

Analysis of Performance Measurement Using The Balanced Scorecard dan Objective Matrix Method at PT XYZ

Louis Cassilas Setiawan, Mohammad Agung Saryatmo, and Juliana Helena Kristina

Department of Industrial Engineering

Tarumanagara University

Jakarta, Indonesia

louis.545200026@stu.untar.ac.id, mohammads@ft.untar.ac.id, julianak@ft.untar.ac.id

Abstract

Performance measurement is a process used by companies to measure, monitor, and evaluate the work of employees or teams in achieving company goals with the aim of measuring employee performance standards. Performance measurement must be carried out to improve the performance of company employees, human resource development, corporate culture development, and the growth of company success. This electric and telecommunication cable company has a vision to become the largest electric cable manufacturer in Indonesia with a global reputation and its cable products have international quality and reliability. This research aims to formulate KPIs for the company and a performance appraisal system for the company that is beneficial to the company. Performance measurement is carried out using the Balanced Scorecard (BSC) method with 4 perspectives, namely Finance, Customers, Internal Business Processes, and Learning and Growth with weights of 0.480, 0.181, 0.195, 0.144 respectively. The resulting KPIs are 12 KPIs where 4 KPIs are good, 6 KPIs that are still not optimal, and 2 KPIs that are still far below the company's target. These KPIs are analyzed using Objective Matrix (OMAX) with Traffic Light System.

Keywords

Performance Measurement, Balanced Scorecard, Key Performance Indicator, Objective Matrix, Traffic Light System

1. Introduction

The manufacturing industry is one of the industries that drives the wheels of the national economy, where the economic growth of society is highly dependent on manufacturing companies. The manufacturing industry consists of various types of products, one of which is the electricity and telecommunications cable industry. The power and telecommunications cable industry has a crucial role in supporting electricity and communication infrastructure in today's modern era. With the development of technology and growing demand, cable production has become a rapidly growing industry. Cable manufacturers are in a highly competitive environment, where electrical and telecommunication cables must meet very high quality standards to maintain the reliability of electricity and communication systems. Companies in this sector compete on price, quality, and innovation of their products. Therefore, conducting a performance assessment can help to identify areas that require special attention and maintain operational effectiveness to keep the company competitive in this market segment.

This cable company has been established since 1970 and began operating in 1972 with technical support from Japan and has a vision to become the largest electric cable manufacturer in Indonesia with a global reputation and cable products of international quality and reliability. The products produced are various types of cables, including telecommunication cables, power cables, and enameled wires. In an effort to maintain competitiveness in the industrial world, the company need to have a strong performance appraisal system to ensure that all goals that have been set can be sustainable in the long term. For now, there is no overall performance assessment of the company and the performance measurement that is carried out when it is still partial where the lack of integration of performance measurement can lead to a lack of synergy between departments within the company in achieving company targets. The company will tend to experience obstacles and will find it difficult to realize its strategic goals. Therefore, it is necessary to assess the company's overall performance in order to achieve an optimal level of performance that will result in sustainable revenue growth. This research aims to

The Balanced Scorecard (BSC) method is a framework proposed by Robert Kaplan and David Norton in early 1992. This method is used to assess company performance by offering a balanced view of company performance by measuring performance in 4 perspectives, namely financial perspective, customer perspective, internal process perspective, and learning and growth perspective. Balanced Scorecard can assist in linking the company's strategic goals to the performance indicators measured and can develop the company's business in the long term. The results of the research that will be obtained are a suitable Key Performance Indicator (KPI) system and will be continued by giving weighted values with the Analytical Hierarchy Process method. Giving weight using the AHP method is expected to make it easier to know the value of each perspective. After obtaining the weighted value of each perspective, a performance appraisal analysis is carried out with the Objective Matrix (OMAX) with the Traffic Light System. Objective Matrix can help in integrating company goals and strategies and assessing company performance in achieving them. Meanwhile, the Traffic Light System helps in providing visualization that can show which indicators should be improved and maintained performance with the help of 3 color categories namely green, yellow, and red. Therefore, this research aims to be able to identify areas of company performance that need to be improved and maintain their performance properly.

2. Literature Review

The balanced scorecard is created through a process that fosters agreement and clarity on how to translate strategy into operational objectives and measures. This implies that this method reflects the combined knowledge of the organization's managers. Rather than being a mere effort to enhance a measurement system, Norton (1992) said that balanced scorecard projects aim to bring about changes in the organization's perspective and management approach. In essence, the balanced scorecard seeks to achieve the following objectives (Kaplan 1996), 1) Clearly define and garner consensus on vision and strategy, 2) Establish a strategic management team, 3) Disseminate the process across the organization, 4) Align department goals with the process, 5) Define company strategic targets, 6) Conduct periodic and systematic strategic reviews, and 7) Gather feedback to understand and enhance strategy. The integration of Balanced Scorecard and Objective Matrix (OMAX) in company performance evaluation builds a comprehensive performance measurement system. By using an assessment index that considers the various perspectives of the Balanced Scorecard, supported by the OMAX assessment model, the company can monitor all aspects of its performance.

3. Methods

This research took place in a company engaged in manufacturing power and telecommunication cables located in West Jakarta. The method used in this company performance measurement analysis research use the Balanced Scorecard and Objective Matrix methods. In collecting the required data, interviews are conducted with the company and provide questionnaires to get an overview of the company's situation that will produce strategic goals. After obtaining several strategic objectives, followed by a follow-up questionnaire to get a comparison between strategic objectives from each perspective. The results of the advanced questionnaire will be given a weighting assessment using the Analytical Hierarchy Process method.

Based on the results of strategic objectives, the company's KPIs are obtained in accordance with its strategic initiatives contained in the *Balanced Scorecard* model. After that, proceed with determining the company's target based on the results of interviews with the company. The KPIs that have been obtained will be entered into the *Objective Matrix* with the *Traffic Light System* to find out how well the company is currently performing. After that, the strategic goals that hasn't reach the company's target will be the company's focus to improve. Suggestions for improvements will be given to help solving the problem.

4. Data Collection

There are 2 types of data that are used in this research, namely primary data and secondary data. The primary data is obtained from conducting interviews and discussions with company staff who understand the company's performance conditions and distributing questionnaires to obtain strategic goals and be able to compare the four perspectives of the balanced scorecard, while secondary data is obtained from the company profile website, such as vision and mission, product descriptions, as well as other company archives.

5. Results and Discussion

In forming a balanced scorecard (BSC) model, SWOT analysis can help in forming a strong strategic plan because it includes the strengths, weaknesses, opportunities, and threats of the company itself. The following is a SWOT analysis of this company which can be seen in Table 1.

Table 1. SWOT Analysis Results

Internal External	S (Strength) S1 The Company has a wide range of cable products that can meet various customer needs. S2 The Company has extensive experience and distribution network in Indonesia. S3 The company has production machines with advanced technology S4 Products produced have certificates from the country and abroad	W (Weakness) W1 Product price is expensive W2 Lack of reliable human resources W3 Depends on only one <i>supplier</i> W4 Uneven product storage
	O (Opportunity) O1 Has large financial resources O2 Has a strong <i>brand image</i> O3 Has large cable export opportunities O4 Has a high business market in Indonesia	S-O Strategy S2-O2 Conduct aggressive marketing S1-O4 Maintain product quality and price stability S3-O3 Produce the highest quality products according to international standards
	T (Threat) T1 Price competition is getting stronger with the entry of competitors with new prices T2 Fluctuations in stock prices and interest rates can affect company finances Q3 Receipt of raw materials may be hampered because there are already many competitors T4 Raw material prices rise	W-O Strategy W1-O2 Convince <i>customers</i> of the product quality of the products offered W2-O3 Improve the quality of existing human resources W4-O3 Optimize logistics flow in distribution
	S-T Strategy S2-T1 Design a good and competitive marketing strategy S1-T4 Conduct evaluation for factory production system S2-T3 Evaluate the <i>supply chain</i> system at the company's raw material <i>suppliers</i>	W-T Strategy W3-T3 Seek and develop relationships with alternative raw material <i>suppliers</i> W4-T1 Open a new warehousing area that is strategically located W1-T1 Create promotions that can attract consumers

After making a SWOT analysis, an initial questionnaire was made which would produce strategic objectives prioritized by the company with a value weighting of 1 to 5. The data from the questionnaire in the form of 12 strategic objectives will be processed again to obtain KPIs and strategic initiatives from each strategic objective. The following is a Balanced Scorecard model that is in accordance with the results of the initial questionnaire data which can be seen in Table 2.

Table 2. BSC model of PT XYZ

Strategic Objectives	KPI	Strategic Initiatives
Financial Perspective		
PK-1 Company profits increase every year	Percentage growth in company turnover	1.Optimize production cost 2.Improve the performance of the company's <i>purchasing</i> division 3.Improve the company's <i>marketing</i> performance
PK-2 The company should increase the number of product orders	Percentage increase in number of product orders	1. Give discounts to customers 2. Reach a wider target market. 3. Using marketing strategies
PK-3 Operating cost expenditures are in accordance with what is determined.	Optimal operating cost percentage	1. Using technology and automation to improve production efficiency. 2. Identify inefficient operational costs. 3. Improve quality control performance to reduce the number of product defects.
Customer Perspective		

PP-1 Customer is satisfied with the service provided	Number of Customers	1. Provide service training for employees. 2. Respond quickly to complaints experienced by customers. 3. Have a team of technicians who can provide accurate guidance for customers
PP-2 Getting new customers should be prioritized.	New customers	1. Improve product quality. 2. Provide discount promotions that attract new customers. 3. Using digital media to improve company marketing.
PP-3 The products produced captivate customer interest	Number of visitors	1. Gain customer trust and satisfaction with the product. 2. Increase product advantage over other company competitors 3. Maintain a good image of the company's products.
Internal Business Process Perspective		
PPBI-1 The company maintains and improves product quality	Number of product defects	1. Conduct market research and trends to ensure that products remain relevant. 2. Emphasize quality management system (ISO 9001). 3. Collect and analyze customer reviews of products.
PPBI-2 The company improves quality control capabilities	Number of attenuation tests	1. Add labor to the attenuation test section. 2. Provide training to the fiber optic quality control division to minimize human error. 3. Build a quality control team that is reliable in managing the quality control process.
PPBI-3 The company has a comfortable and safe working environment	Number of work accidents that occurred	1. Appeal to employees about the importance of implementing occupational health and safety systems (SMK3) while working. 2. Provide employees with a comfortable workplace and working position. 3. Ensure that work machinery and equipment comply with safety standards.
Learning and Growth Perspective		
PPP-1 The company provides disciplinary training for employees	Sanctioning employees who violate regulations	1. Provide bonuses as an appreciation to employees who have a disciplined attitude at work. 2. Provide discipline training for employees. 3. Firm in imposing sanctions on employees who violate the rules.
PPP-2 The performance of each employee must be improved	Number of meetings held	1. Provide communication training to employees so that communication skills can be improved. 2. Reward employees who have good performance and impact on the company. 3. Create a space for employees to brainstorm in solving problems.
PPP-3 The company provides training facilities that improve employee performance.	Number of trainings conducted for employees	1. Determine the training schedule for employees on a regular basis. 2. Provide training that can hone and develop technical skills on the job. 3. Provide clear information about the training provided.

Based on the BSC model table that has been designed, KPIs are obtained for each strategic goal. KPIs are metrics that can be used to evaluate company performance in various perspectives that can be a reference in the company achieving its goals. will continue to make a strategy map so that the company gets a visual tool that presents the company's strategy comprehensively and the relationship between each perspective. The following is a strategy map that can be seen in Figure 2.

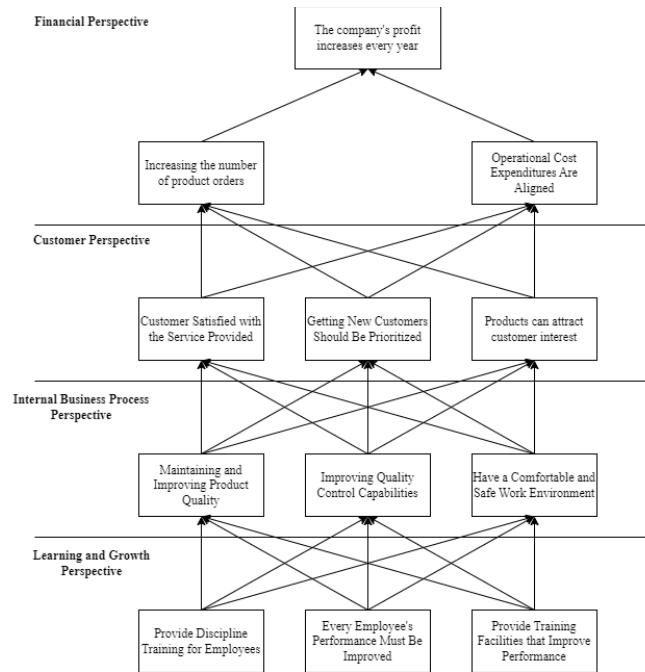


Figure 2. Strategy Map

The advanced questionnaire contains the level of importance comparison between each Balanced Scorecard perspective. The questionnaire was filled out by the staff of the company that understands the condition of the company. The results of the calculation of the level of importance are described as a hierarchical structure of the Balanced Scorecard model which can be seen in Figure 3.

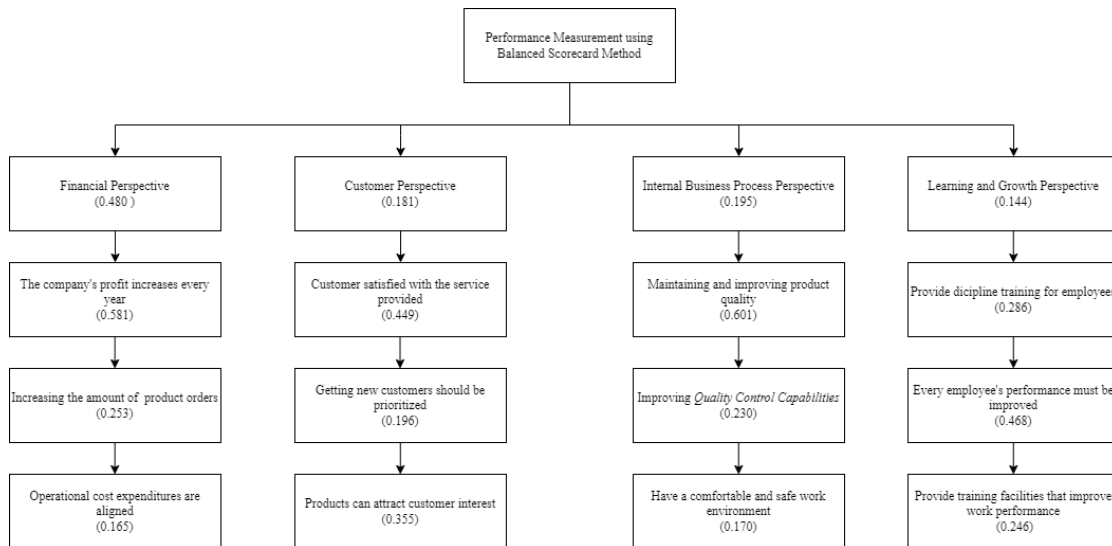


Figure 3. Hierarchical Structure of The BSC Model

Company targets and minimum and maximum limits were obtained from interviews with the company director. Performance assessment is carried out using company data from January to July 2023. The following is the company's performance target as a result of discussions with the company which can be seen in Table 3.

Table 3. Company Performance Assessment Targets

Target Strategy	KPI	Minimum Limit	Maximum Limit	Company Target
Financial Perspective				
PK-1 Company profits increase every year	Percentage growth in company turnover	50%	100%	57.5
PK-2 The company should increase the number of product orders	Percentage increase in number of product orders	8.64%	12%	9%
PK-3 Operating cost expenditures are in accordance with what is determined.	Optimal operating cost percentage	4.39%	11%	5%
Customer Perspective				
PP-1 Customer is satisfied with the service provided	Number of Customers	53 People	120 People	63 People
PP-2 Getting new customers should be prioritized	New customers	10 People	28 People	15 People
PP-3 Products that are produced can attract customers	Number of visitors	50 People	90 People	61 People
Internal Business Process Perspective				
PPBI-1 The company maintains and improves product quality	Number of product <i>defects</i>	2000 m	800 m	1700 m
PPBI-2 The company improved its <i>quality control</i> capabilities on <i>fiber optic</i> products.	Number of <i>fiber optic</i> attenuation tests	210 Times	150 Times	180 Times
PPBI-3 The company has a comfortable and safe working environment	Number of work accidents that occurred	5 Times	0 Times	2 Times
Learning and Growth Perspective				
PPP-1 The company provides disciplinary training for employees	Sanctioning employees who violate regulations	5 People	0 People	3 People
PPP-2 The performance of each employee must be improved	Number of meetings held	1 Time	5 Times	3 Times
PPP-3 The company provides training facilities that improve employee performance	Number of trainings conducted for employees	1 Time	4 Times	2 Times

Based on the company's performance targets that have been obtained, it can be continued to measure the resulting KPIs using *Objective Matrix* with *Traffic Light System*. In the *Objective Matrix* calculation, there are levels 1 to 10, where level 10 is the maximum target, levels 9 to 4 will be filled based on interpolation from level 10, level 3 is the company target, levels 2 to 1 will be filled based on interpolation from level 3 and level 0 is the minimum target. The performance assessment of the *Objective Matrix* results with the *Traffic Light System* can be seen in Figure 4 and Figure 5.

Figure 4. Results of Objective Matrix Calculation with Traffic Light System

KPI	Financial Perspective			Customer Perspective			Internal Business Process Perspective			Learning and Growth Perspective		
	PK-1	PK-2	PK-3	PP-1	PP-2	PP-3	PPBI-1	PPBI-2	PPBI-3	PPP-1	PPP-2	PPP-3
Performance	78.07	10.78	7.87	98	18	75	1000	180	1	1	3	3
10	100	12	11	120	28	90	800	150	0	0	5	4
9	93.93	11.57	10.14	111.86	26.14	85.86	928.57	154.29	0.29	0.43	4.71	3.71
8	87.86	11.14	9.29	103.71	24.29	81.71	1057.14	158.57	0.57	0.86	4.43	3.43
7	81.79	10.71	8.43	95.57	22.43	77.57	1185.71	162.86	0.86	1.29	4.14	3.14
6	75.71	10.29	7.57	87.43	20.57	73.43	1314.29	167.14	1.14	1.71	3.86	2.86
5	69.64	9.86	6.71	79.29	18.71	69.29	1442.86	171.43	1.43	2.14	3.57	2.57
4	63.57	9.43	5.86	71.14	16.86	65.14	1571.43	175.71	1.71	2.57	3.29	2.29
3	57.5	9	5	63	15	61	1700	180	2	3	3	2
2	55.00	8.88	4.797	59.67	13.33	57.33	1800.00	190.00	3.00	3.67	2.33	1.67
1	52.50	8.76	4.593	56.33	11.67	53.67	1900.00	200.00	4.00	4.33	1.67	1.33
0	50	8.64	4.39	53	10	50	2000	210	5	5	1	1
Score	6.388	7.153	6.348	7.298	4.615	6.379	8.444	3.000	6.500	7.667	3.000	6.500
Weight	0.279	0.122	0.079	0.081	0.036	0.064	0.117	0.045	0.033	0.041	0.067	0.035
Value	1.782	0.873	0.502	0.591	0.166	0.408	0.988	0.135	0.215	0.314	0.201	0.228
Index Performance	3.156			1.166			1.338			0.743		

Figure 5. Performance Assessment Using Traffic Light System

Indicator	Strategic Objectives	KPI
	PP-1 Customer is satisfied with the service provided	Number of Customers
	PPBI-1 The company maintains and improves product quality	Number of product defects
	PPBI-3 The company has a comfortable and safe working environment	Number of work accidents that occurred
	PPP-1 The company provides disciplinary training for employees	Sactioning employess who violate regulations
	PK-1 Company profits increase every year	Percentage growth in company turnover
	PK-2 The company should increase the number of product orders	Percentage increase in number of product orders
	PP-2 Getting new customers should be prioritized	New customers
	PP-3 The products produced captivate customer interest	Number of visitors
	PPP-3 The company has provides training facilities that improve employee performance	Number of training conducted for employees
	PK-3 Operating cost expenditures are in accordance with what is determined	Optimal operating cost percentage
	PPBI-2 The company improves quality control capabilities	Number of attenuation tests
	PPP-2 The performance of each employee must be improved	Number of meetings held

From the results of the *Objective Matrix* calculation with the *Traffic Light System*, it can be seen that there are 4 KPI indicators that have been calculated well, namely the company must increase the number of product orders, *customers are* satisfied with the services provided, the company maintains and improves quality. 5 KPI indicators that are good but not yet optimal are company profits must increase every year, operational cost expenditures are in accordance with what is determined, getting new customers must be prioritized, the products produced can attract customer interest, the company has a comfortable and safe work environment, and the company provides training facilities that improve employee performance. 2 KPI indicators that are still not good and must be improved more, and given more attention by the company are the company must improve *quality control* capabilities and the performance of each employee

must be improved. This can be overcome by the company providing training in the *quality control* section to be able to improve the ability of each employee who works in the *QC* section and to improve employee performance the company can ensure that employees understand the contributions made affect the company's goals and strategies.

6. Conclusion

Based on the results of the Balanced Scorecard and Objective Matrix, there are 12 Key Performance Indicators (KPIs) that have an important influence in the cable company. In the Balanced Scorecard results, the weighted value for the financial perspective is 0.480, the customer perspective is 0.181, the internal business process perspective is 0.195, and the learning and growth perspective is 0.144. The strategic goal that has the largest value weight is maintaining and improving quality with a value of 0.601 and the strategic goal that has the smallest value weight is optimal operational cost spending with a value of 0.165. Performance measurement using Objective Matrix with Traffic Light System results in 4 KPIs that are good, 6 KPIs that are still not maximized, and 2 KPIs that are still far below the company's target, that requires further enhancement and increased focus from the company are the need to elevate quality control capabilities and enhance individual employee performance. To address this, the company should prioritize to improve its quality control expertise through targeted training for employees in that department. Simultaneously, to boost overall employee performance, the company can ensure that staff comprehensively grasp the impact of their contributions on the company's objectives and strategies.

References

- Biazzo, Stefano and Garengo, P., *Performance Measurement with the Balanced Scorecard*, 1st Edition, Springer Berlin, Heidelberg, 2012.
- Dekrita, Y. A., Yunuss, R., Cinta, A. B., Yamin, M., 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*, Vol. 92, 2018.
- Estiasih, Soffia Pudji, Measurement of Cooperative Performance with The Balanced Scorecard Analysis Approach, *International Journal of Economics, Business and Accounting Research (IJEBAAR)*, Vol. 5, Issue 2, June 2021.
- Muhyi, H. A., & Muttaqin, Z., Performance Analysis Based on Balanced Scorecard at Cooperative in Cianjur District - Indonesia. *International Journal of Sciences and Research*, 6(7), 1773-1777, 2017.
- Kopeeka, Nattarinee, The Balanced Scorecard Implementation, Integrated Approach and the Quality of Its Measurement, *16th Annual Conference on Finance and Accounting*, Prague, May 2015.
- Tibbs, C. Y. and Langat, L. K., Internal Process, Learning Perspective of Balance Scorecard and Organisational Performance, *International Journal of Economics, Commerce and Management*, Vol. IV, Issue 11, United Kingdom November 2016.
- Ofurum, C. D. I., & Afodigbueokwu, H. E., Balance Scorecard and Financial Performance: Evidence from Nigerian Consumer Goods Manufacturing Companies. *International Journal of Advanced Academic Research Social and Management Sciences*, Vol. 5, 2019.
- Praharsi, Y., Hardiyanti, F., Puspitasari, D., Akseptori, R. And Maharani, A., An Integrated Framework of Balance Scorecard-PESTLE-Smart and Green Port for Boosting the Port Performance, *Proceedings of the International Conference on Industrial Engineering and Operations Management*, Monterrey, Mexico, November 3-5, 2021.
- S. Ryanto and Sutarman, Perspective Application of Four Pillars Balance Scorecard (BSC) On Company Organization Performance, *International Journal of Engineering Science Invention*, Vol. 6, 2017.
- Yahya, R., Mahachandra, M., and Handayani, N. U., The Mundel and Objective Matrix Model of Productivity Measurement at PT Adi Perkapalan, *IOP Conference Series: Materials Science and Engineering*, 2019.

Biographies

Louis Cassilas Setiawan is an industrial engineering student at Tarumanagara University. He started his education in 2020. He also recognized for his effective communication skills and adaptation with new environment.

Mohammad Agung Saryatmo is a full-time lecturer at Universitas Tarumanagara's Department of Industrial Engineering. He holds a Bachelor of Engineering in Industrial Engineering from Universitas Gadjah Mada in Indonesia and a Master of Management from Universitas Diponegoro in Indonesia. He also holds a PhD from Asian Institute of Technology, Thailand. His research interests are in the areas of digital supply chain management, quality management, strategic human resources management and service quality.

Helena Juliana Kristina is a lecturer at the Industrial Engineering Department of Universitas Tarumangara since 2019. She graduated with her Bachelor of Industrial Engineering at Universitas Atma Jaya Yogyakarta, then she got her Master's Degree in Mechanical Engineering at University of Indonesia. She has been exploring research on Lean and Green Manufacturing and Participatory Ergonomics since 2015, which has been published nationally and internationally. She has also been exploring community service activities for the waste bank community and garbage collectors. She produced two digital books with ISBNs from Community Service activities, entitled Guyup Garbage and Guyup Care for the Earth, Our Home Together.