

Performance Measurement in ITG Based on Balanced Scorecard

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ABSTRACT

The article reports on our work in conducting performance measurement for the management of Information Technology (IT) by applying the Balanced Scorecard (BSC) at Mulawarman University, Samarinda, East Kalimantan, Indonesia. The results of this study are then used to propose a hybrid framework that applies both BSC and a artificial intelligence (AI) techniques in order to measure the performance of IT governance generally. This article also examines BSC's abilities and its flexibility compared to other methods in measuring the performance of IT governance. The proposed hybrid framework is expected to yield a management that produces a scorecard measures that are more rigorous, accurate and consistent with the objectives and organizational strategies in non-profit organizations, especially educational ones.

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1. INTRODUCTION

Measuring performance is a fundamental and very important issue of any organizations [1-3]. Performance measurement is used to ensure the program has achieved the expected goals. Therefore, performance measurement is performed in order to ensure that all resources have been utilized effectively and efficiently in a sustainable manner. This is in line with [4] which underlines that performance measurement is a cumulative measure of all the resources, processes and mechanisms in a sustainable manner.

The IT Governance Institute (ITGI) confirms that the measurement of performance in IT management is conducted in order to track the achievement of the company's IT-related services and solutions to meet external requirements specified. ITGI also points out that without specifying and monitoring performance measures focus on IT, the governance will not achieve the desired results [3].

Meanwhile, according to [5, 6] performance measurement is a track and monitor strategy implementation, project completion, resource usage, process performance and service. Performance measurement is conducted and intended to determine the initial position (*as-is*) of the IT organization, then becomes an input for management to make improvements to a higher level (*to-be*). Therefore, decisions taken by management should be focused more on the utilization of IT in the organizations. In other words, IT goals and objectives should be associated with corporate goals [7, 8].

The purpose of this paper is to explore the implementation of BSC related to IT performance measurement. This is divided into two parts; (1) Types of application of BSC in non-profit organizations, and (2) the benefits and features that need to be considered in the application of BSC in providing the understanding of performance measurement in the management of IT.

2. RESEARCH METHOD

2.1. Performance Measurement

One of the important factors in the field of IT governance is the IT performance measurement [6]. This field is essential in order to assess the performance of IT management in an organization. This also confirms that each organization is required to implement a method of measurement to assess the performance of its Information Technology management. The performance measurement is carried out in order to control the activities that support the objectives and strategies of the organization [1, 9].

Performance measurement within an organization has a key driver perspective. This ensures that the performance measurement can be accomplished in line with the objectives of the organizational strategies. Therefore, to ensure the performance measurement activities are in an unbiased state, focused and measurable, an activity must have something that we can focus which are measurable. The focus in IT performance measurement process consists of five perspectives, namely (1) the performance of the process, (2) the financial performance, (3) the health organization, (4) the customer satisfaction, and (5) the learning process [2, 7, 9].

According to ITGI, the application of IT can be said to be successful, if the activity of the management can be monitored. This means that the performance measurement of the IT management should be part of the management's agenda. Furthermore, in order to achieve the measurement results in accordance with the objectives and strategies, ITGI recommends that more detailed performance measures should be placed in order to support a few key elements such as [3]:

1. Alignment - monitor the strategic direction of IT and IT and business alignment.
2. Value Delivery - to assess whether the IT organization /business is providing business value of IT and assess ROI.
3. Risk Management - Monitoring whether those risks have been identified and managed, and measure the costs and benefits of risk management investment.
4. Resource Management - Measures the effectiveness of the source and use of IT resources, aggregate funding of IT at the enterprise level, and measurement of IT capabilities and infrastructure compared to the current business and future expected requirements.

Information System Audit and Control Association (ISACA) emphasizes that an effective performance measurement depends on two key aspects addressed: (1) a clear definition of performance goals, and (2) establishment of effective metrics to monitor the achievement of goals. The performance measurement process is also needed to ensure that performance is consistently and reliably monitored [5].

In the last decade, based on a literature, there are a few methods exist that can be used to assist the performance measurement of IT management. Among them are the Balanced Scorecard (BSC), the performance prism, the performance measurement matrix and the SMART pyramid. In principle, the multidimensional performance measure is used in particular to balance some of the financial and non-financial factors [9].

One of the performance measurement tools discussed in this article is the BSC. BSC is used as a performance measurement tool that is very effective in achieving the alignment of the organization activities and the objectives and strategies of the organization [10, 11]. In relation to IT governance, the Control Objective for Information and Related Technology (COBIT) framework is also adopting the BSC as a performance measurement method which is expressed by the IT Balanced Scorecard [12, 13]. This shows clearly that the development of IT Balanced Scorecard is inspired by the BSC method, which was introduced in 1992 by Robert S. Kaplan and David P. Norton. The following section will explain the BSC measurement model and its application in non-profit organizations.

2.2. Balanced Scorecard

As part of an organization, board members should ensure that reports received from the management should be measured. Measurable and targeted reporting may be done by applying the BSC. The BSC is a strategic management system that is able to translate the vision and mission of an organization into objectives and measurable items for the operational strategies. Therefore, the application of the BSC is more defined as a contribution to the company, user orientation, operational excellence and future orientation [14-16].

A performance measurement which is well defined will affect the performance and behavior of individuals within the organization. This corresponds to the BSC since it was introduced that had a mission to perform precise measurements of performance with each perspective [17]. Further, it has revealed that the model of performance measurement in the BSC is not only based on a financial perspective but also a non-financial perspective that needs attention to be measured. Nevertheless, this performance measure will also have impacts on the financial perspective [10, 11, 18, 19].

In general, the BSC has a domain of performance measurement in the non-financial and financial perspectives. More certainly, the domain is categorized into four inter-related perspective which contains (1) the customer perspective, (2) internal business perspective, (3) innovation and learning perspective, and (4) the financial perspective as a form of statement of objectives and measures for the operational strategies an organization [11, 15, 18].

A brief description of each perspective in the BSC framework shown above is as follows: (1) a financial perspective (the tangible results of the strategy of using traditional financial terms, such as economic value added, revenue growth, cost, profit margin, cash flow, net operating income; a perspective for answer important questions from the shareholders), (2) the perspective of the customer (value proposition to adopt a business organization to satisfy customer needs; with perspective to answer the important question of the customer), (3) internal business perspective (internal business processes that create and give the customer value proposition; with perspective to answer the important questions a company owned area of expertise), and (4) Learning & Growth perspective (an intangible asset of an organization refers to the internal capability and capacity needed to support value-creating internal processes; with the perspective to answer the important questions the sustainability of organization and create).

The BSC also integrates the organization objectives with the strategic set performance measurements based on the four perspectives into the *cause-effect* in Figure 1. This explains the *cause-effect* relationships among the perspectives. The output resulting from the application of the BSC method is a reference to measurable performance assessment scorecard scheme in which this scorecard is usually a clue to the company's scorecard on the achievement of targets that have been implemented [15, 17, 20].

Table 1. Four perspective of BSC [17]

Perspective	Key Question
Financial	To succeed financially, how should we appear to our stakeholders?
Customer	To achieve our vision, how should we appear to our customers?
Process	To satisfy our customers and shareholders, at what business processes must we excel?
Learning and Growth	To achieve our vision, how will we sustain our ability to change and improve?

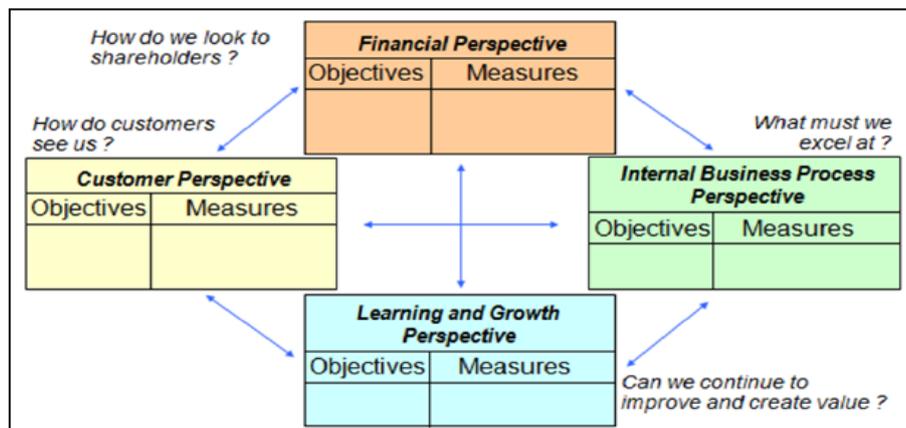


Figure 1. The cause-effect mechanisms of BSC [17]

2.2. The implementation of BSC in the Non-Profit Organizations

The BSC performance measurement methods have begun to be used by busy non-profit organizations. Even though, the BSC was initially introduced in the profit organizations, but the initiator of this method declares that the BSC is flexible to be applied in various types of organizations [10, 17]. In addition to that, researchers confirm that the BSC can be used as a performance measurement tool to determine the intangible assets and focus on the major issues that are important to modern business organizations. BSC also has the flexibility in solving problems [18, 21, 22]. Several studies have been conducted in the organizations of non-profit in Table 2. The researchers suggested the use of BSC can also assist organizations in conducting performance measurement.

Table 2. Previous research using BSC in profit and non-profit organizations

Researcher(s)	Findings
Grigoroudis, et al., 2012	Evaluating and revising the strategy of a hospital in Evros, Greece.
Zhonghua & Ye, 2012	Exploring the inspiration of performance measurement in public sector in China.
Mendes, Santos, Perna, & Teixeira, 2012	Applying BSC in public service management at the Urban Hygiene and Solid Waste Division.
El-Jardali, Saleh, Ataya, & Jarnal, 2011	Developing and implementing a sustainable indicator of performance appraisal at the national hospital in Lebanon.
Gauld et al., 2011	Developing a scorecard in the health sector in New Zealand to emulate the model CWF (The Commonwealth Fund) scorecard of America.
Wu, Lin, & Chang, 2011	Evaluating the performance of the three universities in the city of Taoyuan, Taiwan.
Bentes, Carneiro, Silva, & Kimura, 2011	Measuring performance of Brazilian Telecom Company.
Borousan, Hojabri, Manafi, & Hooman, 2011	Evaluating the performance of health care.
Asosheh, Nalchigar, & Jamporzamey, 2010	Determination of election winning bidder IT projects in Ministry of Science, Research and Technology, Iran.
Tohidi, et al., 2010	Strategic planning in schools in Iran.
Tseng, 2010	Evaluating performance of a private university of science and technology in Taiwan.

3. RESULTS AND DISCUSSION

3.1. Model Design Implementation of Balanced Scorecard

The BSC can be applied in the context of general management [4]. This article will provide a design in the context of implementing performance measurement of IT management. The case study in the selected of non-profit educational organization is at Mulawarman University, Samarinda, East Kalimantan, Indonesia.

In addition to the successful implementation of the BSC, there are some stages need to be conducted for improvements of organization goals and strategies. These stages are activities as follows [10, 13, 15, 17, 20, 22]:

1. Discussing the issues clearly, in the management of IT and applying the concept of BSC.
2. Identifying goals, strategies, and analyzing the management of IT to be translated into the four BSC perspectives.
3. Integrating the goals and strategies through *cause-effect* mechanisms to explain the relationships among the BSC perspectives.

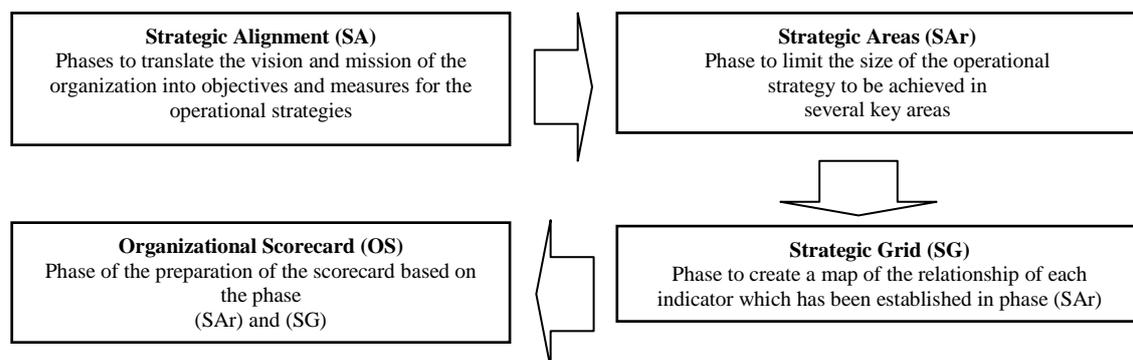


Figure 2. Design scheme of the implementation of the BSC at Mulawarman University

In implementing the BSC to measure performance, the stages of predetermined measurement activities should be done well. This is to affirm that the principle of performance measurement in the BSC that must meet the criteria can be quantified, easily understood and can be effectively and efficiently measured. This article provides the design stages of implementation of the BSC method at University Mulawarman as illustrated in the Figure 2.

The design details of each phase as follows:

1. Phase of Strategy Alignment (SA)

"Phase to translate the vision and mission into objectives and measures of operational strategy".

This phase requires the organization to define the business department where a scorecard will be applied.

Vision: towards a world class university

Mission: providing IT services in the entire academic community

Purpose: to measure the performance of IT management in support of the vision and mission of the organization.

Strategy: provide an understanding of the BSC as a method of performance measurement tools to IT department.

2. Phase of Strategy Areas (SAr)

"Phase to limit the size of the operational strategy to be achieved in several key areas". The following phase is to translate the goals and strategies in more details of the SA phase. SAr is grouped according to the four phases in the BSC perspectives.

Perspective of academic community: to provide the needs of IT in teaching and learning, research and operational activities for students, lecturers/researchers and administrative staffs.

Perspective of internal business: to provide ease of access to IT in the university environment.

Perspective of financial: to provide ease of use of finance in supporting IT activities.

Perspective of learning and growth: to deliver services to managing IT resources.

3. Phase of Strategy Grid (SG)

"Phase to create a map of the relationship of each indicator, which has been established in phase (SAr)". This phase is designed to measure the involvement of each of the indicators in each perspective. In this case, an ability to assess the relationship (*cause-effect*) of each indicator thoroughly, carefully and consistently is needed.

The existence of frameworks such as COBIT, provides an ease of sign for each indicator set for attention to DCO-detail control objectives to be assessed [23]. Furthermore, this stage is also used to set KPIs (*Key Performance Indicators*) of each indicator for evaluation of perspective.

Some studies employ a combination of performance measurements such as using the AI techniques and others. The combination of these measurement methods are applied to obtain detailed relationship between the indicators in each perspective so that the produced output could be much better and more focused [10, 15, 17, 20, 22, 24].

4. Phase of Organizational Scorecard (OS)

"Scorecard preparation phase is based on the phase (SAr) and (SG)".

In this phase, a set of scorecards will be formed and structured. The results of these format and structure will be presented to top management and labor departments. Furthermore, these scorecards will be reviewed, discussed and followed up at regular intervals within a specific period.

3.2. Benefits and Features Need to be Considered in the Application of the BSC

The benefits of the BSC implementation are certainly related to the excess factors. Researchers recognize that the BSC presents a logical structure framework of each division/unit/department that may initiate an active organization to determine its performance. It is also asserted, that the BSC is more valuable than the traditional performance measurement [10, 15, 17, 20, 22, 24], such as: (1) the BSC performance measurement model does not only take into account the particular perspective (financial) but also considers the other perspective (non-financial) so that it is more comprehensive and balanced, and (2) Model with the BSC performance measurement can help organizations to be more focused in achieving the organizational goals. To achieve these, managers are able to more concentrate on reaching an agreement only on measurements of the critical aspects of organizational strategy.

Although there are some advantages of using the traditional measurements, the performance measurement using BSC will also assist organization in the determination of strategies to achieve measurable targets with more efficient and effective. It is claimed that the factors of precision, accuracy and suitability in calculating the expectations of the performance measurement results are the features that should be taken into account. Therefore, based on the literature review, it is possible to propose a hybrid framework in which it combines the BSC method with other methods in measuring the performance. This is in line with [17] which assert that the BSC has the flexibility to be combined with other methods especially in the calculation of the indicator factor in order to obtain optimal results.

4. CONCLUSIONS

The current implementation of the performance measurement model based on BSC conducted at the University Mulawarman, Samarinda, East Kalimantan, Indonesia is still at early stage of IT management performance measurement models. The next stage will deal with actions to explore and connect, and count accurately, carefully and consistently every indicator. These indicators will be obtained in the next phase called the strategic areas (SAr) and the strategic grid (SG) phases in order to get a new performance measurement model in scorecard organizational phase (OS).

Grembergen and Kaplan & Norton also confirm that a clear and transparent measurement is the core of successful implementation of the BSC concept. It is expected that future research will further examine thoroughly, carefully and consistently the proportion of each indicator relations that exist within each perspective with the BSC combined with AI techniques for the calculation. Therefore, it will contribute to the domain of IT management-related performance measurement in non-profit organizations particularly at university or tertiary education [13, 15-17].

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