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DEVELOPMENT OF LEAN AND GREEN-BASED WORK PROGRAM EVALUATION MODEL IN A COSMETIC SMALL AND MEDIUM COMPANY USING THE CIPP MODEL APPROACH

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ABSTRACT

Lean and Green is well-known as an emerging paradigm in the industry to increase competitiveness with minimal environmental impact. A small and medium-sized cosmetics company in the Depok area has implemented programs based on lean and green concepts in stages since 2019. Currently, the company does not have sufficient skills and knowledge to carry out independent evaluations. The company also does not yet have a holistic and structured reference evaluation model. This research aims to assist decision-makers in SMIs in comprehensively evaluating the implementation of lean and green concepts. Researchers use the Context, Input, Process, Product (CIPP) model in the evaluation concept design with the in-depth interview (IDI) technique. The results of the study show six indicators that need improvement. Researchers propose two improvement activities that can ensure the sustainability of the lean and green program in the long term.

Keywords: Evaluation, Lean, Green, CIPP, IKM, Cosmetics

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1. INTRODUCTION

The concept of lean and green (L&G) has been studied in several studies since the 2010s and is stated to be able to create an inclusive and sustainable industry, taking into account customer needs and the effectiveness of the strategies taken by decision makers (Cluzel *et al.*, 2010; Parveen, Kumar, & Rao, 2011). The need to implement lean concepts generally comes from internal management and stakeholders, while demands for implementing green concepts come from the government and society (Gandhi, Thanki, & Thakkar, 2018).

The implementation of the integration of the L&G concept in the industrial sector has been proven to be able to increase long-term economic benefits and environmental sustainability through improving process productivity and product quality, as well as controlling environmental impacts (Amrina & Zagloel, 2019; Shibin, 2016; Ikatrinasari *et al.*, 2018). The Director General of SMEs of the Ministry of Industry stated that the contribution of this industrial sector to GDP grew significantly to around 1.92%. (Gareta, 2021). The number of large and small, and medium-scale cosmetic industries (SMIs) has also increased from 760 in 2019 to 797 in 2020, of which 95% come from SMIs (Rimma, 2022; Amrina *et al.*, 2021).

Budi Andhika, PD, is one of the pilot Cosmetics SMIs from PT. Sucifondo. The company produces natural-based beauty and body care cosmetics, including hair, face, hands and feet. The company has obtained a certificate of Good Manufacturing Practice of Cosmetics. Products made and marketed are halal certified by the Indonesian Ulema Council (MUI) and distribution permits from the Food and Drug Supervisory Agency (BPOM). With 19 employees, the company has implemented programs based on lean and green concepts in stages since 2019. Figure 1 describes the stages of implementing the program.

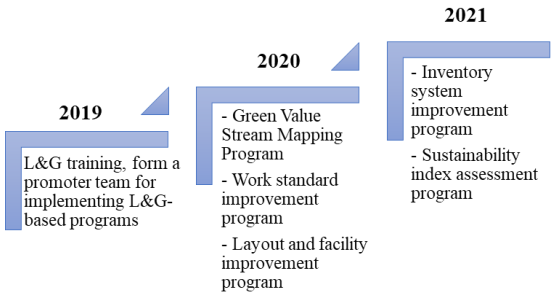

Figure 1 Map of the Implementation of Lean and Green (L&G) Based Programs in Budi Andhika, PD (Source : Budi Andhika, 2020)

Figure 1. shows that in the early stages (2019), the company's management started the L&G concept implementation program with training for all employees. The training purpose was to shape the right mindset and understanding of the L&G concept, including why the concept must be implemented and how to implement it. Then the implementation stage is continued with process mapping, assessment, and improvement using L&G methods and tools.

After three years of implementing the L&G concept, several improvements have impacted company performance positively, for example, in the clarity of process and information flow, saving on resource use, and reducing inventory quantities. However, these improvements' results are unstable and still require close monitoring. So that the company's management feels compelled to evaluate the effectiveness of implementing lean and green concepts.

However, the company currently lacks the ability and knowledge to carry out an evaluation independently. The company also does not yet have a holistic and structured reference evaluation model. The phenomenon of these problems underlies researchers to explore models for evaluating the implementation of the L&G concept that suits the company's needs.

Evaluation is a series of processes, including gathering information, determining assessment criteria, conducting

assessments, and drawing conclusions (Hajaroh, 2018; Brugman *et al.*, 2022). In tree theory, evaluation is built by three branches of knowledge: method, assessment, and use (Alkin & Christie, 2004). Decision makers need the evaluation process to assess the success or failure of a program implemented carefully. Experts have produced six program evaluation models (Muryadi, 2017). Among them are the appraisal model, which emphasizes expert decisions, and the Kirkpatrick model, which assesses results and processes. This study uses the Context, Input, Process, and Product (CIPP) evaluation model. This model was chosen because it has a holistic advantage in evaluation, which can provide a detailed and broad picture of the implementation of a program, starting from its context to the implementation process. These advantages are suitable for assessing the level of success in implementing the L&G concept in Cosmetic SMIs.

Based on the background, it can be formulated that the problem of this research is how to evaluate the implementation of lean and green concepts, which can include several aspects of the required assessment. This study aims to assist decision-makers in SMIs in comprehensively evaluating the implementation of lean and green concepts. Previous studies on the concept of L&G in the industrial world today have focused more on the integration model and its practical implementation (Cherrafi *et al.*, 2018; Hallam & Contreras, 2016; Kumar & Rodrigues, 2020). Research on the evaluation of the effectiveness of implementing the L&G concept is still limited. This research is expected to enrich scientific updates related to the development of the L&G concept through a comprehensive CIPP evaluation model in evaluating the implementation of the L&G concept in SMEs in particular, as well as in the industry in general.

2. LITERATURE REVIEW

Evaluation Concept

Griffin & Nix (1991) said that evaluation is a decision on the implications of the results of implementing activities that are preceded by measurement and assessment activities. The evaluation results are used to carry out follow-up activities and make subsequent decisions. Evaluation can be interpreted as monitoring activities (Indana & Sukidjo, 2020). With an evaluation, it can bring implications in the form of program termination, program revision, program continuation, and program expansion.

Model *Context – Input – Process – Product* (CIPP)

This model is based on the fact that the program's success is influenced by various factors, such as the characteristics of the participants and the environment, the program's objectives and the equipment used, and the procedures and mechanisms for implementing the program itself. Some fields that can use the CIPP model evaluation are education, management, companies, and others. The object's scope, for example, can be related to projects, programs or institutions.

The CIPP evaluation model is an extension of (Stufflebeam, 2000):

a. *Context evaluation to serve planning decisions.* Evaluators are required to understand the evaluation context related to planning decisions, identifying needs, and formulating program objectives. Four questions can be raised, namely:
   - What needs have not been met by the program?
   - What development goals have not been achieved?
   - What are the development goals that help accelerate the program?
   - What are the most manageable goals to achieve?

b. *Input Evaluation structuring decision*. Input evaluation assists in making decisions, determining the resources needed, looking for alternatives that can be done,

determining plans, making strategies and paying attention to work procedures in achieving them. The input evaluation component includes human resources, supporting facilities and equipment, funds or budget, and the necessary procedures and rules.

c. *Process evaluation to serve and implement decisions*. There are several questions in the process of carrying out this evaluation. For example, are the plans that have been made following the implementation? What are the improvements to the current program implementation process? Have facilities and infrastructure been utilized optimally? What obstacles were faced? These questions ensure that the program implementation process can be monitored, supervised, or improved. Process evaluation is used to capture and predict procedure design during the implementation phase, provide information for decisions, and record or archive procedures that have occurred. Process evaluation can determine how far the plan has been implemented and what needs improvement.
d. *Product evaluation to serve recycling decision*. Evaluation results are used to decide what to do next. At the same time, product evaluation is used to see the achievement/success of a program in achieving predetermined goals. Evaluators can determine or recommend whether a program can be continued, developed/modified, or even discontinued.

According to Widoyoko (2017), CIPP's evaluation model is more comprehensive than other evaluation models because the object of evaluation is not only results but also includes context, input, process, and results. The advantage of the CIPP model is that CIPP has a holistic approach to evaluation, aiming to provide a very detailed and broad picture of a project, from its context to implementation (Poth, *et al.*, 2020). CIPP helps make improvements during the program and provides information at the end. However, the weakness of the CIPP model is that it is sometimes too concerned with how the process should be rather than the reality on the ground. This makes it seem top down with the managerial nature of its approach. This model also has limitations, including the application of this model in the field of learning programs still requires modification.

3. METHODOLOGY

The data collection method used in this research proposal includes method triangulation, namely :

1. Field Observation
   The data collection method is direct research at Budi Andhika, PD.
2. In-Depth Interview (IDI) and Questionnaire
   The IDI technique is a way of obtaining data by having conversations or interviews with PD management. Budi Andhika to get the information needed for research. In comparison, the questionnaire contains closed questions to 8 respondents (Employees of PD. Budi Andhika who are involved in the L&G program) to obtain the information and data needed in the research.
3. Document Analysis
   Researchers seek information and data from relevant documents, including official documents from institutions/companies and individual data.

The interview question instrument for management is shown in Table 1.

Table 1. Interview Transcript

Category	Question Topics
Context	1. Background and program needs analysis.
	2. L&G program implementation objectives, which points have been achieved.
	3. Overarching legalization or government regulations, as well as which parts have been fulfilled.

Category	Question Topics
	4. Strategic planning for the program (covering schedules and budget and resource allocations)
Input	1. Availability of program implementing resources (HR, facilities and equipment, funds). If not available, is there an alternative?
	2. HR Capability. If not capable, then what is the strategy?
	3. How to design program implementation procedures.
Process	1. How is the technical implementation of the program, what is being done, who is doing it, and when is the program finished? What is the suitability of implementation and planning?
	2. How is the performance of the human resources implementing the program?
	3. Factors supporting and inhibiting the implementation of the program.
	4. Are there program evaluation and monitoring reports?
Product (Hasil)	1. Company Financial Statements exploration
	2. Report on the performance of L&G indicators that have been compiled in the Balance Scorecards
	3. Is there a change in work culture and an increase in employee motivation
	4. What is management's view of the results achieved? What decisions does management make regarding the sustainability of the program?

Figure 2 briefly describes the stages of the research proposal.

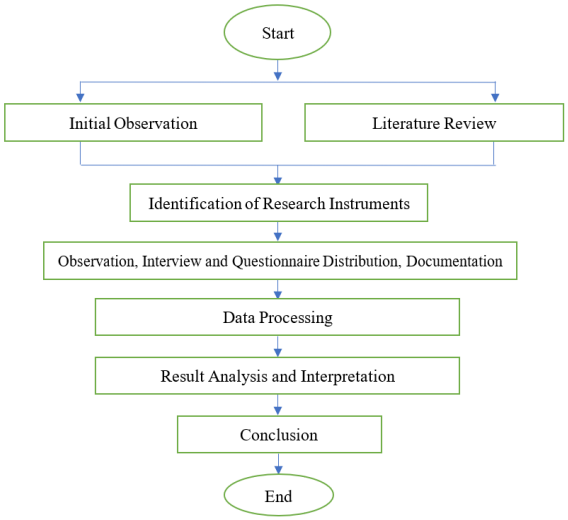

Figure 2. Flowchart of Research Steps

4. ANALYSIS AND DISCUSSION

The researcher mapped each content, input, process and output criteria into their respective objectives to determine the model. Then each objective is translated into a summative assessment indicator. Furthermore, each indicator is mapped into data collection techniques and questions to be asked. The researcher modelled the evaluation of lean and green-based work activity programs, as shown in Appendix 1. This model was validated using a brainstorming technique that invited Cosmetics SMIs stakeholders consisting of 2 Cosmetics SMIs management, one association member, three academics, and two cosmetics distributors. Those invited to brainstorm have at least ten years of working experience in the field.

The results of evaluating the six types of documents on the object of study (one of the pilot Cosmetics SMI) are shown in Table 2.

Table 2. Observation Results From Each Assessment Indicator

Category	Evaluation Indicators	Observation results
Context Evaluation	CE1. Documents L&G program objectives and strategic planning	1. The company has written program goals and strategic planning in a simple way 2. Strategic goals and plans are conveyed by the principal director to managers at management meetings
Input Evaluation	IE1. Standard Operating Procedure Document	1. Updates on standard operating procedures after the implementation of the L&G program have been carried out in the following procedures: - mixing process - filling process - warehousing
	IE4. HR allocation documents, budget plans, and scheduling of the implementation of the L & G program	1. The planning documents found only included allocating human resources and schedules. Regarding the budget, it is not written down.
Process Evaluation	PE8. L & G program implementation evaluation document	1. There was no program evaluation regarding error identification and prediction.
Output Evaluation	OE1. Analysis of Company Financial Statements	1. Company profits slightly increased (+2%) 2. A decrease in electricity costs is seen due to changes in several work procedures
	OE2. L&G Program Performance Report	1. There is no official document in the form of a performance report on the L&G program 2. The company conducts a qualitative descriptive evaluation regarding the program discussed at the company meeting

Table 3 Questionnaire Result

Respondent	Q-PD	Q-MGR-1	Q-MGR-2	Q-MGR-3	Q-S-1	Q-S-2	Q-S-3	Q-S-4
CodeR	1	1	1	1	2	2	2	2
CE2	4	4	4	4	4	3	3	3
CE3	4	4	4	4	4	4	4	4
CE4	3	3	3	3	3	3	2	2
CE5	3	2	2	3	2	2	2	2
CE6	3	3	2	3	3	3	3	3
CE7	2	2	2	2	2	2	2	2
CE8	2	2	2	2	2	2	2	2
CE9	3	3	3	3	3	3	3	3
IE2	3	3	3	3	3	3	3	3
IE3	4	3	2	2	3	3	2	2
PE1	4	4	4	4	4	4	4	4
PE2	3	3	3	3	3	3	3	3
PE3	3	3	3	3	3	3	3	3
PE4	2	3	3	3	3	3	3	3
PE5	3	3	3	3	3	3	3	3
PE6	3	3	3	3	3	3	3	3
PE7	3	3	3	3	3	3	3	3
PE9	2	2	2	2	3	3	3	3
PE10	2	2	2	2	2	2	2	2
PE11	2	2	2	2	2	2	2	2
OE3	2	2	2	2	2	2	2	2
OE4	3	3	3	3	3	3	3	3
OE5	4	4	3	4	3	3	3	3

Table 3 shows the data processing results for the eight questionnaire respondents, from the manager to the staff level. The table shows the answers that vary between respondents. Next, the researcher processed the data using the mean, median, and mode descriptive statistical methods, as shown in Figure 2.

Respondent	Indicator	Average	Median	Mode
CE2	Context Evaluation	3.63	4	4
CE3	Context Evaluation	4.00	4	4
CE4	Context Evaluation	2.75	3	3
CE5	Context Evaluation	2.25	2	2
CE6	Context Evaluation	2.88	3	3
CE7	Context Evaluation	2.00	2	2
CE8	Context Evaluation	2.00	2	2
CE9	Context Evaluation	3.00	3	3
IE2	Input Evaluation	3.00	3	3
IE3	Input Evaluation	2.63	2.5	2
PE1	Process Evaluation	4.00	4	4
PE2	Process Evaluation	3.00	3	3
PE3	Process Evaluation	3.00	3	3
PE4	Process Evaluation	2.88	3	3
PE5	Process Evaluation	3.00	3	3
PE6	Process Evaluation	3.00	3	3
PE7	Process Evaluation	3.00	3	3
PE9	Process Evaluation	2.50	2.5	2
PE10	Process Evaluation	2.00	2	2
PE11	Process Evaluation	2.00	2	2
OE3	Output Evaluation	2.00	2	2
OE4	Output Evaluation	3.00	3	3
OE5	Output Evaluation	3.38	3	3

Context Evaluation	2.813
Input Evaluation	2.813
Output Evaluation	2.792
Process Evaluation	2.838
Grand Total	**2.821**

Figure 3. Average Calculation Results Per Indicator

Figure 3 shows the measurement results of the mean (average), which shows the distribution of ratings per indicator. Next, the researcher conducted a T-test for each questionnaire question, where the results are shown in Appendix 2.

Based on the data processing and testing results, several analyses are mapped through Table 4.

Table 4 L&G Program Performance Achievement Analysis

No	Issues	Analysis
1	A score of 4 was achieved for all respondents	#2. The management has set measurable targets and socialized them #11. The L&G program has mapped out the entire process from upstream to downstream
2	Approaching a score of 4 (data shows a not-too-significant difference with target 4)	#1. Management involves stakeholders to analyze problems as a basis for considering the selection of the L&G program
3	Achievement of a score of 3 for all respondents	#8. The implementation of the L & G program is accompanied by experts (academicians and practitioners) in their fields #9. The existing production (manufacturing) system supports the implementation of the L&G program
		#12. The L&G program has improved the inventory system #13. The L&G program has improved the standard operational processes at the company #15. The L & G program coordinator performs his duties and reports progress following his obligations #16. All employees are involved in implementing the L & G program #17. The L & G program is carried out according to the plan/schedule determined by management #22. Increased discipline to come to work on time
4	Approaching a score of 3 (data shows a not-too-significant difference with target 3)	#3. Management is committed to fulfilling all requirements to implement the L&G program #5. The management has designed a key performance indicator (KPI) that will be used to evaluate the achievement of the objectives of the L & G program #10. Management collaborates in implementing alternative strategies when the existing system cannot support the implementation of the L & G program #14. The L&G program has measured a company's productivity and efficiency #18. The L & G program coordinator periodically evaluates and analyzes program implementation and reports it to management #23. Management decisions regarding the future sustainability of the L&G program
5	Need Improvement	#4. The management maps opportunities, establishes cooperation, and promotes the implementation of L & G as a marketing strategy #6. Complete strategic planning and disseminate it to all employees

No	Issues	Analysis
		#7. Management plans regular monitoring activities for the implementation of the L & G program #19. The program implementation analysis contains the factors that support the success of the program and strategies for optimizing it #20. The analysis of program implementation contains factors that impede the success of the program and strategies for overcoming them #21. Increased number of improvement ideas from employees

The following discussion is related to the analysis of differences in the evaluation results between the answers given by the management and the operational team. Five indicators show a significant difference in answers, shown in Figure 3.

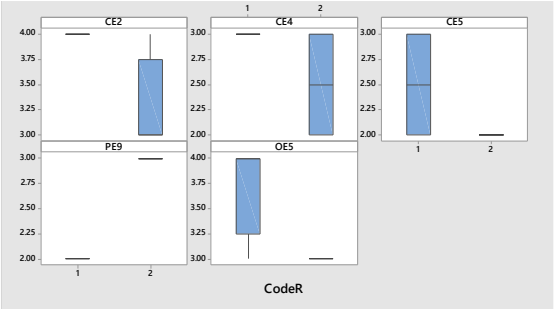

Figure 4. Box Plot Lean and Green Evaluation Answers Differences

Figure 4 shows that management feels that they have involved stakeholders in conducting a problem analysis as a basis for considering the selection of the L&G program (CE2 indicator). That condition also happens to indicators CE4 and CE5. In comparison, the Operations Team answered otherwise. For the PE9 indicator, the Operational Team replied that they had conducted an evaluation and analysis. However, the management answered otherwise. Then, the final difference lies in the OE5 indicator, where the operational team does not see clear management decisions regarding the sustainability of the L & G program in the future.

The researcher suggests two strategies to conduct six indicators that need improvement at the end of Table 4. First, the management and Operations Team synergize in correcting these differences in perceptions by conducting open innovation. Second, the company must increase the frequency of coordination meetings. These activities can ensure the sustainability of the L&G program in the future.

5. CONCLUSION

This research produced an evaluation model of lean and green-based work activity programs in the Cosmetic Small and Medium Industry (IKM) based on four categories, 13 assessment objectives, 16 summative assessment indicators, and two data collection techniques (observation and questionnaires). This model refers to the CIPP model approach (Context, Input, Process, Output). Researchers analyzed 6 (six) indicators that must be improved, which require more vigorous management efforts, namely, elaborating the L & G program into marketing strategy, outreach to all employees, and periodic monitoring activities. In addition, improvement also requires synergy between management, the L & G team, and employees, namely an in-depth analysis of the supporting and inhibiting factors for the success of the program and its strategy, as well as efforts to increase the number of employee improvement ideas.

The researcher suggests that the relevant SMIs should evaluate the success of the L&G program by using the evaluation model produced in this study. Further studies regarding how to align the success of the L&G program with the company's marketing

strategy is an interesting research topic to be explored. Other researchers can examine from the perspective of stakeholders and customers regarding the attractiveness of the L&G program on people's decisions to buy a product.

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