

Performance Measurement in Service and Consultant Company with Balanced Scorecard-AHP

Belia Afifah¹

Syakia Muflihat²

¹Industrial Engineering, Islamic University of Indonesia, Indonesia

²Industrial Engineering, Hasanuddin University, Indonesia

¹Author's correspondence: beliaafifah96@gmail.com

Abstract. PT XYZ is a services and consulting firm that wants to measure the company's overall performance. Currently, the company only measures financial aspects and cannot describe the company's overall performance. It was conducted to measure the company's performance by identifying key metrics from three perspectives: financial, customer, internal processes, and learning and growth. Underpinned by the Analytical Hierarchy Process weighting system, the Objective Matrix, and the Traffic Light System rating system, the company's performance achieved an overall index score of 9.15. Of a total of 30 KPIs, 10 are yellow KPIs, which means the company's performance is in line with realistic goals, and the remaining 20 are green KPIs. It shows that the company's overall performance is in line with company goals. The 30 KPIs consist of 4 KPIs for financial, 8 KPIs for customer, 12 KPIs for business internal process, and 6 KPIs for learning and growth.

Keywords: Analytical Hierarchy Process; Balanced Scorecard; Objective Matrix; Traffic Light System.

Abstrak. PT XYZ merupakan perusahaan yang bergerak di bidang jasa training dan konsultan, menginginkan pengukuran kinerja secara menyeluruh pada perusahaannya. Untuk saat ini perusahaan hanya menerapkan pengukuran pada aspek keuangan, hal tersebut belum menggambarkan performansi perusahaan secara keseluruhan. Penelitian ini dilakukan untuk mengukur kinerja dengan mengidentifikasi indikator penting dalam perspektif Balanced Scorecard, yaitu keuangan, pelanggan, proses bisnis internal, dan pertumbuhan serta pembelajaran. Dengan didukung oleh sistem pembobotan Analytical Hierarchy Process dan scoring system pada Objective Matrix dan Traffic Light System, perusahaan mendapat nilai total indeks sebesar 9,15 yaitu dari total 30 KPIs terdapat 10 KPIs berwarna kuning, artinya kinerja perusahaan telah sesuai target realistis yang diinginkan, dan sisanya 20 KPIs berwarna hijau yang berarti pencapaian KPIs tersebut mampu melewati target yang ditetapkan perusahaan, serta tidak ada indikator berwarna merah yang menunjukkan kinerja perusahaan rendah. Ada pun 30 KPIs yang teridentifikasi terdiri atas 4 KPIs keuangan, 8 KPIs pelanggan, 12 KPIs proses bisnis internal, and 6 KPIs pembelajaran dan pertumbuhan.

Kata kunci: *Analytical Hierarchy Process; Balanced Scorecard; Objective Matrix; Traffic Light System.*

Article Info:

Received: October 2, 2022

Accepted: October 22, 2022

Available online: June 30, 2024

DOI: <http://dx.doi.org/10.30588/jmp.v13i2.1228>

BACKGROUND

Global competition encourages the companies to make improvements in the company's management system. Companies must understand the management system in accordance with the demands of the business environment to develop the business properly. Companies need to know the success level of each strategy and every vision and mission that has been implemented by measuring the company's performance. Company's performance measurement can be a benchmark to improve company's performance through activities that are in accordance with the company's strategy and vision and mission. Each organization has a different definition of success and appropriate performance management varies based on different visions and strategies of business to business (Kopia, Kompalla, Buchmüller, & Heinemann, 2017).

Previous research has discussed about performance measurement tools such as The European Foundation for Quality Management (EFQM), Balanced Scorecard (BSC), Business Excellence Model, Performance Measurement Matrix, Performance Pyramid, Performance Prism, and Kanji Business Excellence Management System (KBEMS) (Okfalisa, Anugrah, Anggraini, Absor, & Fauzi, 2018). Among all these tools, BSC and EFQM are the foremost as often as possible talked about and utilized strategies in performance management systems. These models provide a organized approach in recognizing the conceivable methodology changes and threats. In expansion, they are able of interpreting the corporate procedure into targets which lead to a more point by point and reasonable activity arrange. Organizations can utilize those models to clarify objectives, set vital objectives and communicate the chosen techniques.

BSC has been used by many organizations, profit and non-profit. BSC has the control to layout the clarity, collaboration, and consistency of vision, mission and organizational technique from corporate to the person level. The checking assessment handle of each technique can be controlled intermittently and are adaptable against any changes and advancements that happen. Amid the Integration of the execution estimation handle, the cross-platform communications are well set up. This in a round about way triggers the arrangement of information creation and securing between level administration on-screen characters, However, a few shortcomings were found, especially those related to the scorecard assurance prepare and its examination estimation (Striteska M & Spickova M, 2012). Estimation is frequently created based on manager's sees as individual in charge when deciding the scorecard number, hence the importance, subjectivity, and point by point examination are predisposition. AHP is one of the strategies that's presented in this inquire about to overcome the shortcoming of scorecard estimation in BSC. AHP strategy has the advantage of permitting assessors to capture both subjective and objective measures of organizational quality assessment (Okfalisa, Anugrah, Anggraini, Absor, & Fauzi, 2018).

AHP is a method that combines the qualitative and quantitative assessment method so it can overcome the shortcoming of a single qualitative or quantitative assessment method [4]. Previous studies used this concept such as Perez et al., (2017). They integrated AHP and BSC framework for sustainable business in a software factory in the financial sector. Dekrita et al., (2018) used BSC and AHP as a tool for determining the priority program strategy that need to be implemented at a hospital performance measurement. Okfalisa et al., (2018) designing a BSC dashboard model by integrating it with AHP and Objective Matrix (OMAX) for performance measurement.

PT. XYZ is training and consulting services company since 2013. The company has done a lot of consulting and training for various companies, both from government agencies and State-Owned Enterprises (BUMN). The development and growth of the service industry makes PT. XYZ requires performance measurement to measure the strategy or target of the company has been achieved of all the company's strategies that has been determined. Currently, performance measurement at PT. XYZ is limited to the financial perspective and unable to provide a complete picture of the company's performance. Therefore, a company performance measurement method is needed that can measure company performance comprehensively. The BSC extends into linking employee rewards to performance in all four areas, with suitable weightings applied to reflect the relative significance of each KPI's range.

In a few instances, company see the non-financial measures of such significance that a threshold level of performances is set for each KPI of the non-financials. As it were in case an individual surpasses these threshold levels, can they qualify for performance related rewards connected to the financial performance result? This approach clearly demonstrates to employees the level of significance the organization places on future capability building and vital issues, whereas at the same time recognizing shorter-term financial performances (Chavan M, 2009). The literature review also shows that researchers have created the BSC framework in different industries and companies such as environmental education, fuel distribution industry, cooperatives, small businesses (Kefe, 2019). This method aims at decoding the complex processes of decision-making, enabling a better monitoring and evaluation of the strategy (De Andrade Guerra, et al., 2018).

BSC's primary concern is to connect business strategy with the company's operational activities. This is done using indicators that show both the level of implementation of the strategies adopted by the organization and the relationship between operational activities and corporate objectives (Tubis & Werbińska-Wojciechowska, 2017). To Support Balanced Scorecard (BSC) as a performance appraisal method can be combined with Analytical Hierarchy Process (AHP) method. The while AHP in this research is enable for determining important KPIs in measuring company performance and summarizes the expert opinion on the four objects from BSC. The KPI will be used as a performance measurement parameter so that the company can consider corrective steps against poor performance. The application of OMAX and Traffic Light System in this research amplifies the completeness and precision of calculation leveling and scoring of execution estimation. The root cause examination of this model ended up the bases for proposing the suggestion towards any changes and exercises that happened. Therefore, it can be used for evaluation and monitoring to control any accomplishments during the procedure execution (Okfalisa, Anugrah, Anggraini, Absor, & Fauzi, 2018).

THEORETICAL REVIEW

Performance management is described as a system to improving the performance of the company by improving individual or department performances (Kefe, 2019). This method explains how to know the extent to which the company has succeeded in achieving its objectives through a predetermined strategy (Sardjono, Selviyanti, & Perdana, 2019). The intent was to allow management to see real-time performance managers make operational adjustments faster, more effectively, and ultimately improve effectiveness of strategy execution and overall financial performance (Alex & Tabesh, 2022). Whereas, performance measurement is the process of determining how well business activities are being carried out to achieve strategic objectives, eliminate waste and provide timely information to carry out continuous improvement (Supriyono, 2019). Furthermore, the purpose of company's performance measurement is to motivate employees to achieve organizational goals and in order to provide desired actions and results (Hanuma & Kiswara, 2011).

In the previous decades, Balanced scorecard (BSC) has been adopted by many forms of organization. BSC can be defined as a framework that helps top management select a set of measures that provide a cohesive view of the organization by mapping a list of measurable items to four different perspectives such as financial, customer, internal business process and learning and development (Juiz, Ricardo, & Gómez, 2018). Thus, BSC has the power to outline the clarity and consistency of organizational strategy from corporate to individual level (Okfalisa, Anugrah, Anggraini, Absor, & Fauzi, 2018). In addition, the scorecard requires service supply chain managers to maintain balanced attention to all four dimensions and permeate the financial dimension, which is directly affected by the other three, with the criteria of environmental, energy and social efficiency (Nouri, Shafiei, & Olfat, 2019). The balanced scorecard is used to balance the efforts of executives to financial and non-financial performance. To measure executive performance in the future, a comprehensive measure is needed that includes 4 perspectives, namely financial perspective, customer perspective, internal business process perspective and learning and growth. With a BSC, top management and owner have now a more acceptable common language to discuss issues in and implement strategies (Dekrita, Yunus, Citta, & Yamin, 2018).

Analytical Hierarchy Process (AHP) is a method of making decisions on complex problems by simplifying the problem into a hierarchical structure. The main tool of the AHP process is a functional hierarchy with the main input is human perception, the viewpoint is that humans are the main input. Hierarchy is defined as a representation of complex problems into a multilevel structure consisting of goal level, factor level, criteria level, sub-criteria level to the last level which is the alternative level (Saaty, 1999). Thus, it necessary for a management system to be able to monitor performance. It takes a framework that integrates BSC and AHP, a decision-making tool used to prioritize multiple performance perspectives on BSC that help achieve company's goals (Pérez, Montequín, Fernández, & Balsera, 2017). Some performance measurement studies lack critical analysis for prioritization of performance indicators, therefor in their research also developed method in integrated framework using BSC and AHP for humatarian organizations's performance evaluation (Anjomshoe, Hassan, Kunz, Wong, & de Leeuw, 2019).

There are several methods that can be used in measuring company performance. Cahyawati et al. (2013) analyze hospital performance measurement using the performance prism method supported by the Analytical Hierarchy Process (AHP) as a weighting system and Objective Matrix (OMAX) as well as a traffic light system. The research resulted in 99 KPIs, consisting of 17 aspects of investors, 35 aspects of customers, 16 aspects of employees, 15 aspects of suppliers and 16 aspects of government and society. The same method was applied by Adianto et al., (2014) for cement companies that provide 16 KPIs according to expectations, 19 KPIs that still have adequate performance but need attention and 5 KPIs whose performance is very low. Study by Abdurrachman et al. (2022) did research on financial aspect only. Measures performances conducted by analyzing company's financial statements and comparing them with the results obtained in the previous period. A total of 13 KPIs consisting of two major parts, explicitly profit margin and operating asset turn over. Different authors documented that an increasing number of organisations recognise the importance of sustainability dimensions, which should be integrated into strategies and management models, and the need for assessing performance along the economic, environmental and social dimensions through a systematic and balanced process (Silvestre & Fonseca, 2020).

Another study using BSC can conduct the pretesting procedure to examine whether there is no ambiguity with the wording and phrasing of the questions and to ensure that the respondents entirely understand the items in the questionnaire. The result shown the scale contains 27 indicators under three general factors of corporate social responsibility, namely, social, environmental and economic dimensions (Asiaei & Bontis, 2019). Another study combining SWOT analysis and BSC through the ANP for analyzing a company from an internal and external perspective in order to generate strategies for the firm. Instance research by Quezada et al. (2019) was implemented SWOT analysis and BSC in a company that belongs to the food industry. After the application, managers were asked about the method and the implementation process. They found that the method was useful, but time consuming. Regarding the Finances Perspective, the most important objective is to "Increase sales" and it is also doing well. However, The SWOT analysis showed that the most important factors were the threat "Restriction for some company products that are not considered healthy" and the opportunity "Tendency to consume health products". Thus, in this study we measure the performance of PT. XYZ by developing the BCS method and combining it with AHP, OMAX and Traffic light systems to obtain complex and comprehensive measurements of all aspects of the BSC.

RESEARCH METHODS

Considering that the study used the BSC method, it takes a lot of exploration using a qualitative approach, which is considered suitable for this study. Data collection is primarily based on primary data collected through semi-structured interviews with experts and company representatives, including top management and owners. This study combines AHP and BSC to assess company performance. Combining the AHP and BSC methodologies is also a step towards understanding your company's key performance indicators (Seungbun, Brownlee, Yongjae, & Soonhwan, 2017) and developing reliable measurement tools for your company's business continuity (Okfalisa, Anugrah, Anggraini, Absor, & Fauzi, 2018). More details about the research framework can be seen in Figure 1.

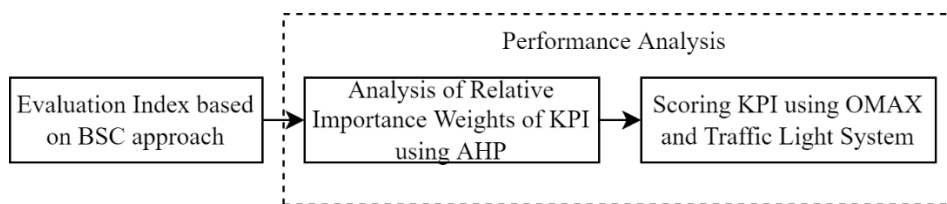


Figure 1. Framework of The Research

The first step is (1) designing a company performance measurement system based on the Balanced Scorecard. After obtaining the important indicators related to the four BSC perspectives, the next step is to (2) weight each criterion in the form of BSC's perspectives with the AHP to ensure that the previously designed indicators are aligned with the company context. The weight calculation is based on a pairwise comparison matrix between BSC criteria as shown in Table 1. This matrix uses a preference scale. The advantage of this scale setting is that it uses a scale of 1 to 9, so there is some variability in the scores. Information about the scale can be seen in Table 2. In addition, weight measurement is also carried out between sub-criteria in the form of pre-determined important indicators in BSC's perspectives. The indicator of sub-criteria matrix is also built based on the same principle as the previous pairwise comparison criteria matrix. After the data consistency has been checked with AHP, the next step is (3) a scoring system using OMAX and a traffic light system. The OMAX method helps create a measurement performance record sheet that includes data targets, achievement of each key performance indicator, and determination of optimism for each indicator. In addition, a target matrix (OMAX) and traffic light system are also used to determine the level of each of the company's key performance indicators.

Table 1. Pairwise Comparison Matrix of BSC's Perspectives

Perspective	Value	Perspective
Financial	9 7 8 7 6 5 4 3 2 1 2 3 4 5 6 7 8 9	Customer
Financial	9 7 8 7 6 5 4 3 2 1 2 3 4 5 6 7 8 9	Internal Process
Financial	9 7 8 7 6 5 4 3 2 1 2 3 4 5 6 7 8 9	Learning and Growth
Customer	9 7 8 7 6 5 4 3 2 1 2 3 4 5 6 7 8 9	Internal Process
Customer	9 7 8 7 6 5 4 3 2 1 2 3 4 5 6 7 8 9	Learning and Growth
Business Internal Process	9 7 8 7 6 5 4 3 2 1 2 3 4 5 6 7 8 9	Learning and Growth

Table 2. Pairwise Comparison Scale

Scale	Degree of preference
1	Equal importance
3	Moderate importance of one factor over another
5	Strong or essential importance
7	Very strong importance
9	Extreme importance
2,4,6,8	Reflecting dominance of second alternative compared with the first

RESULTS AND DISCUSSIONS

This research was conducted in Yogyakarta, Indonesia by interviewing employees, top management and owners of a service and consultant company. Interviews were conducted to obtain what indicators are considered important to be a benchmark for company performance based on the BSC's perspectives. This research combines BSC with AHP as well as an assessment system using OMAX and Traffic Light System to find out whether the company's performance has reached the realistic target expected by the owner of the company.

Table 3. Scoring Perspective and KPIs

Perspective	KPIs	Weight using AHP
Financial	F1 Net Profit Margin (NPM)	0,034
	F2 Return On Asset (ROA)	0,014
	F3 Return On Equity (ROE)	0,009
	F4 Revenue Growth Rate	0,121
Customer	C1 Customer satisfaction with training facilities	0,037
	C2 Customer satisfaction with training materials	0,056
	C3 Number of customer prospects per month	0,048
	C4 Percentage of complaints served	0,076
	C5 Percentage of feedback/suggestions given	0,021
	C6 Percentage of Total Road Training per month	0,090
	C7 Percentage of checking completeness of training needs	0,017
	C8 Growth in the number of potential customers	0,035
Business Internal Process	IP1 Employee attendance percentage	0,034
	IP2 Internal audit	0,014
	IP3 Paying salary on time	0,009
	IP4 Procurement of office equipment and supplies	0,121
	IP5 Manage the planning and completeness of training needs	0,015
	IP6 Average number of incoming training prospects	0,068
	IP7 Percentage of employee complaints served	0,034
	IP8 Ensure the place and time of training	0,017
	IP9 Percentage of accuracy of order specifications	0,005
	IP10 On time training	0,019
	IP11 Increase in Website Traffic	0,005
	IP12 Average training deal	0,013
Learning and growth	LG1 Number of training for employees	0,045
	LG2 Number of evaluation meetings	0,024
	LG3 Owner's investment amount	0,089
	LG4 Community complaints	0,061
	LG5 Maintain a positive image in society	0,075
	LG6 Number of social activities	0,060

Designing a Measurement System Based on Balanced Scorecard

At this stage, key performance indicators are obtained based on four BSC perspectives, namely Financial (F), Customer (C), Internal Process (IP) and Learning and Growth (LG). After conducting observations and interviews with top management and owners, KPIs were obtained for each BSC perspective. Details of these indicators are listed in the column “KPI” in Table 3.

KPI weighting using AHP

AHP has a stage of decomposition that solves the problem in a more concrete form, a comparison stage compares two factors of relative importance. At this stage, the researcher used an open-ended questionnaire and a preference scale of 1 to 9 to classify each indicator into groups based on four BSC’s perspectives. Using AHP we weighted each indicator in terms of BSC and the results are shown in Table 3.

Table 4. Measurement Performance Record Sheet Financial Perspective

Category	KPIs	Source	Unit	Target	Performance	Optimistic value	Pessimistic value
Pelanggan	F1 Net Profit Margin (NPM)	(Abdurrachman, Givan, Amalia, & Riesmiyantiningtias, 2022)	%	25	26	30	20
	F2 Return On Asset (ROA)	(Abdurrachman, Givan, Amalia, & Riesmiyantiningtias, 2022)	%	10	11	15	7
	F3 Return On Equity (ROE)	(Abdurrachman, Givan, Amalia, & Riesmiyantiningtias, 2022)	%	30	36	35	25
	F4 Revenue Growth Rate	Discussion with the company	%	10	62	30	10

Table 5. Scoring system from a financial perspective using OMAX

KPI	F1	F2	F3	F4
Performance	26	11	36	62
10	30	15	35	30
9	29,2857	14,2857	34,28571	27,14286
8	28,5714	13,5714	33,57143	24,28571
7	27,8571	12,8571	32,85714	21,42857
6	27,1429	12,1429	32,14286	18,57143
5	26,4286	11,4286	31,42857	15,71429
4	25,7143	10,7143	30,71429	12,85714
3	25	10	30	10
2	23,3333	9	28,33333	10
1	21,6667	8	26,66667	10
0	20	7	25	10
level (score)	4	4	10	10
bobot (weight)	0,034267564	0,014248006	0,009354411	0,12071377
Value (level*bobot)	0,137070258	0,056992025	0,093544106	1,207137696

Scoring System using OMAX and Traffic Light System Method

In this stage, OMAX was used to create measurement performance record sheet. First, columns for target and performance were created with optimistic and pessimistic values that were discussed with senior management, as shown in Table 4. The value of the data is then calculated by multiplying the weight by the level obtained. After obtaining the achievement score, then the value of each KPI is calculated by multiplying the weight and score. The value of each of these KPIs will be calculated in total so that the company's performance index value is obtained. An overview of the scoring system using OMAX and Traffic Light System can be seen in Table 5.

Traffic Light System divides achievement levels into three parts. The first sections of levels 1 to 2 are marked red, the second sections of levels 3 to 7 are marked in yellow, and the third sections of levels 8 to 7 are marked in green. The value of the multiplication of scores and weights for all KPIs can be seen in Table 6.

Table 6. Index Value of KPIs

Code	Value	Level	Kategori
F1	0,13	4	Yellow
F2	0,05	4	Yellow
F3	0,09	10	Green
F4	1,20	10	Green
C1	0,10	3	Yellow
C2	0,10	3	Yellow
C3	0,40	10	Green
C4	0,70	10	Green
C5	0,06	3	Yellow
C6	0,80	10	Green
C7	0,17	10	Green
C8	0,30	10	Green
IP1	0,10	3	Yellow
IP2	0,10	10	Green
IP3	0,09	10	Green
IP4	1,20	10	Green
IP5	0,10	10	Green
IP6	0,20	4	Yellow
IP7	0,30	10	Green
IP8	0,06	4	Yellow
IP9	0,04	8	Green
IP10	0,10	10	Green
IP11	0,05	10	Green
IP12	0,04	3	Yellow
LG1	0,40	10	Green
LG2	0,20	10	Green
LG3	0,80	10	Green
LG4	0,10	3	Yellow
LG5	0,70	10	Green
LG6	0,50	10	Green
9,15			

The results of scoring using OMAX in each BSC perspective obtained a total index value of 9.15 and by using the traffic light system, it can be seen that the company's overall performance is in green or above the expected performance.

CONCLUSIONS AND RECOMMENDATIONS

After the KPI scores were analyzed using the Traffic Light System, there were no red indicators with a total index of 9.15, meaning that the company's overall performance was in line with the company's expectations. In total there are 30 KPIs consisting of 4 KPIs of financial, 8 KPIs of customer, 12 KPIs of internal process, and 6 KPIs of learning and growth. Based on the graph in Fig. 2 10 KPIs are marked yellow, meaning that the company's performance is in accordance with the realistic targets set, and the remaining 20 KPIs are marked green, meaning that the achievement of these KPIs is not only on target but has exceeded the targets set by the company. The results show that the company has the initiative to improve the company's performance and is expected to maintain it by not stopping to do performance evaluations.

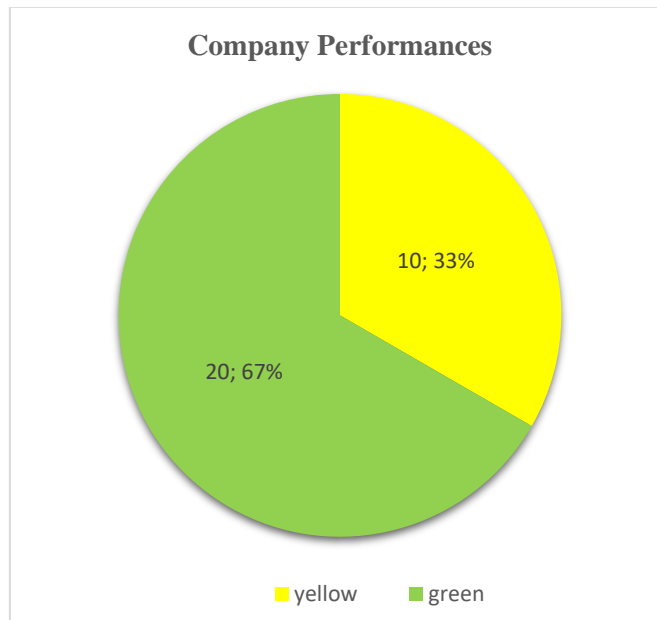


Figure 2. Company Performances Graph

This study mainly suffers from some methodological limitations. For instance, this research was only conducted in one case study in a consulting service firm. For future research, it is expected that the proposed framework in this study can be improved by integrating the strategy maps and BSCs with AHPs from different field. BSC and AHP will allow us to assess the impact that each KPIs included in the BSC has on the different objectives defined in the strategy map of the company. Furthermore, the use of methods such AHP can avoids the uncertainty and the ambiguity associated with human preferences.

REFERENCES

- Abdurrachman, Givan, B., Amalia, R., & Riesmiyantiningtias, N. (2022). Implementation of the Balanced Scorecard as a measuring tool for company performance. *Intl Journal of Educational Research & Social Sciences*.
- Adianto, Saryatmo, M. A., & Gunawan, A. S. (2014). Analisa Pengukuran Kinerja dengan Menggunakan Metode Performance Prism dan Scoring Objective Matrix (OMAX) pada PT. BPAS. *Sinergi*, 61-70. Diambil kembali dari <http://publikasi.mercubuana.ac.id/index.php/sinergi>
- Alex, T., & Tabesh, P. (2022). Thirty years with the balanced scorecard: What we have learned. *Business Horizon*. doi:<https://doi.org/10.1016/j.bushor.2022.03.005>
- Anjomshoae, A., Hassan, A., Kunz, N., Wong, K., & de Leeuw, S. (2019). Toward a dynamic balanced scorecard model for humanitarian relief organization's performance management. *J. Humanit. Logist. Supply Chain Manage.* 7 (2), 194-218.
- Asiaei, K., & Bontis, N. (2019). Using a balanced scorecard to manage corporate social responsibility. *Knowl Process Manag.*, 1-9. doi:10.1002/kpm.1616
- Cahyawati, A. N., Pratikno, & Soenoko, R. (2013). Analisis Pengukuran Kinerja Rumah Sakit dengan Menggunakan Metode Performance Prism. *JEMIS*, 1-7.
- Chavan M. (2009). Performance management: a framework for management control systems research. *Management Accounting Research*, 10, 363-383.
- De Andrade Guerra, J., Garcia, J., de Andrade Lima, M., Barbosa, S., Heerdt, M., & Berchin, I. (2018). A proposal of a balanced scorecard for an environmental education program at universities. *Journal of Cleaner Production*, 172, 167-1690.
- Dekrita, Y. A., Yunus, R., Citta, A. B., & Yamin, M. (2018). Integration of Balanced Scorecard and Analytical Hierarchy Process as a Tool for Determining the Priority of the Program Strategy: Case Study in Dr.Tc.Hillers Maumere Hospital. *3rd International Conference on Accounting, Management and Economics 2018*. Indonesia: Atlantis Press.
- Hanuma, S., & Kiswara, E. (2011). Analisis Balance Scorecard Sebagai Alat Pengukur Kinerja Perusahaan (Studi Kasus Pada PT. Astra Honda Motor). *Jurnal Akuntansi*, 1-24.
- Juiz, C., Ricardo, C.-P., & Gómez, B. (2018). Cascading ISO/IEC 38500 based Balanced Score Cards to improve board accountability. *Procedia Computer Science* 138 (hal. 417-424). Elsevier Ltd. doi:10.1016/j.procs.2018.10.059
- Kefe, I. (2019). The Determinan of Performance Measures by Using a Balanced Scorecard Framework. *Foundations of Management*, 11(1), 43-56. doi:10.2478/fman-2019-0004
- Kopia, J., Kompalla, A., Buchmüller, M., & Heinemann, B. (2017). Performance Measurement of Management System Standards Using the Balanced Scorecard. *Amfiteatru Economic*, 9(11), 981-1002.
- Nouri, A. F., Shafiei, N. M., & Olfat, L. (2019). Developing the framework of sustainable service supply chain balanced scorecard (SSSC BSC). *International Journal of Productivity and Performance Management*, 68 (1), 148-170. doi:<https://doi.org/10.1108/IJPPM-04-2018-0149>

- Okfalisa, Anugrah, S., Anggraini, W., Absor, M., & Fauzi, S. S. (2018). Integrated Analytical Hierarchy Process and Objective Matrix in Balanced Scorecard Dashboard Model for Performance Measurement. *TELKOMNIKA*, 27013-2711.
- Pérez, C. A., Montequín, V. R., Fernández, F. O., & Balsera, J. V. (2017, 9). Integrating Analytic Hierarchy Process (AHP) and Balanced Scorecard (BSC) Framework for Sustainable Business in a Software Factory in the Financial Sector. *Sustainability*, 486. doi:10.3390/su9040486
- Quezada, L., Reinao, E., Palominos, P., & Oddershede, A. (2019). Measuring Performance Using SWOT Analysis and Balanced Scorecard. *Procedia Manufacturing*, 39 (hal. 786-793). Chicago, USA: Elsevier Ltd. doi:10.1016/j.promfg.2020.01.430
- Saaty, T. L. (1999). How to Make a Decision: The Analytic Hierarchy Process. *European Journal of Operation Research*, 9-26. doi: [https://doi.org/10.1016/0377-2217\(90\)90057-I](https://doi.org/10.1016/0377-2217(90)90057-I)
- Sardjono, W., Selviyanti, E., & Perdana, W. (2019). The application of the factor analysis method to determine the performance of IT implementation in companies based on the IT balanced scorecard measurement method. *J. Phys.: Conference Series*. 1538 012026.
- Seungbun, L., Brownlee, E., Yongjae, K., & Soonhwan, L. (2017). Ticket Sales Outsourcing Performance Measures Using Balanced Scorecard and Analytical Hierarchy Process Combined Model. *Sport Marketing Quarterly*, 110-120.
- Silvestre, W., & Fonseca, A. (2020). Integrative sustainable intelligence: A holistic model to integrate corporate sustainability strategies. *Corporate Social Responsibility and Environmental Management*, 27(4), 1578-1590. doi:<https://doi.org/10.1002/csr.1906>
- Striteska M, & Spickova M. (2012). Review and Comparison of Performance Measurement Systems. *Journal of Organizational Management Studies*, 1-13.
- Supriyono, R. (2019). *Manajemen Biaya (Suatu Reformasi Pengelolaan Bisnis)*. Yogyakarta: BPFÉ.
- Tubis, A., & Werbińska-Wojciechowska, S. (2017). Balanced Scorecard Use in Passenger Transport Companies Performing at Polish Market. *Procedia Engineering* 187, 538-547. doi:10.1016/j.proeng.2017.04.412