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Abstract: The purposes of this research were to evaluate Information and Communication Technology (ICT) management of public universities in Thailand using balance scorecard (BSC) and to develop key performance indicators (KPIs) of ICT in order to develop new ICT strategic model. This proposed model provide some guidelines to improve Investment and worthwhile ICT management and to conform with strategies of universities. The research methodology were both qualitative and quantitative research. The findings of this research showed how universities have been developed ICT as strategic management and the efficiency of ICT management. Further more, the specific KPIs have been created to measure and follow up the use of ICT. Then, the proposed ICT strategic model could apply to other public organization.

Keywords: ICT strategic model; KPIs; BSC.

I. Introduction

Since, all 41 campuses of Rajabhat University have been used ICT to service students and employee and to support administration. The amount of spent on investment of ICT is quite high and keep on increasing with time[1]. The usability of ICT equipment is not suitable, break even and used not extremely benefit[2]. Because of management is not suitable, policies and strategies of ICT can not be executed in reality. Moreover, Evaluation and monitoring of ICT management were proceed. The balanced scorecard (BSC) soon be came a tool for managing strategy[3]. Strategic Implementations were using measurement to align their business units, shared service units, team and individuals around overall organizational goal[4]. The BSC emphasize that financial and non-financial measures[5]. It has been implemented in companies to both measure as well as manage the IT effort[3], [4], [5], [6]. BSC has many dimension for execution decision and to mange all level of

strategies. It combines objective, planning, initiatives an measures with organization strategies[7]. Measure results would be data for evaluation of ICT management[8]. Because of problems to use ICT is not suitable and to execute strategic ICT effort. Researchers have studied to find suitable methods for ICT management. It also use BSC principles to create strategy by emphasis Implementation. The ICT strategy align with strategic themes of university. It set the role of ICT suitable business base on IT Maxim[9]. The result of this evaluation of ICT management developed key performance indicators (KPIs) and ICT strategic model for Rajabhat Universities.

II. Related Research

The researchers have conduct a study on information technology management, information technology evaluation and relevant researches, used for the concepts and theories related to this research, as follows:

II. 1 An Information and Communication Technology Management

In order to obtain strategies for information and communicationadministration strategic administration is an administration on systematic planning and plan implementation and the actual operation as to the set plan, the strategic planning for information and communication technology is also a mechanism of strategic administration for information and communication technology so that such plan would be actually beneficial to the organization. Therefore, the strategies of the university together with the demand for information and communication technology to be sued to create or to support the main university strategies must be mainly considered.

II. 2 IT Maxim

Creating business driven IT infrastructure involves a series of decision points based on a sound understanding of the firm's strategic context. This understanding of the firm's strategic context. This understanding 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 information and data needs to be accessed and used [9].

II. 3 The evaluation of Information and Communication Technology management.

The benefits gained from the measurement would cause the evaluation on the IT administration [10]. The evaluation on ICT is considered the first step of strategic planning and the result from the evaluation would generate strategy creation[13]. In the past, many people tried to search for various evaluations on ICT administration, especially the economic-conceptualized evaluation [12], which did not give an importance only to the financial aspect but the evaluation on the utmost benefits gained from the resources [13]. The worthiness of ICT investment as a part of ICT administration can be mainly concluded as follows:

1. Benefit
   The evaluation of ICT reward divides tangible benefits and intangible benefits by considering the role of ICT [9], ICT capacity [5], ICT by-product and actual benefit affecting the organization operation[15],[16].
2. Cost
   In the past ICT use in organization increased. The important point for considering ICT investment is the cost reduction which extremely saves the cost [2] in terms of suitable ICT investment for organization operation, service providing and good management. The cost would correspond to the benefits for the society or the organization.
3. Risk
   The risk in the evaluation comprises the evaluation of ICT investment risk before the investment [14] by analyzing the possible risk [12]. A good evaluation must give an importance to the risk management [12].
4. Customer satisfaction
   IT is used to create customer satisfaction to attract customer g roup [12], [15].

II. 4 Balance Scorecard Principle

Balance Scorecard (BSC) is a concept developed from "The Corporate Scorecard" or the Balanced Scorecard" of Kaplan & Norton[5],[6].It is a tool leading to the strategic Implementation by measurement which would create unity to the organization and lead to organization achievement[3],[4],[5],[6]. Researchers use BCS base on 4 perspectives which are financial, customer internal business process and learning and growth to evaluate ICT management. Moreover develop a suitable model for ICT management for Rajabhat Universities by emphasis on reality .

III. Research Methodology

The research methodology were both qualitative and quantitative research. The population are 41 campuses of Rajabhat University. The sampling group into 4 groups follow 1) Board of University who have duty and responsibility of ICT management, 2) Middle manager who control and manage ICT policies to proceed, 3) Group of person who concern with ICT and 4)Students. The data collecting use interview and observation for the sampling group 1 and questionnaire for the sampling group 2,3 and 4. The data analysis use content analysis and interview for qualitative data and analyze questionnaire for quantitative data. The researchers use Delphi technique analysis from professionals to analyze accordance of opinion about developmental strategic model.

IV. Preliminary Results

From the interview with the chief Information Officer(CIO) in Rajabhat Universities and from the analysis on the document contents, the preliminary data of the research under the BSC is as follows:

IV. 1 Financial Perspective: It Was Found That:

1. For the budget allocated for ICT, 66.67% was not appropriate and only 33.33% was appropriate.
2. The budget for ICT was not clearly defined but up to demand and emergency.
3. Most CIO see that ICT investment is worthy.
4. The ICT administration for earning income to the university was very low.

IV. 2 Customer Perspective : It Was Found That:

1. Demand on ICT usage increased.
2. Demand on advanced technology existed.
3. Demand on network with hi-speed data transfer existed.

IV. 3 Internal Business Processes Perspective : It Was Found That:

1. Only 66.67% of ICT administration with ICT master plan was found
2. The university could actually implement only 52.5%.of the master ICT plan.
3. ICT development as to the master plan was very low 16.67%.
4. 83.33% of the executives agreed with the development of e-university.
5. Problems and difficulties found: Lack of technical specialists, lack of consistent budget support, the actual performance did not correspond to ICT policy and Teacher/Staff did not adjust themselves   Improper use.

IV. 4 Learning and Growth Perspective : It Was Found That:

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 part of questionnaire survey asked respondents to detail what ICT management from middle managers, employee and students all 41 campus at Rajabhat University.

V. Proposed ICT strategic model

Kaplan & Norton,[4][5][6] suggest BSC that aims to balance the traditional perspective of accounting for intangibles by adding four perspectives related to: innovation and learning business process improvement, customer relationship, and , value creation in financial and intangible terms. In contrast to other tools, this proposed model provides an integrated focus on both management and measurement systems for management with focus on financial and non-financial indicators relevant to organizational performance. Broadbent & Weill[9],proposes the ICT used to align with business. The ICT strategy align with strategic themes of universities[3]. It set the role of ICT suitable business IT Maxim[9]. The proposed conceptual model is detailed in this paper for consideration when ICT investments is worthwhile and suitable. It is divided into six hierarchical levels of ICT management ; strategic themes, ICT for Rajabhat University, an evaluation of ICT management , KPIs, ICT strategic map and Implementation.

V. 1 Strategic Themes :

The framework begins with consideration of the Rajabhat university wide strategic context, synergies Amongst business units and the extant to which the firm wishes to exploit those synergies. Strategic themes are derived from the strategic context and identify the future concern of the Rajabhat Universities as whole.

V. 2 Identifying ICT RU :

The ICT RU (Information and Communication Technology for Rajabhat University) are statements which how ICT needs to support main missions of university. The ICT RU express the way in which information and data to be accessed and used. In addition, what technology resources need to be deployed to ensure adequate technical capabilities, integration and standards. The expectations for ICT investment are classified in terms of the balance between short term cost with minimum investment level and future options and flexibility which might require an over investment based on current need.

V.3 An Evaluation of ICT Management Using BSC:

An evaluation methods that are very popular and used widely at the present. This method does not consider only results of goal achievement but also considers linking about vision, mission, and content strategies. The BSC provides executives with a comprehensive framework that translates the university's vision and strategy into a coherent determination of performance measures.

V. 4 KPIs.

Key Performance Indicators are evaluation result of ICT Management base on four perspective of BSC.

V. 5 ICT Strategic Map

BSC can be used within the ICT department to assess its own performance as well as to integrate itself to organization as a whole[3]. There are a variety of approaches to implementing on ICT scorecard.

V. 6 Implementation

This is the implement part of proposed ICT strategic model. Since, it can proof that if this model is suitable in practices.

VI. Conclusion

From the CIO' opinions, it was found that ICT investment was fairly worthy. From the management's opinions, it was found that the policy of the master plan did not correspond to the actual operation. The master plan could create knowledge learning process to the operations at a level and the operations could obtain knowledge on ICT use. Moreover, it was found that related parties as staff and student were satisfied, at a level, to gain or use ICT service. From the staffs' and students' opinions, it was found that ICT was beneficial to them. They were satisfied at a level and learned how to use ICT. They also need the operation which could make the service or the use to be extremely corresponding to the demand. An evaluate result of ICT management could be develop key performance indicators KPIs). The alignment between technology and the organizational processes using the balance scorecard methodology requires a redefinition of ICT management and can provide some guideline to improve Investment. This paper has sought to emphasize the importance of a structured evaluation framework to evaluate ICT management. The BSC approach was chosen as the template for this model due to its success in wide spectrum of organizations. The model is in this paper with ICT performance perspectives and indicators developed specifically for ICT management.

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