# A Performance Evaluation of Information and Communication Technology Management Using Balanced Scorecard

[1]Ubonsin Poprom, [2]Choonhapong Thaiupathump and [3]Preang Kitratporn

[1,3]Project Office for Consortium on Doctor of Philosophy Programs
Phranakhon Rajabhat University
3 Jangwattana Rd. Bangkhen Bangkok, 10220 Thailand,
[1]Email: ubonsin@yahoo.com, [3]Email:preang@pnru.ac.th

[2]Faculty of Information Technology
Rangsit University
52/347 Muang-Ake, Phaholyothin Rd.
lak-Hok Pathumtani, Thailand 12000
Email:choonhapong@gmail.com

***Abstract***

*This research was conducted with two objectives; 1. to evaluate the effectiveness of Information and Communication Technology (ICT) management of Rajabhat universities in Thailand which based on Balanced Scorecard(BSC), and 2. to create Key Performance Indicators (KPIs) of ICT developing. This was to confirm that ICT could give an extreme benefit to the universities and stakeholders. In order to reach these objectives, qualitative and quantitative research methodologies were used. The researcher investigated on 41 Rajabhat universities in Thailand as a case study. The research results demonstrated that the ICT management of the universities was satisfactory and benefit students in high level. The proposed KPIs became much clearer. Moreover, these KPIs could be used as the prototype and could be applied to other organizations.*

Keywords: ICT Management, KPIs, BSC, Performance Evaluation.

## 1. Introduction

Since ICT was utilized in 41 Rajabhat universities for servicing students, staff and supporting in administrative work, providing ICT investment was rather higher than it should be, and seemed to be increasing in each year [1]. Nevertheless, the problems of these were its unworthy, improper use and not utilization. According to ICT, policy and strategies were not actually implemented. An evaluation and monitoring were not conducted in ICT management [2]. Balanced scorecard (BSC) is one of the management supporting tools, its implementation of strategy by means of measurement, which would create conformity within an organization and emphasize on the organization achievement [3]. BSC is a multi-dimension tool to specify the operation and strategic management in all levels by linking objectives, program, project or activities, evaluation and strategies of the organization together [4]. Financial and non financial are both important measurements in BSC. Nowadays, BSC is introduced to use for IT measurement and other management in various companies. The results of its measurements would be the

data and information that used for evaluation of ICT management [3], [6], [7], [8].

Because of the problems in using ICT were not suitable, and the expectation of ICT effective in planning and implementing are determined. Then, the researchers tried to look for an ICT strategic management which could implement strategies in actual operation. As to BSC principle, could be in conformity with the main strategy of the university by specify ICT proper roles and duties for the organization operation as to IT Maxim principle [9] by depending on ICT management evaluation to derived KPIs.

## 2. Related Research

The researchers have conducted a study on IT, ITM, and evaluating IT. The relevant researches as the followings:

### 2.1 Information and Communication Technology (ICT)

The modern management and the strategic establishment applied for ICT investment in this research related to the components of hardware, software, data, personnel and procedures. These were the main support in strategy of universities [10], [11].

### 2.2 Information and Communication Technology Management (ICTM)

In order to obtain strategies for ICTM, it had to focus on systematic planning, implementation plan and the actual operation. The strategic planning for ICT is also a mechanism of strategic management of ICT so that such a plan would be actually beneficial to the organizations [10], [12]. Therefore, the strategies of the universities together with the demand for ICT to support the main university strategies must be mainly considered.

### 2.3 IT Maxim

We know that creating business driven IT infrastructure involves a series of decision points based on a sound understanding of the firm's strategic context. This means to understand of the firm's strategic context. It is articulated and communicated through a series of business maxims. Business maxims lead to the Identification of IT maxims which express how information technology resources should be deployed and the way in which data and information needed to be accessed and used [9].

### 2.4 An Evaluation of Information and Communication Technology

In this meaning, the evaluation could be concluded as the process of interpreting the measurement's value for decision making of effective selection for the authorized [12]. Consequently, the evaluation developed here was the form of interpreting the value from the measurement on ICT management [8], which would be an evaluation for the four aspects such as 1.financial, 2.customers, 3.internal business process and 4.learning and growth of personnel in organization.

The benefits gained from the measurement would cause the evaluation on the ITM [13]. The evaluation on ICT is considered at the first step of strategic planning and the result from this would generate strategy creation. In the past, many researchers tried to search for various evaluation methods on ICT management. Especially, the economic-conceptualized evaluation [14], which did not give any importance point. These evaluation focus on not only the financial perspective but also the benefits gained from the resources [15]. The worthiness of ICT investment as a part of ICT management could be summarized as follows:

*1. Benefit*

The evaluation of ICT reward divided in both tangible and intangible benefits as considering the role of capacity by various researchers [8], [9], [16], [17], [18]. Also ICT by-product and actual benefit directly affected the organization operations [19].

*2. Cost*

The important point for considering on ICT investment was the cost reduction which extremely saved the cost in terms of suitable for organization operation [1], [20], [21], service providing [22] and good management [23]. The cost would correspond to the benefits for the society [24].

*3. Risk*

An evaluation on ICT investment might comprise of risk analysis [14], [16]. A good evaluation must give an importance to the risk management [13].

*4. Customer satisfaction*

ICT was used to create customer satisfaction and delight. It also attracted customer group or customized customers [14], [17].

**2.5 Balance Scorecard Principle**

Balance Scorecard (BSC) was a concept developed from "The Corporate Scorecard" or "The Balanced Scorecard" of Kaplan & Norton [3], [5], [6]. It is a tool leading to the strategic implementation by measurement which would create unity to the organization and lead to the organization achievement.

**2.6 Intangible Assets Monitor**

Intangible assets monitor was developed by Sveiby [25] and defines in three types of intangible, 1.value to market, 2. value discrepancy, and 3. attribute to individual competence of employee, internal structure and external structure. With the primary emphasis on people, this model was based on the premise that persons were the only true agents in business and all aspects of structure, internal and external, are embedded in human actions. Application of this model was very context-specific and the indicators were chosen as polar descriptors that were specific to the contextual purposes that might make sense differently across firm.

**2.7 KPIs**

KPIs were a tool or an index for assessment business process in all levels [2]. Moreover, KPIs of BSC were developed to evaluate of organization effort in four perspectives [26]. Development of KPIs under the BSC principles must be start considering the evaluation results of business process or management of organizations. Then, researchers determined of each objectives to align with four perspectives. Determination of KPIs aimed to know about the KPIs at both inputs and output level of the project [26].

**3. Research Methodology**

The research methodologies were both qualitative and quantitative. The population was 41 campuses of Rajabhat University in Thailand. The sample was divided into 4 groups as followed 1) Board of University who have duty and responsibility of ICT management, 2) Middle manager who control and manage ICT policies, 3) Group of person who concern of ICT operation and 4) students, who use ICT, as a customer. To collect the data, interviewing and observation were used for the sample used in group 1, and surveying by questionnaire is used in the sample groups 2, 3 and 4, respectively. Content analysis will be used to analyze the qualitative data. Also, descriptive

statistics would be used to analyze the quantitative data.

## 4. Preliminary Results

In the first trial of research, some of the Chief Information Officers (CIOs) in Rajabhat Universities was interviewed. Document was analyzed under BSC's analytical concepts. The preliminary results were found as the followings:

### 4.1 Financial Perspective

1. For the IT budget, CIO allocated of ICT with 66.67% was not appropriate and only 33.33% was appropriate.
2. The budget for ICT was not clearly defined. Also, the demand and contingency budget plan was not determined.
3. Most opinion of CIO confirmed that ICT investment was worthy.
4. In the case of determination on managing the ICT in universities, the earning income was very low.

### 4.2 Customer Perspective

1. Demand on ICT usage was still increasing.
2. Demand on advanced technology was existing.
3. Demand on network with high speed data transfer was still existing.

### 4.3 Internal Business Processes Perspective

1. Only 66.67% of ICT management in Rajabhat University has ICT master plan.
2. The university could actually implement only 52.5%.followed of the ICT master plan.
3. There was 83.33% of the executives that agreed with the development of e-university.
4. Problems and difficulties on developing ICT found that: they were lack of technical specialists, lack of consistent budget supported, the actual performance did not correspond to the ICT policy and teacher/staff did not adjust themselves improper used.

### 4.4 Learning and Growth Perspective

1. Lack of monitoring and evaluation to review ICT policy.
2. ICT users were not certain that they would gain any benefits or sustainable knowledge.
3. The university had not enough programs or projects to develop the quality of ICT human resource.

The next step of this research, surveying by questionnaire will ask for respondents in detail what ICT management from middle managers, employee and students in all 41 campus at Rajabhat University.

## 5. The Development of KPIs

The evaluation results of ICT management on universities based on BSC. Then, the KPIs of ICT management could be developed from the basis of four perspectives of the BSC as followed:

### 5.1 Financial Perspective

1. Budget allocated for ICT.
2. ICT budget allocated for human resource.
3. Expense for program or project implementation.
4. Actual expenses beyond the budget.
5. The worthiness of ICT investment.

### 5.2 Customer Perspective

1. Survey result of student's satisfaction.
2. Survey result of staff's satisfaction.
3. Availability of computer and accessories for office used as targeted student's claim.
4. Average service time of officer.
5. Average service time used of customer.
6. Quantity of customer's loyalty.

### 5.3 Internal Business Process Perspective

1. Speed of service.
2. Turnover rate of relevant staff.
3. Quantity of activities trained in each year.
4. Capacity level of service provided to students.
5. Customer care level of executive.
6. Document and information filing system.
7. Cooperation creation to develop the organization.
8. Brainstorm to review the ICT Master plan.
9. Quantity of inspection activities.
10. ICT master plan review.
11. Efficiency of staff after being trained.
12. Amount of computer ratio to students.
13. Amount of software/license per student in computer lab.

### 5.4 Learning and Growth Perspective

1. Quantity of service development in each year.
2. Duration of service period.
3. Realization on innovation for executive's growth and survival.
4. Numbers of suggestion and innovation creativeness.
5. Average work period of staff.
6. Turnover and new employment rate.
7. Training cost/total budget.

## 6. Conclusion

The result for the development of the proposed KPIs would be the information for strategic ICT development in universities. It would be suitable and corresponding to the main strategy of the universities. Moreover, it would be the most beneficial to relevant parties such as students could get have speedy and comfortable service from ICT equipment, university staff could use computer and accessories which were suitable to their work, lecturers could conveniently utilize ICT to support their teaching, ICT executives could supervise the operation as to the policy and suitable budget allocation for ICT initiative.

This research results would be the information for ICT relevant parties in Rajabhat universities. They could realize and have good point of view towards the existing ICT. It had known the roadmap for the strategic ICT management for Rajabhat universities. This would be a suitable ICT investment which benefit to the other institutions.

## References


[1] Teadudom, T. etc. (2004), "Study Project of Return of Investment IT's Government.. Bangkok: Thammasat University. (Final Report).

[2] DechaRin, P., (2004). *From Strategy to Action with Balanced Scorecard and Key Performance Indicators*. (12th). Bangkok: Chulalongkorn University.

[3] Kaplan, R.S. & Norton, D.P. (2000), Strategy-*Focused Organization.* Harvard Business School Press.

[4] Mesutta, A. & Satchukorn, S. (2004) *Performance Appraisal*. Bangkok: Technology Promotion Association (Thailand-Japan).

[5] Kaplan, R.S. & Norton, D.P. (1996), *Balance Scorecard***.** Boston, Massachusetts: Harvard Business School Press.

[6] Kaplan, R.S. & Norton, D.P. (1996), *Translating strategy into action the balanced scorecard*. Boston, Massachusetts: Harvard Business school Press.

[7] Keyes, J., (2005) *Implementing the IT balanced scorecard: aligning IT with corporate Strategy*. U.S.A: Taylor & Francis Group.

[8] Chang, H.& Shaw, M. J. (2004), "Evaluating the Economic Impacts at IT-Enable Supply Chain Collaboration," In the *Eighth Pacific Asia Conference on Information System (PACIS 2004*) 8-14 July, Shanghai, China**,** 524 – 537.

[9] Broadbent, M. & Weill, P. (1996), "Management by maxim: Creating Business driven Information Technology Infrastructures*," Sloan Management Review*, November.

[10] Tan, A. (2004), *IT Management: An Executive Summary*. (n.p.)

[11] Phuvan, Y. (1996), *Important Information Standard in Globalization.* Songserm Technology**,** June–July. 23, 141 145.

[12] Boar, B.H. (2001), *The Art of Strategic Planning for Information Technology*. (2 nd ed.). U.S.A: Wiley Computer Publishing.

[13] Kanungo, S., Wayal, A, & Jain, V. (2004), "Reaping Return on Information Technology Investment: An Empirical Study" In the *Eighth Pacific Asia Conference on Information System (PACIS 2004*) 8-14 July, Shanghai, China.

[14] Bui. T. (2005), "Economic Evaluation of Information and Information Technology," Paper presented at *the ninth Pacific Asia Conference on Information System (PACIS* 2005). Bangkok, Thailand

[15] Tappan, Y. (2541), Economic *aspects*. Bangkok: Thammasat University.

[16] Nationall Institutes of Health (NIH) (1998). "Cost-Benefit Analysis Guide for NIH IT Projects**.** Office of the Deputy Chief Information Officer on Cost/Benefit and Customer Satisfaction," *Information Systems Frontier*, 5(3), 265-277.

[17] Lu, J. (2003), "A Model for Evaluating E-Commerce Base on Cost/Benefit and Customer Satisfaction," *Information Systems Frontier*, 5(3), 265-277.

[18] Lee, H., Yu, J. & Kim, H.( 2004), "An Empirical Study on the Integrated Performance Model for the Effect of Information Technology Investment," In the *Eighth Pacific Asia Conference on Information System (PACIS 2004)* 8-14 July**.** Shanghai, China.

[19] Jain, V. & Kanungo, S. **(**2004), "Analyzing IS enabled Productivity Using Technology Acceptance Model," In t*he Eighth Pacific Asia Conference on Information System (PACIS 2004).*

[20] The National Office for the Information Economy (NOIE) (2003). *E-Government Benefits Study*. Australia..

[21] United States General Accounting Office (GAO) (1998). "Measuring performance and demonstrating results of information technology investments," GAO*/AIMD-98-89 IT Performance. Measurement Guide.*

[22] Kim, J., Kim, K., Song, B., Rhee, D., Bae, K. & Choi, J. (2004), "*Technologies and Frameworks of e-Government Service"*. In the *Eighth Pacific Asia Conference on Information System (PACIS 2004)* 8-14 July, Shanghai, China. pp. 2072-2078.

[23] Beimborn, D., Fladung, R. B. & Koenig, W.(2004) "An Optimization Framework for Efficient Information Supply in the Academic Sector". In the *Eighth Pacific Asia Conference on Information System (PACIS 2004)* 8-14 July, Shanghai, China. pp. 778 – 792.

[24] Rachlin, S & Marshall, J. (2002), *Value Measuring Methodology*. Washington, DC.