [21] [22] [23]

Enterprise Policy Office (SEPO) [2] has given the 7criteria of the IS/IT management of Thai State Enterprise evaluation as following: 1) plan of operation and management 2) Information System and Digital supporting the State Enterprises operation 3) Information System and Digital supporting the risk management 4) Information System and Digital supporting the internal control and inspection 5) Information System and Digital supporting the HR operation and management 6) Information System and Digital supporting the requirement of persons outside the organization, including economic digital policies and other government policies and 7) Information System and Digital supporting the requirement of persons or staffs within the organization. After the related the literature reviews to this research the researcher has set the framework of research as in the fig. 1.

2. Research methodology

2.1 Population and Samples

Population and Samples which are used in this research include 55 States Enterprises in Thailand. The samples consisted of executive teams (general directors and other performing directors), IT- user and the persons who related to the evaluation of Information System Management. The sample conducted by the researcher is from 8 sources by Quota Sampling.

Therefore, the researcher decided to classify the population as 4 sub-groups, in which contain the similar characteristic. These sub-groups are based on the classification of evaluation result of organization's operation.

Group A is 7 State Enterprises with the evaluation point of organization's operation more or equal 4.0 points for every section of evaluation.

Group BA is 12 State Enterprises with the evaluation point of organization's operation in average for 3 years over 3.75 points.

Group BB is 14 State Enterprises with the evaluation point of organization's operation in average for 3 years less than 3.75 points.

Group C is 22 State Enterprises with the evaluation point of organization's operation in average for 3 years less than 3.00 points.

After, the researcher has chosen the sample from each group, 2 sources from each group, total 8 sources. The quantity of samples for questionnaire came from the determination of appropriated parameter, that is 20 times per 1 variable [27], in this research appeared to be 17 variables, then the volume of sample will be 340 persons.

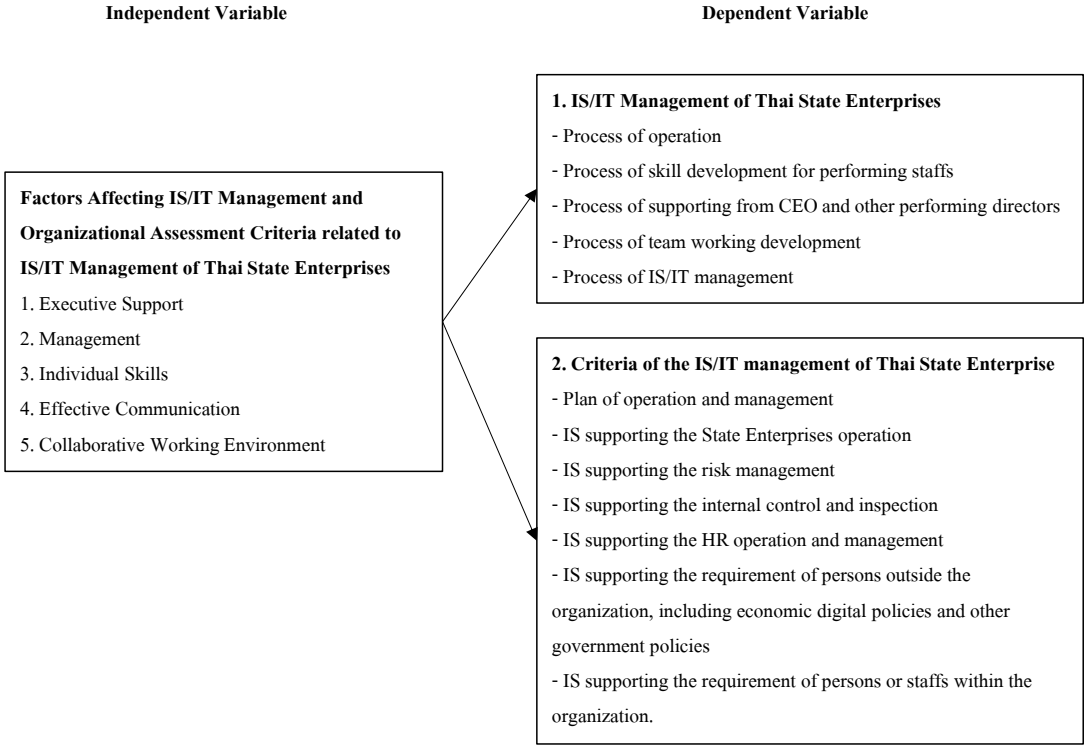

Figure 1 Research Framework

2.2 Research Tool

For this research the questionnaire is used as instrumentation to collect information about factors, resulting in the Information System Management and the evaluation of Thailand' s State Enterprises Information System Management, which is divided in 4 parts as following:

Part 1: General information of respondents is fixed as Check List answer with 5 question, including sex, age, level of education, working experience (period of working) and position

From part 2 to part 4 are fixed as Rating Scale Evaluation according to Likert, in which the evaluation is identified in 5 levels as most, more, moderate, low, very low

Part 2: The factors, resulting in the Information System Management and the evaluation of Thailand' s State Enterprises Information System Management, 15 questions

Part 3: Thailand' s State Enterprises Information System Management, 17 questions

Part 4: the criteria for evaluation of Thailand' s State Enterprises Information System Management, 25 questions

2.3 Assessment Research Tool

2.3.1 The review and study of documents, ideas, theories and related research paper to this research in accordance with the Information System Management.

2.3.2 Study how to formulate the Rating Scale questionnaire which covers all objectives of this research.

2.3.3 Submit the questionnaire to adviser for the inspection of structural validity of content and language, then do the adjustment.

2.3.4 Prove the Content Validity. The researcher have submitted the questionnaire inspected by adviser to 3 experts so as to make questions as listed items. Afterwards Index of item objective congruence: IOC will be calculated. Given that if any item contains IOC point less than 0.5, it will be considered to be improved, so that the question will contain IOC point according to the standard [28] Having analyzed IOC point, it was found that the entire questionnaire contains the IOC point more than 0.5.

2.3.5 After an adjustment upon advice of experts the researcher has checked the accuracy of questionnaire and tried it out so as to identify the quality of Assessment of research tools before using it for data collection from the fieldwork.

2.3.6 The questionnaire is used among the sample as trial, not real sample for the research in an quantity of 30 persons so as to conduct an item analysis and calculate the Cronbach's Coefficient Alpha by using an the statistical software package (SPSS) while analyzing the data. The result of analysis indicated the Cronbach' s Coefficient Alpha of entire questionnaire is 0.944.

2.3.7 Use the questionnaire, of which the accuracy analysis was conducted, to collect further data.

2.4 Data collection

2. 4. 1 Secondary Data collection. The researcher has studied and collected data, ideas,

theories and related research papers to this field of study from Textbook, other research papers and internet search query both in country and from so as to collect enough data to apply to the searching for the factors, resulting in the Information System Management and the evaluation of State Enterprises' Information System Management.

2. 4. 2 Primary Data Collection. The researcher has collected the data by using the questionnaire among the sample from the correct quantity mentioned in this research.

2.5 Data Analysis

2.5.1 Analyze general data of respondents with represented statistics by percentage

2.5.2 Analyze general data of respondents from the part 2 to part 4 by using Mean and Standard Deviation

2.5.3 Analyze the factors, resulting in the Information System Management and the evaluation of State Enterprises' Information System Management by Multiple Linear Regressions analysis to study the relations between many independent variables and 1 dependent variable.

3. Results and Discussion

3.1 Results of Research

3.1.1 Results of Primary Data Analysis

Most of sample is female with the quantity of 196 – 51.58% and male with the quantity of 144 - 37.89%, Age from 36 to 45 with the quantity of 103 – 27.11%, Age below 25 with the quantity of 52 – 13.68%, Age higher than 55 with the quantity of 50 – 13.16% and Age between 46 and 55 with the quantity of 37 – 9.74%. 244 from Sample Group study in program Bachelor Degree – 64.21%, 65 from Sample Group study in program Master Degree and higher – 17.11% and 31 from Sample Group have level of education lower than Bachelor Degree – 8.16%. 94 from Sample Group have 1-5 years' work experience – 24.74%, 83 from Sample Group have 6-10 years' work experience – 21.84% ,% ,77 from Sample Group have 10-15 years' work experience – 20.26%, %, 35 from Sample Group have less than 1 year work experience – 9.21%, 30 from Sample Group have 16-20 years' work experience – 7.89%, 21 from Sample Group have more than 20 years' work experience – 5.53%, 237 from Sample Group possessed the position of Practitioner Level (level from 2 to 5) – 62.37% and 103 from Sample Group possessed the position of Executive Level (level from 6) – 27.11%

3.1.2 The results of Mean and Standard Deviation of analysis the factors, resulting in the Information System Management and the evaluation of Thailand' s State Enterprises Information System Management.

Table 1 Mean, Standard Deviation and level of opinion to the factors, resulting in the Information System Management and the evaluation criteria of Thailand' s State Enterprises Information System Management entirely.

(n = 340)

Factors Affecting IS/IT Management	$\overline{X}$	S.D.	Opinion level
1. Executive Support	3.95	0.722	high
2. Management	3.97	0.724	high
3. Individual Skills	3.91	0.736	high
4. Effective Communication	4.05	0.866	high
5. Collaborative Working Environment	3.90	0.676	high
Average	3.96	0.745	high

From Table 1 The level of opinion to the factors, resulting in the Information System Management and the evaluation criteria of Thailand' s State Enterprises Information System Management in the overview is at the high level ($\overline{X}$ = 3.96) and when the sections of them were partly considered, it was found that the section of communication ($\overline{X}$ = 4.05) ranked first among others, afterward are the sections of Operation and Management ($\overline{X}$ = 3.97), supporting from executive persons ($\overline{X}$ = 3. 95), capacity of performing staffs ($\overline{X}$ = 3.91) and participation ($\overline{X}$ = 3. 90) in order. Thus, the communications are significant in the organizations in term of performing the basic functions of management.

3.1.3 The results of Mean and Standard Deviation of the Thailand' s State Enterprises Information System Management.

Table 2 Mean, Standard Deviation and level of opinion to the Thailand' s State Enterprises Information System Management entirely.

(n = 340)

IS/IT Management	$\overline{X}$	S.D.	Opinion level
1. Process of operation	3.88	0.720	high
2. Process of skill development for performing staffs	4.17	0.778	high
3. Process of supporting from CEO and other performing directors	3.61	0.736	high
4. Process of team working development	3.78	0.758	high
5. Process of IS/IT management	3.78	0.737	high
Average	3.84	0.746	high

From Table 2 The level of opinion to the Thailand' s State Enterprises Information System Management is at the high level ($\overline{X}$ = 3.84) and when the sections of them were partly considered, it was found that the section of skill development for performing staffs ranked first among others ($\overline{X}$ = 4.17), afterward are the sections of Operation and

Management ($\overline{X}$ = 3.88), team working development and IT system development ($\overline{X}$ = 3. 78) and supporting from executive persons ($\overline{X}$ = 3. 61) in order. Hence, if the organization has guidelines for enhancing personnel skills; training, activities participating, together expression, it will create greater personnel performance for operation.

3.1.4 The results of Mean and Standard Deviation of the Thailand' s State Enterprises Information System Management.

Table 3 The results of Mean and Standard Deviation and the level of opinion to the evaluation of Thailand's State Enterprises Information System Management entirely.

(n = 340)

Criteria of the IS/IT management of Thai State Enterprise	$\overline{X}$	S.D.	Opinion level
1. Plan of operation and management	3.96	0.703	high
2. IS supporting the State Enterprises operation	3.99	0.664	high
3. IS supporting the risk management	3.86	0.707	high
4. IS supporting the internal control and inspection	3.88	0.659	high
5. IS supporting the HR operation and management	3.95	0.689	high
6. IS supporting the requirement of persons outside the organization, including economic digital policies and other government policies	3.91	0.768	high
7. IS supporting the requirement of persons or staffs within the organization.	3.67	0.782	high
Average	3.89	0.711	high

From the table 3 the level of opinion to the evaluation of Thailand' s State Enterprises Information System Management is at the high level ($\overline{X}$ = 3. 89) and when the factors as sections of them were partly considered, it was found that the factor of Information and Digital System supporting the System Management of the States Enterprises ($\overline{X}$ = 3.99) ranked first, afterwards are the factors of Operation Plan ($\overline{X}$ = 3 . 96) Information System and Digital supporting the HR Management ($\overline{X}$ = 3.95), Information System and Digital supporting the use and requirement of persons outside the organization, including economic digital policies and other government

policies ($\overline{X}$ = 3.91) Information System and Digital supporting the use and requirement of persons or staffs within the organization. ($\overline{X}$ = 3.88) Information System and Digital supporting the risk management ($\overline{X}$ = 3.86) Information System and Digital supporting the use and requirement of persons or staffs within the organization. ($\overline{X}$ = 3.67) in order. Therefore, it was found that the information system is an important tool in the working. If an organization has the availability of the information systems, it will make its possibilities to manage the various tasks to meet with efficiency and effectiveness.

3.1.5 The results of Multiple Regression Analysis in searching for the factors, resulting in the Information System Management and the evaluation of Thailand' s State Enterprises Information System Management

Multiple Regression Analysis for the purpose of searching for the relations between independent and dependent variables with the method of "Enter", in which all of variables will be input into the Fit Model. In this test the variables which should be analyzed consisted of 5 independent variables, such as support from executive teams (managing directors and other performing directors) (X_1) , Operation and Management (X_2), the capacity of performing staffs (X_3), communication (X_4) and participation (X_5) . The dependent variables are Thailand' s State Enterprises Information System Management (Y_1) and the evaluation criteria of Thailand' s State Enterprises Information System Management (Y_2)

The results of analysis were shown as table 4 and table 5

Table 4 The results of Multiple Regression Analysis for the purpose of searching for Thailand' s State Enterprises Information System Management

Prediction variable	Unstandardized Coefficients		Standardized Coefficients	t	p-value
	B	Std. Error	β		
Constant (a)	1.552	0.247		2.238	0.002
Executive Support (X_1)	0.255	0.060	0.150	2.925	0.035*
Management (X_2)	0.374	0.053	0.184	4.394	0.026*
Individual Skills (X_3)	0.275	0.064	0.171	2.719	0.017*
Effective Communication (X_4)	0.230	0.042	0.192	5.451	0.000**
Collaborative Working Environment (X_5)	0.316	0.056	0.276	5.652	0.000**
R = 0.741 R^2 = 0.674 R^2_{adj} = 0.661 F = 46.620 P = 0.000					

*Correlation is Significant at the 0.05

**Correlation is Significant at the 0.01

Table 5 Results of Multiple Linear Regressive Equation Analysis for the purpose of searching for the factors, resulting in the evaluation criteria of Thailand's State Enterprises Information System Management

Prediction variable	Unstandardized Coefficients		Standardized Coefficients	t	p-value
	B	Std. Error	β		
Constant (a)	2.205	0.236		0.868	0.386
Executive Support (X_1)	0.306	0.057	0.286	3.617	0.000**
Management (X_2)	0.204	0.051	0.190	3.339	0.001*
Individual Skills (X_3)	0.210	0.061	0.206	1.786	0.045*
Effective Communication (X_4)	0.394	0.040	0.344	4.823	0.000**
Collaborative Working Environment (X_5)	0.363	0.053	0.327	4.936	0.000**
$R = 0.789$ $R^2 = 0.715$ $R^2_{adj} = 0.690$ $F = 60.701$ $P = 0.000$					

*Correlation is Significant at the 0.05

**Correlation is Significant at the 0.01

From the table 4 it was clear that predictive variables consisted of support from executive teams (managing directors and other performing directors), Operation and Management, the capacity of performing staffs, communication and participation have linear relation with statistical significance at level 0.05 and 0.01 sorted by priority as following: participation ($\beta = 0.276$), communication ($\beta = 0.192$), Operation and Management ($\beta = 0.184$), capacity of performing staffs ($\beta = 0.171$) and support from executive teams (managing directors and other performing directors) ($\beta = 0.150$). These 5 predicative variables and the Thailand's State Enterprises Information System Management have linear relation with statistical significance at level 0.01 ($F = 46.620, P = 0.000$) and the coefficient of multiple correlation is 0.741 ($R = 0.741$), so it can be assumed that this set of predicative variables can describe the Thailand's State Enterprises Information System Management at the percentage of 66.10 ($R^2_{adj} = 0.661$) and another percentage of 33.90 came from other factors.

Therefore, predicative equation of Thailand's State Enterprises Information System Management can be described as following:

Regressive Equation as the Raw Score

$$Y = 1.552 + 0.255X_1 + 0.374X_2 + 0.275X_3 + 0.230X_4 + 0.316X_5 \quad (1)$$

Regressive Equation as the Standard Score

$$Z = 0.150Z_1 + 0.184Z_2 + 0.171Z_3 + 0.192Z_4 + 0.276Z_5 \quad (2)$$

In order to make the Information System Management of Thailand's State Enterprises most effectively. It must give first priority to the personnel participation in the organization and secondly give priority to communications, operation and management, individual skills, and executive support, consecutively.

From the table 5 it was clear that predictive variables consisted of support from executive teams (managing directors and other performing directors), Operation and Management, capacity of performing staffs, communication and participation have linear relation with statistical significance at level 0.05 และ 0.01 by priority as following: communication (β = 0.344), participation (β = 0.327) support from executive teams (managing directors and other performing directors) (β = 0.286), capacity of performing staffs (β = 0.206) Operation and Management (β = 0.19). These 5 predicative variables and the Thailand's State Enterprises Information System Management have linear relation with statistical significance at level 0.01 (F = 60.701, P = 0.000) and the coefficient of multiple correlation is 0.789 (R = 0.789), so it can be assumed that this set of predicative variables can describe the criteria evaluation of Thailand's State Enterprises Information System Management at the percentage of 69.00 (R^2_{adj} = 0.690) and another percentage of 31.00 came from other factors.

Therefore, predicative equation of Thailand's State Enterprises Information System Management can be described as following:

Regressive Equation as the Raw Score

$$Y = 2.205 + 0.306X_1 + 0.204X_2 + 0.210X_3 + 0.394X_4 + 0.363X_5 \quad (3)$$

Regressive Equation as the Standard Score

$$Z = 0.286Z_1 + 0.190Z_2 + 0.206Z_3 + 0.344Z_4 + 0.327Z_5 \quad (4)$$

Therefore, State enterprises must give priority to communications and should establish channels of communication both inside and outside the organization clearly. In addition, focus on participation, executive support, enhancing the performance of personnel and management in order to make the organization assessment of enterprises in Information System Management in the proper.

3.2 Research Discussion and Critique

The results of this research have revealed the new facts leading to the research perspective. That is the factors, resulting in the Information System Management and the evaluation of Thailand's State Enterprises Information System Management, including support from executive teams (managing directors and other performing directors), Operation and Management, the capacity of performing staffs, communication and participation, which complied with the studies of Abdullah and Quaddus [6] Alreemy, et al. [7] and

Denolf, et al. [8]. The support from executive teams (managing directors and other performing directors in the framework of IT System Management will push the organization forward more successfully, due to the fact that the executive teams play an important role to move the new course of development for performing staffs and relating persons to the organization. Moreover, it is corresponded to the studies of Montequin, et al. [11] Smuts, et al. [12] และ Sudhakar [13], in which the additional result was found that the determination of operation and management process should be in plan. Visions, strategies and tactics for IT and communication [7] [8] [11] should be also well planned and developed so as to cover all management process of organization.

But according to the studies of Alreemy, et al. [7] Denolf, et al. [8] Smuts, et al. [12] and Sudhakar [13], effective Information System Management requires the mass of good performing staffs, so advanced training and skill upgrading to enhance the staffs ' capacity, including the skill of executive teams [8] [11] [12] [13]. However, beside the participation of executive teams, operation and management, another outstanding factor having importance to the Information System Management is the factor of communication in accordance with the studies of [6] Alreemy, et al. [7] Denolf, et al. [8] Smuts, et al. [12] Sudhakar [13] and Ye and Xu [14], which explained that the effective communication enables also the effective Information System Management and allows the organization succeed in gaining benefits, moreover, the structure of organization, which is clear and covered a wide range of management will lead to the rapid and accurate communication [16] [17] [18] and the last factor, resulting in the Information System Management, is the participation, including the participation of performing staffs [6] [8] [13] [15] [17], the participation of stakeholders (relating persons to the organization) [7] [12] [13] [14] [15] and the participation of users[12] [15].

4. Research Conclusion

This research aimed to search for the factors, resulting in the Information System Management and the evaluation of Thailand's State Enterprises Information System Management. The research emphasized that the discovered factors will be a tool for the further application, which will be useful for planning or other management processes of the State Enterprises and it will lead to the more effective Information System Management. The results of this research revealed that the factors of the support from executive teams (managing directors and other performing directors), Operation and Management, capacity of performing staffs, communication and participation result in the Information System Management and the evaluation of Thailand's State Enterprises Information System Management with statistic magnificence at level 0.01 and 0.05, and together with the assumption of Thailand's State Enterprises Information System Management at the percentage of 66.10 and together with the assumption of the evaluation criteria of Thailand's State Enterprises

Information System Management at the percentage of 69.00 Meanwhile, weather is successful management of the enterprises, or not, depends on both the 5 factors above. In addition, if State enterprises need to be administered in accordance with the evaluation criteria of the State enterprises, it must give priority to these 5 factors as well.

Hence, these Factors are considered to be essential for designing a framework for effective and sustainable Information System Management in Thai State Enterprises which will be the next step in this study.

5. References

[1] The Board of Minister's Support Handbook. *Governance Framework*. Ministry of Finance. Bangkok. 2008.

[2] State Enterprise Policy Office. *The Manual of the System to Appraisal the Performance of State Enterprises*. Ministry of Finance. Bangkok. 2014.

[3] State Enterprise Policy Office. *Score of state enterprise performance.* Ministry of Finance. Bangkok. 2018.

[4] Panmuang M. and Porrawatpreyakorn N. Factors and Guidelines on the Benefits Realization from Information System: A Systematic Literature Review. *Thai Journal of Science and Technology*. 2018. 26(4) : 715-729.

[5] TuPhijit C. , Pongkachorn W. , Chirawichitchai N. IT Service Operation Improvement with ITIL (Case Study of Data Products Toppan Forms Ltd). *Science and Technology RMUTT Journal*. 2017. 7(1): 134-143.

[6] Abdullah Z.S. and Quaddus M. A critical success factors model for IS implementation: Development and validation of a structural model using PLS. *Proceedings of the 2012 7th International Conference on Computing and Convergence Technology (ICCCT)*. Seoul, Korea. 3-5 December 2012.

[7] Alreemy Z. and et al. Critical success factors (CSFs) for information technology governance (ITG). *International Journal of Information Management*. 2016. 36(6, Part A) : 907-916.

[8] Denolf J.M. and et al. Towards a framework of critical success factors for implementing supply chain information systems. *Computers in Industry*. 2015. 68(Supplement C) : 16-26.

[9] Rukshan C.J. and Mangala R.P. Project success factors for Information Technology (IT) related solution deployments; a study conducted for Sri Lankan IT vendors. *Proceedings of the 2010 5th International Conference on Information and Automation for Sustainability (ICIAfS)*. Colombo, Sri Lanka. 17-19 December 2010.

[10] Kamaruddin M., Razali R. and Deraman A. Critical success factors of executive information systems development for education management - A preliminary investigation. *Proceedings of the 2011 International Conference on Electrical Engineering and Informatics*. Bandung, Indonesia. 17-19 July 2011.

[11] Montequin V.R. and et al. Analysis of the Success Factors and Failure Causes in Information & Communication Technology (ICT) Projects in Spain. *Procedia Technology*. 2014. 16(Supplement C) : 992-999.

[12] Smuts H. and et al. Critical Success Factors for Information Systems Outsourcing Management: A Software Development Lifecycle View. *Proceedings of the 2010 Annual Research Conference of the South African Institute of Computer Scientists and Information Technologists*. Bela Bela, South Africa. 11-13 October 2010.

[13] Sudhakar G.P. A model of critical success factors for software projects. *Journal of Ent Info Management*. 2012. 25(6) : 537-558.

[14] Ye X., Liu K. and Xu Q. The Influence of Management Support on Enterprise' s Information System (IS) Successful Implementation: Based on Method of Field Interview. *Proceedings of the 2008 4th International Conference on Wireless Communications, Networking and Mobile Computing*. Dalian, China. 2 March 2008.

[15] Zahra K. and et al. Success Factors of Organizational Change in Software Process Improvement: A Systematic Literature Review. *Proceedings of the 5th International Conference on Information and Education Technology*. Tokyo, Japan. 10-12 January 2017.

[16] Luftman J. and et al. Key information technology and management issues 2012-2013: an international study. *Journal of Information Technology*. 2013. 28(4) : 354-366.

[17] Silvius A. J. G. and Stoop J. The Relationship between the Process of Strategic Information Systems Planning and Its Success: An Explorative Study. *Proceedings of the 2013 46th Hawaii International Conference on System Sciences*. Maui, Hawaii. 7-10 January 2013.

[18] Sinawong S. The Influential Factors and Challenges in Implementing E-Government in Cambodia. *Proceedings of the 2008 Third International Conference on Convergence and Hybrid Information Technology*. Busan, South Korea. 11- 13 November 2008.

[19] Akarasuwan A. *The Study of Component of Key Success of Accounting Information Systems in Government Sector*. M. Acc. Thesis. Dhurakij Pundit University. 2015.

[20] Hussein B. A. and Hafseld K. Impact of organizational factors on information system project. *Proceedings of the 2013*

IEEE 7th International Conference on Intelligent Data Acquisition and Advanced Computing Systems (IDAACS) . Berlin, Germany. 12-14 September 2013.

[21] Hicks M., Pervan G. and Perrin B. A Case Study of Improving Information Technology Governance in a University Context. *Proceedings of International Working Conference on Human Benefit through the Diffusion of Information Systems Design Science Research*. Perth, Australia. 4 Mar 2010.

[22] Rahimi F., Møller C. and Hvam L. Business process management and IT management: The missing integration. *International Journal of Information Management*. 2016. 36(1) : 142-154.

[23] Rajarathinam V. , Chellappa S. and Nagarajan A. Conceptual Framework for the Mapping of Management Process with Information Technology in a Business Process. *The Scientific World Journal*. 2015.

[24] Eiampit K. *Problems and Solutions for Information System management of the Municipal Schools under the Educational Region 6*. M.Ed. Thesis. Thepsatri Rajabhat University. 2010.

[25] Thaweewat, S. *Problems and Solutions for Information System Management in Schools under Suphan Buri Educational Service Area Office 3*. M. Ed. Thesis. Thepsatri Rajabhat University. 2010.

[26] Ahsan A. The rise and fall of R & D center's ‘ Quality Management Department’ of a major ICT Based Chinese Organization in Pakistan: An exploratory, explanatory and analytical case study of core reason of rise and fall and corresponding soft benefits and dis- benefits for the overall organization. *Proceedings of the 2010 IEEE 17th International Conference on Industrial Engineering and Engineering Management*. Xiamen, China. 29-31 October 2010.

[27] Hair J. F. and et al. *Multivariate data analysis: A global perspective*. 7th ed. Prentice-Hall, New Jersey. 2010.

[28] Tirakanant S. *Creating a Variable Measurement Tool in Social Science Research: A Practical Approach*. Chulalongkorn University Printing House. Bangkok. 2008.