

The Success Indicators for the Computer Center in Higher Education Institutions

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Abstract: This paper proposed the success indicators and the measurement model of the computer center in higher education institutions (IMOCC). The Balanced Scorecard (BSC) concepts were used to develop the IMOCC. The research finding the IMOCC included eight sub components; two factors and four perspectives (Input factors; financial, customer, internal process and learning & development perspectives, Output; financial, customer, internal process and learning & development perspectives). The factor loading of success indicators for the operations of computer center (CC) in higher education institutions were output and input factor components, respectively. The IMOCC was fit to the empirical data ($\chi^2 = .021$; $df = 3$; $P = .999$; $GFI = 1.00$; $AGFI = .999$; $RMR = .000937$). The IMOCC is measure with eight indicators which are tool for measure performance of CCs to enable the organization to identify their own strategies plans.

Key-words: Indicator, Measurement, Balanced Scorecard, Performance, Organization

1 Introduction

All organizations are faced with numerous challenges. Trade pockets of electronic commerce economy, rapidly changing innovations, specific needs of a customer to reduce the cost of competitive advantage, etc. leading organizations are seeking ways to respond to these challenges and lead their organizations towards excellence. Corporate excellence is a high performance organization, that have the ability to compete and in business, evaluating the quality of education is necessary because it is a process to check the quality of education. Evaluation will focus on comparative analysis of the results of the University, Faculty or Organization with indicators of quality in every component that quality [1].

In general, organizations need to have criteria and standard in their operations. The standardized operation will increase their performances. The performance improvement process is a critical component of the strategic planning process. This process has been recently dubbed as the balanced scorecard. The balanced scorecard is a system of combining financial and non-financial measures of performance in one single scorecard. It includes performance measures for four perspectives: financial, customer, internal processes, and learning and growth (development) [2] [3]. According to the results of BSC consultations by NRI (Nomura Research Institute, Ltd.), the requirements for successful reform can be summarized in the

following three point: 1) adopting a problem-solving approach that does not rely on “tool”; 2) ensuring a commitment by management; and 3) creating a cross-functional team that incorporates such functions as corporate planning and personnel administration [4].

Evaluation is necessary and important to develop a great organization, increase its abilities for obtaining funds or future planning, and fulfil the organizational objectives. The organizations, public or private sector, need to the evaluation process for developing their organization. They bring information to verify that the organization has met the target is placed on how. If they have information from the assessment, the organization will determine vulnerability and strengths. Be adaptive and relevant allows organizations to be effectively and efficiently [5] [6] [7]. There are a large number and wide variety of evaluations that can occur in organization, whether for-profit or non-profit. Evaluation is closely related to performance management (whether about organizations, groups, processes or individuals), which includes identifying measures to indicate results. Evaluation often includes collecting information around these measures to conclude the extent of performance [8] [9].

Long time ago, performance indicators have been produced for universities and government sector in Thailand. Performance indicators are at the heart of a performance monitoring system. One of

the main factors used is the entry qualifications of the organization of university. They define the data to be collected to measure progress and enable actual results achieved over time to be compared with planned results. Thus, they are an indispensable management tool for making performance-based decisions about program strategies and activities [10].

Computer Center or Educational Technology is an organization of higher education institutions formed under the awareness and recognize the importance of technology education to enhance the teaching and learning. As contributing to the development of teaching and learning with the instructional design, media production and service educational materials. These operations have been developed within the context based on instructional technology: the definition and domains of the field [11]. So the computer centers must be taken to quality assurance, it is essential that organizations need to create a competitive environment under the rapid and severe changes. As a result, these factors make the management of organizations are seeking ways to assess and improve capabilities. The IMOCC is the tool that will bring the organization towards excellence.

2 Methodology

A development of measurement model of the success indicators of the operations of efficient for the computer center used the research and development method. Indicative of the development process steps, which can include a summary important step in the development of markers 6 step process, is 1) defining the purpose of developing indicators 2) definition of indicators 3) data collection 4) creating markers 5) audit quality indicators and 6) delivering reports. The research findings were:

Resulting from the literatures review; Computer theory and Balanced Scorecard concepts. The theoretical concept results are summarized by the content analysis as presented in Table 1.

Interviewed six directors of computer center from six different universities. A selected sample is selected purposive sampling that represents were three groups of small, medium, and large sizes of universities. The interview results are summarized by the content analysis as presented in Table 2.

Table 1. Theoretical concept

Variables		
The operations of efficient for computer center	Input factors	Financial perspective
		Customer perspective
	Output factors	Internal process perspective
		Learning and Development perspective

Table 2. Success indicators of the operations of efficient for CC in higher education institutions

Input factors	Financial perspective	Personal Operation
		Customer relationship
	Customer perspective	Customer care
		Customer acquisition
Output factors	Internal process perspective	Management Innovation
		External environment
	Learning and Development perspective	Human Organization
		Information and computer technology
Input factors	Financial perspective	Personal Cost
		Operation Cost
	Customer perspective	Customer Satisfaction
		Customer need
Output factors	Internal process perspective	New Customers
		Management Achievement
	Learning and Development perspective	Project/Product/Service
		External Relationship
Learning and Development perspective	Human Capital	
	Organization Capital	
Learning and Development perspective	Information and computer technology	
	Capital	

Survey the opinions of the staff of each computer center. A selected sample is selected simple sampling who thirty subjects came from six different computer centers. The opinion results are summarized by the descriptive statistics as presented in Table 3 and Table 4.

Table 3. Descriptive statistics of success input factor

Input factors	Staff (n = 30)		
	\bar{X}	S.D.	Level
Financial perspective	4.06	.90	High
Personal	4.30	.88	High
Operation	3.85	.92	High
Customer perspective	3.76	.91	High
Customer relationship	3.88	.85	High
Customer care	3.73	.91	High
Customer acquisition	3.67	.98	High
Internal process perspective	3.86	.86	High
Management	3.71	.84	High
Innovation	4.09	.86	High
External environment	3.77	.87	High
Learning and Development perspective	4.15	.90	High
Human	4.21	.93	High
Organization	4.28	.90	High
Computer and Information technology	3.97	.88	High
Total	3.96	.90	High

Table 4. Descriptive statistics of success output factor

Output factor	Staff (n = 30)		
	\bar{X}	S.D.	Level
Financial perspective	4.01	.94	High
Personal Cost	4.12	.94	High
Operation Cost	3.90	.94	High
Customer perspective	3.93	.91	High
Customer Satisfaction	3.98	.98	High
Customer need	3.87	.85	High
New Customers	3.93	.89	High
Internal process perspective	3.87	.89	High
Management Achievement	3.79	.84	High
Project/Product/Service	3.86	.89	High
External Relationship	3.95	.95	High
Learning and Development perspective	4.04	.89	High
Human Capital	3.87	.89	High
Organization Capital	4.10	.98	High
Computer and Information technology Capital	4.16	.80	High
Total	3.96	.91	High

Analysis of data from interviews and surveys to create a conceptual framework and variables.

The data results are summarized by the content analysis leads to the measurement model of the success indicators of the operations of efficient for computer center as presented in Table 5.

Table 5. Variables of the success indicators of the operations of efficient for IMOCC in higher education institutions

Sub Component: Input factor	Staff (n = 120)		
	\bar{X}	S.D.	
Financial: IFIN	3.95	.96	Personal
			Operation
			Customer Relationship
			Customer Care
Customer: ICUS	3.98	.94	Customer Acquisition
			Management
			Innovation
			External Environment
Internal Process: IINP	3.95	.96	Human
			Organization
			Computer and Information Technology
			Human Capital
Learning and Development: ILDE	4.22	.96	Organization Capital
			Computer and Information Technology Capital
			Human Capital
			Organization Capital
Financial: OFIN	4.10	.86	Personal Cost
			Operation Cost
			Customer Satisfaction
			Customer Need
Customer: OCUS	3.98	.94	New customers
			Management Achievement
			Project/Product/Service
			External Relationship
Internal Process: OINP	3.95	.96	Human Capital
			Organization Capital
			Computer and Information Technology Capital
			Human Capital
Learning and Development: OLDE	4.22	.96	Organization Capital
			Computer and Information Technology Capital
			Human Capital
			Organization Capital

Table 6. The components of the success indicators of the operations for efficient of IMOCC

Sub components of the operations of efficient IMOCC	Staff (n = 120)		
	\bar{X}	S.D.	Level
Input factor sub-components			
1. IFIN	4.10	.86	High
2. ICUS	3.98	.94	High
3. IINP	3.95	.96	High
4. ILDE	4.22	.96	High

Table 6. The components of the success indicators of the operations for efficient of IMOCC (continue)

Sub components of the operations of efficient IMOCC	Staff (n = 120)		
	\bar{X}	S.D.	Level
Output factor sub-components			
1. OFIN	3.97	.87	High
2. OCUS	4.08	.89	High
3. OINP	3.90	.92	High
4. OLDE	4.16	.85	High

Survey the opinions of 120 staffs within of nine computer centers. The opinions results are summarized by the descriptive statistics as presented in Table 6 and create a measurement model of the success indicators of the operations of efficient for computer centers on figures 1.

3 Measurement Model

This research finding the variables of the success indicators of the operations of efficient for computer center has two main components; 1) input factor 2) output and eight sub domain components; 1) financial input factor perspective 2) customer input factor perspective 3) internal process input factor perspective 4) learning and development input factor perspective 5) financial output perspective 6) customer output perspective 7) internal process output perspective and 8) learning and development output perspective is given in Figures 1.

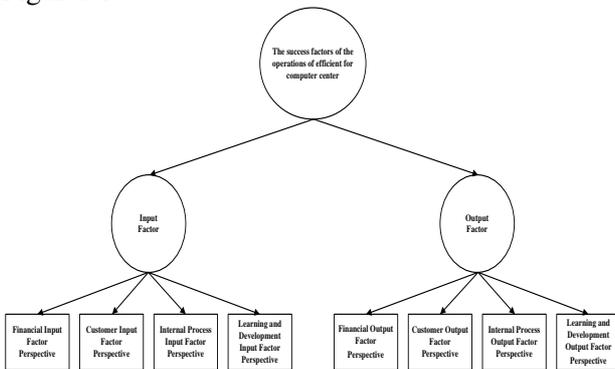


Figure 1. Measurement model of the success indicators of the operations of efficient for Computer Center

3.1 Input factor model

In this model, input factor will be measured as four sub domain components including financial, customer, internal process, and learning & development input factors perspective. Financial input factor perspective has two variables which are divide to personal and operation, meanwhile

customer input factor perspective comprise of three variables which are customer relationship, customer care and customer acquisition. Internal process input factor perspective has three variables which are divide to management, innovation and external environment, meanwhile learning and development input factor perspective include matters; human, organization and computer and information technology variables is given in Figures 2.

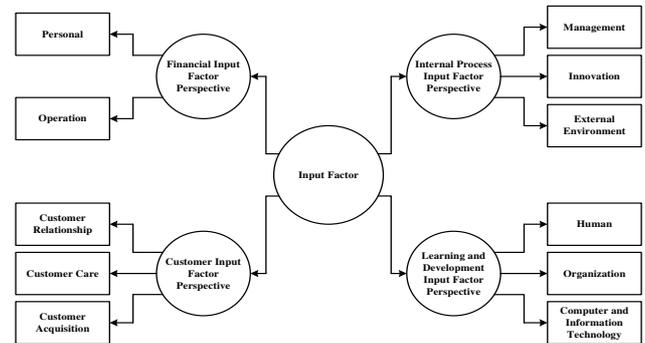


Figure 2. Input factor model

3.2 Output model

Output will be measured as four sub domain components including financial, customer, internal process, and learning & development output perspective. Each sub domain component also has variables of measurement as follows. Financial output perspective has two variables which are divide to personal cost and operation cost, meanwhile customer output perspective comprise of three variables which are customer satisfaction, customer need and new customers. Internal process output perspective has three variables which are dividing to management achievement, project/product/service, and external relationship, meanwhile learning and development output perspective include matters; human capital, organization capital and computer and information technology capital variables is given in Figures 3.

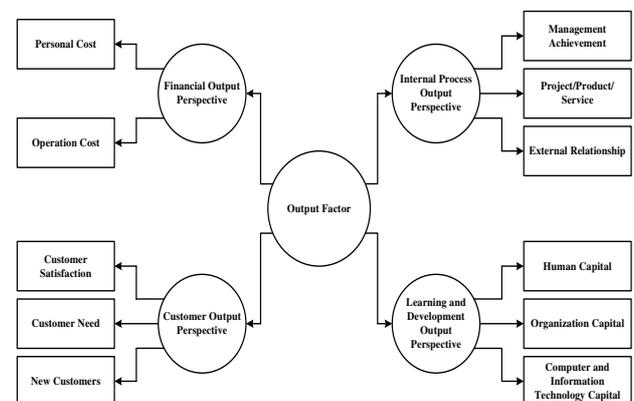


Figure 3. Output factor model

Table 7. Construct validity of the success indicators of the operations of efficient for IMOCC Model

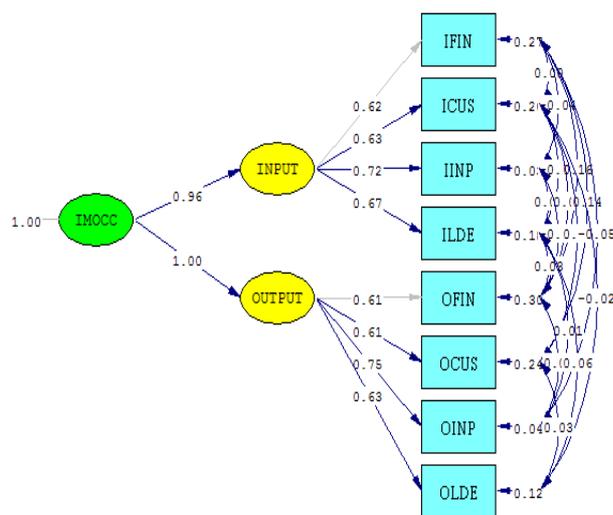
Indicator	Sub component of input				R2
	Factor loading	S.E.	t	Factor score	
IFIN	.619	<->	<->	2.579	.587
ICUS	.627	.068	9.277**	1.013	.660
IINP	.723	.071	10.219**	.636	.943
ILDE	.673	.078	8.612**	.512	.711
OFIN	.610	<->	<->	1.606	.553
OCUS	.612	.072	8.555**	1.765	.612
OINP	.752	.062	12.054**	2.766	.928
OLDE	.630	.065	9.661**	.489	.773

Sub component	IMOCC			R2
	Factor loading	S.E.	T	
INPUT	.959	.108	8.906**	.919
OUTPUT	1.000	.111	9.019**	1.000

$\chi^2 = .021$; $df = 3$; $P = .999$; $GFI = 1.00$
 $AGFI = 0.999$; $RMR = .000937$

** p < .01; <-> = constrained parameters

The model of the success indicators of the operations of efficient computer center was fit to the empirical data ($\chi^2 = .021$; $df = 3$; $P = .999$; $GFI = 1.00$; $AGFI = .999$; $RMR = .000937$). The indicator of the input factor sub-components leading to the weight of most factors loading is the internal process input factor indicator. By the way, the indicator of the output sub-components leading to the weight of most factors loading is the internal process output indicator. It was found that the factor loading of composite indicators of the success factors for the operations of efficient computer center in higher education institutions were output and input factor components, respectively as presented in Table 7 and Figures 4.



Chi-Square=0.02, df=3, P-value=0.99916, RMSEA=0.000

Figure 4. The Measurement Model of IMOCC

It can create scale elements of the success indicators of the operations of efficient for IMOCC in higher education institutions have the following equations as:

$$\text{INPUT} = 2.579(\text{IFIN}) + 1.013(\text{ICUS}) + .636(\text{IINP}) + .512(\text{ILDE})$$

$$\text{OUTPUT} = 1.606(\text{OFIN}) + 1.765(\text{OCUS}) + 2.766(\text{OINP}) + .489(\text{OLDE})$$

4 Empirical Application and Results

Average efficiency measures estimated by the stochastic frontier analysis equation are shown in Table 8. Results by four perspectives indicate that the average efficiencies of the operations from a low 55.20 percent in internal processes perspective. This result indicates that the efficiency of their operations of 90.50 percent in the overview as presented.

Table 8. Average stochastic frontier analysis efficiencies of the operations of CC

CC	Relatively efficient of the operations perspective (percent)				
	Fin.	Cus.	Int.	L&D	Over view
1	68.80	100.00	70.50	100.00	84.80
2	100.00	65.40	100.00	80.10	86.40
3	100.00	100.00	55.20	100.00	88.00
4	100.00	100.00	100.00	61.90	90.50
5	75.50	100.00	64.40	100.00	85.00
6	80.90	100.00	72.60	100.00	88.40

These results imply that the CC1, CC5 and CC6 need to increase their efficiencies in financial and internal processes perspective. The Org.2 needs to increase his efficient in customer perspective meanwhile The CC2 and CC4 need to increase their efficiencies in learning and development perspective.

The guidelines for optimizing the operations of efficient computer in higher education institutions were the approach to adjust input factors operation when operating at constant output [12] [13] and the approach to adjust output operation when input factor leading to stable operations [14] [15].

5 CONCLUSION

Many organizations feel they know what is most critical to the success of their organizations. However, it is only through the measurement of these vital indicators that they can accurately reflect their progress on an ongoing basis. The Balanced Scorecard is a powerful tool that enables any organization to pinpoint and track the vital few

variables that make or break performance. The framework enforces a discipline around strategy implementation by challenging executives to carefully translate their strategies into objectives, measures, targets, and initiatives in four balanced perspectives: Financial, Customer, Internal Processes, and Learning and Development. It focuses on the link between Input factor and Output factor. In evaluating the performance of the organization is considered essential in creating sustainable development that the IMOCC can be used to measure performance characteristics of the organization in four dimensions which covering both the inside, outside, the short and long term. Results from this study indicate that several indicators in this study have statistically significant impact on the efficiency measures.

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