DEVELOPMENT OF THE RESEARCH UNIVERSITY'S RESEARCH PERFORMANCE INDICATORS BY APPLYING BALANCED SCORECARD TECHNIQUE

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Abstract: This research aimed to develop the university's research performance indicators by applying the balanced scorecard technique (BSC). Factors related to research works were determined and categorized according to the perspectives of BSC. The suitability was examined by senior experts. The Index of Item Objective Congruence (IOC) was analyzed and then variables with an IOC of 0.5 or higher were chosen for devising the questionnaire. The sample group comprises research university's associate professors and professors. According to Exploratory Factor Analysis, components consisting of three variables or more with a factor loading of 0.5 or higher were chosen for Confirmatory Factor Analysis. The weight of the indicators in the perspectives of BSC were identified.

It can be concluded that there are 45 indicators in total. They are categorized under the following perspectives: customers/stakeholder (weight 32%, 13 indicators), learning and growth (weight 29%, 8 indicators), internal process (weight 34.2%, 20 indicators) and finance (weight 4.8%, 4 components).

Keywords: Balanced Scorecard Technique, Item Objective Congruence, Research Performance Indicators

Background and Significance of the Study

One can say that the organizational management toward sustainable development and growth while remaining competitive requires continual performance assessment in order to learn about the organizational status and its strengths and weaknesses. The assessment results can thus be used in developing the organization and maintaining its competitiveness. In this regard, appropriate indicators that suit the context, roles, missions and objectives of the organization are required accordingly. The balanced scorecard technique proposed by Kaplan and Norton (1996) is one technique developed for organizational performance assessment.

Assessment under this technique covers four dimensions: patron or customer, internal process, learning and growth of personnel/organization, and finance. In addition, balances between dimensions are included, namely: 1) the balance between financial and non-financial indicators, 2) the balance between the objectives and indicators reflecting the organization's internal and external factors, 3) the balance between long-term and short-term indicators, and 4) the balance between lead and lag indicators. This also reflects the objectives as well as the connection and rational interrelation of all indicators (Pasu Decharin: 2001, 36-37).

Although in principle the balanced scorecard technique consists of four perspectives, they are flexible. That is to say, that the number of such perspectives depends on the philosophy and foundation of individual organizations (Pasu Decharin, 2001: 46-47).

Apart from being used in assessing the business organization's performance, the balanced scorecard technique can also be applied to government and non-profit organizations as well as with the educational institutes' performance assessment. For example, the key performance indicators for State Institutions of Higher Education developed by the Office of Public Sector Development Commission (OPDC) require State Institutions of Higher Education to be assessed under the Public Service Agreement (PSA). They are divided into four dimensions: performance, quality, efficiency and institutional development (State Institutions of Higher Education Manual for Performance Assessment under Public Service Agreement (PSA), Fiscal Year 2008:3).

Furthermore, King Prajadhipok's Institute has monitored, examined and assessed its annual performance on the basis of a performance assessment according to the Institute's strategic plans. This assessment is divided into four perspectives: customer satisfaction, finance and budget, management and innovation and learning. The assessment is carried out according to the key indicators specified in the strategic plans in pursuance of each perspective and the Institute's critical issues. In this regard, the performance assessment under the four perspectives of the balanced scorecard technique is made at the institutional level and main-mission level and the

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Institute's performance is then rated. Meanwhile, the factor loading is considered based on the significance of each perspective.

The balanced scorecard technique has been used in several universities (such as Suranaree University of Technology, Walailak University and Prince of Songkla University, etc.) for university performance assessment. However, most of these have been based on all missions as a whole. In particular, when considering the research-related mission alone, only five-six indicators have been found which is insufficient to clearly reflect and represent the research works.

According to the research of Pongpatcharin Putwattana (2002, D), "although the policy and goals of most universities are toward becoming research universities, they still lack efficient research work management. Most research papers are based on foreign knowledge rather than the production of original ones. There are few quality researchers. The papers are more disciplinary in nature than collaborative. They are not integrated. There is also little multi-disciplinary research. Therefore, the papers cannot truly meet the users' needs…" It can thus be said that the research performance indicators fail to cover all the characteristics of research works.

The goal at the end of the Second 15-Year Long-Range Plan on Higher Education of Thailand (2008-2022) in 2022 is "to enhance the quality of Thailand's higher education for producing and developing qualified personnel who are able to adopt themselves to the works throughout their life; to increase the potentials of higher education in generating the knowledge and in promoting country's competitiveness in the globalized world; and to support the sustainable development of Thailand's local community using good governance mechanisms, finance, standard control and higher education network on the basis of academic freedom, diversity and systematic unity" (the Second 15-Year Long-Range Plan on Higher Education of Thailand (2008-2022), the Office of the Higher Education Commission 2007).

As higher education is expected to be a crucial mechanism in competitiveness promotion, the important path for higher education development toward enhancing country's competitiveness is that the research works should become the focal point of higher education institutes along with the creation of excellence mechanisms and the university's research performance assessment system. Hence, comprehensive and suitable indicators of research capability and quality are indispensable for research universities in order to enhance Thai universities' quality in parallel with world-leading universities. Nonetheless, one important question is what elements should be incorporated into the

university's indicators of research missions for reflecting the research university's true research capability.

Objectives
1. To develop the research university's research performance indicators by applying the balanced scorecard technique
2. To analyze the weight of each indicator in each component and in each perspective of the balanced scorecard technique

Research Procedure
The research **"Development of the Research University's Research Performance Indicators by Applying Balanced Scorecard Technique"** is based on descriptive research methodology. The research procedure was as follows:

1. Use of content analysis for analyzing the key essence of strategies, objectives and characteristics of research proceedings and the research university's performance assessment – this was based on the examination of relevant documents and interviews with university administrators. The documents used in such regard were:

1.1 Articles, essays, research papers, analytical papers and textbooks pertinent to the performance assessment, organizational competency development of the Office of Public Sector Development Commission (OPDC), organizational performance assessment, balanced scorecard techniques, application of balanced scorecard techniques in the performance assessment and indicator development, etc.

1.2 Strategic plans, tactics for research performance development in nine universities, retrieval of data related to the research works, articles, annual reports, research quality assurance and components and indicators of research performance in domestic and international higher educational institutes.

2. Analysis of factors related to the pursuit of research works by the research university.

2.1 Determining the factors in each perspective by analyzing and synthesizing the objectives of performance development strategies, action plans and research performance of the research university and the variables related to each objective; the key objectives affecting the research performance were identified.

2.2 The suitability of the determined variables was verified by senior experts through the checklist developed by the author. The results were then analyzed to find the Index of Item Objective Congruence (IOC). Suitable variables were those with IOC of .05 or higher.

3. Analysis of empirical data to determine the components-indicators and factor loading of the components and indicators of the research university's

research performance according to the perspectives of the balanced scorecard technique as follows:

3.1 Developing the questionnaire on the current situation of higher education institutes in the pursuit of research works – this comprised both five-rating-scale questionnaire and open-ended questions. The validity was examined by the senior experts, while the reliability analysis was based on Coefficient Alpha's Cronbach – the reliability value was 0.961.

3.2 The questionnaire was distributed to the sample group of university lecturers of academic ranking not less than 'associate professor' from three faculties: human and social science (68 lecturers), science and technology (149 lecturers) and health science (181 lecturers). The questionnaire was submitted and returned through the postal service.

3.3 The data from the questionnaire was analyzed by means of Exploratory Factor Analysis (EFA) and 10 components and 56 variables were found initially. The components consisting of 3 variables or more with a factor loading of 0.5 or higher were chosen for Confirmatory Factor Analysis (CFA). This was to reaffirm the components and variables related to the research university's pursuit of research works. The weights of the indicators in the component level and perspectives of the balanced scorecard technique were also identified.

4. Taking all the analyzed variables as indicators and complete details.

Research results

There are 45 research performance indicators, being categorized under the four perspectives of the balanced scorecard technique, as follows:

1. Internal Process Perspective: weight 34.2% with 20 indicators

Budgetary System and Research Support Component: weight 10.2% with 8 indicators

1. System for supporting/aiding lecturers/ researchers with respect to the publication of papers in the international arena: weight 1.3%
2. System and mechanism for supporting the publication of papers in the impact-factor international journal: weight 1.3%
3. Support for lecturers/ researchers in attending national and international conference: weight 1.3%
4. Provision of the opportunity for lecturers/ researchers to produce international-level works: weight 1.3%
5. Enhancement of lecturers'/researchers' motivation to produce research papers: weight 1.3%

6. Availability of systems and mechanisms in supporting research works within the university: weight 1.3%
7. Research support in terms of unit research, excellence center: weight 1.2%
8. Development of research proposal writing skills of lecturers/researchers: weight 1.2%

Strategies and Targets of University-level Research Component: weight 12% with 6 indicators

1. Goal setting toward the creation of and taking the leading role in research and innovations in at specialized area at national and international level: weight 2.2%
2. Universities' goal setting for strengthening the research works: weight 2.4%
3. Percentage of lecturers/researchers being informed about the strategies, goals and action plans of the university's research works: weight 2.1%
4. University's goals toward becoming a world-ranking research university: weight 1.6%
5. Strategy and research plan setting toward the excellence at the international level: weight 2.2%
6. Level of concurrence the research works of lecturers/researchers with the university's research strategies and plans: weight 1.5%

Environment and Facilities Component: weight 12% with 6 indicators

1. Research information system for the pursuit of works and plan making by the personnel/ administrators: weight 2%
2. Provision of retrievable research data sources: weight 1.8%
3. Rules/requirements facilitating the research works: weight 2.1%
4. Twenty-four-hour access to the research laboratory by lecturers/researchers: weight 1.8%
5. Availability of research tools and equipment: weight 2%
6. Atmosphere and environment facilitating the pursuit of works, learning and research toward the academic excellence: weight 2.3%

2. Customer/Stakeholder Perspective: weight 32% with 13 indicators

2.1 Students and Personnel in the Universities: weight 11% with 6 indicators

Graduate School and Publication Component: weight 11% with 6 indicators

1. Percentage of lecturers/researchers whose papers are published in an impact-factor international journal: weight 2%
2. Percentage of lecturers/researchers whose papers are published in peer-reviewed journals and international-database journals: weight 2%
3. Percentage of Ph.D. Graduates whose works are published in an international journal: weight 1.6%
4. Percentage of Master Degree graduates whose works are published in an international journal: weight 1.8%
5. Arrangement of Post-Doctoral Fellow System by the university: weight 1.9%
6. Percentage of lecturers having postgraduates as the research assistants: weight 1.7%

2.2 Community/Country: weight 21% with 7 indicators

Intellectual Property Component: weight 11% with 2 indicators

1. System for promoting and facilitating intellectual property registration: weight 5.6%
2. System for monitoring and protecting intellectual property: weight 5.4%

Research Utilization Component: weight 10% with 5 indicators

1. Utilization of university's research works in public terms: weight 2.4%
2. Utilization of university's research works for the local / communal / national development: weight 2%
3. Utilization of university's research works in commercial terms/business solution: weight 2.2%
4. Utilization of university's research works in the instruction: weight 1.4%
5. University's research-related knowledge management system: weight 2%

3. Learning & Growth Perspective: weight 29% with 8 indicators

Personnel Development Component: weight 15% with 3 indicators

1. University's requirement for all lecturers/ researchers to produce research work yearly: weight 3.2%
2. System for building and enhancing the research skills and ethics of the personnel: weight 6%
3. Enhancement of the skills of lecturers/ researchers in producing research papers for international publications: weight 5.8%

Collaborative Network Development and Pursuit of Research in Collaboration with the Network Component: weight 14% with 5 indicators

1. Network building and collaboration with domestic public and private sectors for technological transfer purposes: weight 2.8%
2. Pursuit of research in collaboration with domestic public and private sectors: weight 2.7%
3. Network building and collaboration with international educational institutes and/or research institutes for technological transfer purposes: weight 3%
4. Pursuit of research in collaboration with international educational institutes and/or research institutes: weight 2.7%
5. Promotion and building of networks for research collaboration with both domestic and international agencies: weight 2.8%

4. Financial Perspective: weight 4.8% with 4 indicators
Budgetary System and Research Support Component: weight 4.8% with 4 indicators

1. Availability of research funding: weight 1.1%
2. Research grant for lecturers/new researchers: weight 1.2%
3. Seeking of research supports from both domestic and international sources: weight 1.3%
4. Consideration in light of allotment of university's research fund: weight 1.2%

Discussion

According to the results of factor analysis and discriminant indicators of the balanced scorecard technique, at total of 45 indicators are categorized as follows: 20 indicators of internal process, 13 indicators of customers/stakeholders, 8 indicators of learning and growth and 4 indicators of finance. In spite of the outnumbering of the analyzed indicators over those being used by nine Thai research universities where the educational assurance system is in use (the highest number of the main indicators of research used in each university is 20), the developed indicators cover the research procedure and are actually within the range of use. Furthermore, the two perspectives with the highest factor loadings are the 'internal process' (weight 34.2%) and the 'customers/stakeholders' (weight 32%). Meanwhile, the total weight of the remaining perspectives is 35.8%. Nonetheless, the perspective of 'finance' has only 4 indicators (weight 4.8%). Thus, it can be said that the 'internal process' and the 'customers/ stakeholders' are the important perspectives for the research performance assessment of Thai research universities and conform to the university's characteristic of being a non-profit organization.

When considering the indicators of customers/stakeholders, the indicators can reflect the achievements of important targets of the development of a national research university under the Second 15-Year Long-Range Plan on Higher Education of Thailand (2008-2022). In this regard, two aspects of the policy of the government are met: (1) excellence development and (2) provision of solutions for the country. Therefore, to maximize the utilization of those indicators, the indicators of customers/stakeholders are categorized into two sub-perspectives: (1) students and personnel in the university with 6 indicators (weight 11%), (2) communities/ countries with 7 indicators (weight 21%). Such categorization is made to suit the characteristics of the university's missions. This conforms to the notion poised by Pasu Decharin (2001) that no matter how many perspectives are categorized under the balanced scorecard technique, those perspectives indeed depend on the organization's philosophy and its important foundations.

Recommendations

1. In this research, the indicators were developed based on theoretical frameworks and statistical methods. Hence, for better quality and suitability of indicators', their trial in Thai research universities should be pursued in order to identify the data required for the improvement of the assessment process and the details of indicators.

2. The agencies responsible for the quality/standard of research work in Thai-research Universities should take into account the use of developed indicators in monitoring and supporting the universities to pursue research works that conform to international standard.

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