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Application of Job Order Costing and Variance Analysis for Production Cost Control in Printing MSMEs

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ABSTRACT

This study aims to analyze the application of the Job-Order Costing method and variance analysis in controlling production costs at Anugrah Photo Printing MSME. This study uses a case study approach with primary data processed based on the components of direct material costs, direct labor costs, factory overhead costs, as well as production targets and actual production. The results show that cost allocation based on the Job-Order Costing method produces a cost of goods manufactured (COGM) of Rp906.00/sheet for 4R photo printing and Rp898.81/sheet for 10R photo printing. Variance analysis shows an unfavorable variance of 17,000 sheets (10 rolls) between the production target (58,800 sheets) and actual realization (41,800 sheets), or a capacity achievement of 71.09%. The application of Job-Order Costing is able to prevent understatement of COGM caused by discrepancies in financial recording. In addition, volume variance analysis reveals a negative (unfavorable) deviation between the planned target and actual production achievement. Reorganizing the classification of Factory Overhead Costs (FOC) and tightening production targets are recommended to improve cost control and business profitability margins. Thus, the Job-Order Costing method can provide information on costs and margins for each order, while variance analysis can be used to evaluate the achievement of production targets.

Keywords: Job-Order Costing, Cost of Goods Manufactured, Cost Control, Volume Variance Analysis.

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INTRODUCTION

Micro, Small, and Medium Enterprises (MSMEs) in the printing sector play a strategic role in supporting the national economy by providing employment and product customization services (Sriyono et al., 2021). Unlike mass-production manufacturing, the printing industry operates with job-order characteristics, in which the manufacturing process is initiated only after a specific customer request is received (Mulyadi & Kurniawan, 2022). The diversity of product specifications in terms of dimensions, material types, and complexity requires a cost accumulation system capable of accurately identifying and allocating costs for each order (Hansen & Mowen, 2021). In this context, the application of Job-Order Costing is highly relevant

because it enables the transparent tracing of direct material, direct labor, and factory overhead costs through job cost sheets (Carter & Usry, 2021; Horngren et al., 2022).

The relevance of the Job-Order Costing method in order-based creative industries has been demonstrated by various previous studies (Nugraheni & Sastrawan, 2025; Azis et al., 2025). Structured COGM calculations have been shown to help management eliminate inaccuracies in cost allocation and optimize selling price determination (Khoirina et al., 2024). Nevertheless, its implementation at the MSME level still often faces technical obstacles, such as neglecting certain overhead components and the unavailability of adequate job cost sheet documentation (Nangin et al., 2018).

In addition to COGM tracing, effective operational control also requires an evaluation of deviations between plans and actual results. In management accounting practice, variance analysis is generally used to compare actual costs with budgets or standard costs (Garrison et al., 2021; Widiyati, 2025; Amani & Ermawati, 2021). However, most of the existing literature still examines these two concepts separately: Job-Order Costing studies predominantly focus on financial COGM calculations, while variance studies emphasize standard-cost evaluation, which is often unavailable in MSMEs. This creates a research gap regarding the importance of integrating order-based COGM tracing with volume variance analysis (target versus actual quantity) as a measure of production effectiveness in MSMEs without a standard costing system.

The empirical problem was clearly identified at Anugrah Photo Printing MSME. In its operations, the entity faces two main constraints: first, the high dominance of direct material costs that are not consistently identified in summarized cost records, potentially causing understatement of COGM; second, a significant quantity gap between the planned production volume target and actual output in the field. The inability to achieve the volume target indicates a decline in production effectiveness that has not yet been systematically evaluated.

To bridge the limitations in the literature while addressing the partner's problems, this study was conducted under the title “Application of Job-Order Costing and Variance Analysis for Production Cost Control in Printing MSMEs”. This study aims to analyze the application of Job-Order Costing in producing precise COGM calculations for each order, as well as to evaluate operational achievement through volume variance analysis. The practical contribution of this

study is to present an adaptive framework for cost control and production volume evaluation for the management of Anugrah Photo Printing MSME.

LITERATURE REVIEW

Production Costs

Production costs are understood as the sacrifice of economic resources undertaken to process materials into finished products (Blocher et al., 2021). According to Dunia et al. (2021), the main structure of production costs consists of three fundamental elements: expenditures for direct materials, compensation for direct labor, and allocation of production overhead costs. In the context of order-based manufacturing (Job-Order Costing), these three expenditure variables are traced and allocated specifically to each job sheet to ensure accurate cost assignment (Carter & Usry, 2021).

Job Order Costing

The Job-Order Costing method is defined as a production cost accumulation system in which costs are accumulated based on a specific work unit or customer order triggered by a special customer request (Horngren et al., 2022). The main characteristics of this method include manufacturing processes that vary according to customer specifications, cost accumulation based on order identification numbers, the use of a primary document in the form of a job cost sheet, direct tracing of material and labor costs, and allocation of overhead using a predetermined rate (Hansen & Mowen, 2021). Empirical studies in the printing industry demonstrate that order-based cost accumulation can improve the effectiveness of managerial control compared with conventional recording (Lestari & Wijaya, 2023). This is consistent with the findings of Kautsar and Srimindarti (2021) in digital printing entities, which show that Job-Order Costing is highly relevant for systematically classifying material, labor, and overhead expenditures in custom-order businesses.

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Volume Variance Analysis

Variance analysis is a management accounting technique used to identify deviations between plans, budgets, or established standards and actual results in the field (Garrison et al., 2021). In the context of operational cost evaluation, variance analysis helps determine whether deviations are favorable or unfavorable (Siregar et al., 2022). In MSMEs that do not yet have established standard costs, variance analysis can focus on the quantitative aspect, namely volume variance analysis, which compares the target production quantity with actual output achievement (Widiyati, 2025). This variance information serves as an important feedback-control instrument for management to diagnose the causes of delays or declines in production effectiveness (Rahman & Pratama, 2023).

Production Cost Control

Production cost control is a series of planned activities aimed at ensuring that resource utilization operates efficiently and is aligned with organizational objectives (Samryn, 2021). Effective control processes include setting operational targets, recording actual costs and volumes, comparing targets with actual results, identifying variances, analyzing root causes, and taking corrective action (Siregar et al., 2022). The integration of Job-Order Costing-based cost tracing and volume variance analysis provides a holistic evaluation framework for MSMEs to control cost efficiency while achieving product quantity targets (Lestari & Wijaya, 2023).

METHOD

This study applies a quantitative descriptive approach by adopting a case study design to explore phenomena in depth within a natural setting (Sugiyono, 2021). The use of a quantitative descriptive method aims to describe the implementation of the Job-Order Costing system, calculate production costs, and identify potential deviations (variances) based on the processing of available numerical cost data (Siregar et al., 2022).

This study is limited in that variance analysis is conducted only on production volume, namely target and actual realization. The study does not analyze material price and quantity variances, labor rate and efficiency variances, or overhead variances because the standard data

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required for such calculations are not available. Therefore, the study is limited to the empirical information available at Anugrah Photo Printing MSME. The data analysis steps include:

1. Cost Classification, namely separating Direct Material Costs (DMC), Direct Labor Costs (DLC), and Factory Overhead Costs (FOC).
2. COGM Calculation (Job-Order Costing), namely allocating all cost components to each order group (4R Photo and 10R Photo) based on the proportion of material consumption/roll volume, calculated using the following formula:

   Order proportion: $P_i = \frac{R_i}{R_T} \times 100\%$

   Description:
   P_i= cost proportion of order i
   R_i= roll volume of order i
   R_T= total roll volume

   Allocated costs: $B_i = B_T \times P_i$

   Description:
   B_i= cost allocated of order i
   B_T= total production costs
   P_i= order proportion

   Cost of Goods Manufactured: $COGM = DMC + DLC + FOC$

   Description:
   DMC = Direct Material Costs
   DLC = Direct Labor Costs
   FOC = Factory Overhead Costs

   COGM per unit: $COGM/unit = \frac{COGM}{Q_i}$

   Description:
   Q_i= number of units produced for each order.

3. Production Volume Variance Analysis, namely comparing the budgeted production target with actual production to identify the level of capacity efficiency. In this study, production volume variance is used as an indicator of production control and is calculated using the following formula: $V = Q_A - Q_T$

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Description:
V= production volume variance
Q_A= actual production
Q_T= production target

Achievement percentage:

$$AP = \frac{Q_A}{Q_T} \times 100\%$$

Shortfall percentage:

$$SP = \frac{Q_T - Q_A}{Q_T} \times 100\%$$

Interpretation is performed by comparing actual production with the target. A negative variance indicates that actual production is below the target, whereas a positive variance indicates that actual production exceeds the target.

RESULT AND DISCUSSION

1. RESULT

a. Production Cost Classification

Cost classification is performed to ensure that each cost element related to the production process can be identified and used in calculating the cost of goods manufactured using the Job-Order Costing method. Based on the material data obtained from Anugrah Photo Printing MSME, the following results were obtained.

Table 1. Direct Material Costs

Raw Material Type	Quantity	Unit Price (Rp)	Total Cost (Rp)
Paper Glossy	15 Rolls	1,250,000	18,750,000
Paper Lutter	10 Rolls	1,250,000	12,500,000
Chemicals/Chemical Materials	2,000 mL	750	1,500,000
	Total		32,750,000

Source: Primary data, processed (2026).

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Based on Table 1, proportionally, Paper Glossy contributes approximately 57.25% of total direct material costs, Paper Lutter 38.17%, while Chemicals/Chemical Materials account for 4.58%. This composition shows that paper-based materials are the main component of the production material cost structure at Anugrah Photo.

Furthermore, labor costs and factory overhead costs are classified based on their relationship to production activities.

Table 2. Labor Costs and Factory Overhead Costs

Cost Component	Quantity	Cost per Month (Rp)	Classification
Production Employee	1 person	1,800,000	DLC
Design Employee	1 person	1,200,000	FOC
Administrative Employee	1 person	1,000,000	Adm & General Expenses
Electricity	-	1,000,000	FOC
Total		5,000,000	

Source: Primary data, processed (2026).

Based on Table 2, Direct Labor Costs of Rp1,800,000 are derived from production employees directly involved in the production process. Design employee costs of Rp1,200,000 and electricity costs of Rp1,000,000 are classified as Factory Overhead Costs, so the total FOC used in calculating COGM is Rp3,200,000. Meanwhile, administrative employee costs of Rp1,000,000 are not included in COGM because they are administrative and general expenses. Thus, the total production costs used in the analysis consist of:

Total Production Costs = DMC + DLC + FOC

= Rp32,750,000 + Rp1,800,000 + Rp3,200,000

= Rp37,750,000,-

The results of this classification provide the basis for calculating the cost of goods manufactured using the Job-Order Costing method.

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b. COGM Calculation Using the Job-Order Costing Method

The second stage is to calculate the cost of goods manufactured using the Job-Order Costing method. In this study, the orders analyzed consist of 25,000 sheets of 4R Photo and 16,800 sheets of 10R Photo. Costs are allocated to each order based on the proportion of material consumption or roll volume.

Table 3. Cost of Goods Manufactured Calculation Based on Job-Order Costing

Cost Element	4R Photo Order	10R Photo Order	Total (Rp)
Direct Material Costs (DMC)	Rp 19,650,000	Rp 13,100,000	32,750,000
Direct Labor Costs (DLC)	Rp 1,080,000	Rp 720,000	1,800,000
Factory Overhead Costs (FOC)	Rp 1,920,000	Rp 1,280,000	3,200,000
Total COGM	Rp 22,650,000	Rp 15,100,000	**37,750,000**
COGM per Unit	**Rp 906.00**	**Rp 898.81**	-
Actual Selling Price per Unit	Rp 1,350.00	Rp 1,350.00	-
Profit Margin per Unit	**Rp 444.00**	**Rp 451.19**	-
Profit Margin (%)	**32.89%**	**33.42%**	-

Source: Primary data, processed (2026)

The results show that the COGM per unit of 10R Photo, Rp898.81, is slightly lower than the COGM per unit of 4R Photo, Rp906.00. With the same selling price, this condition results in a profit margin of Rp451.19 per sheet for 10R Photo, while 4R Photo generates Rp444.00 per sheet.

The research results show that the application of Job-Order Costing enables Anugrah Photo to obtain cost information based on order groups. Total production costs of Rp37,750,000 can be traced into two order groups, namely Rp22,650,000 for 4R Photo and Rp15,100,000 for 10R Photo.

This information provides a more specific picture of the cost consumption of each order compared with a situation in which all production costs are presented only in aggregate. For

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order-oriented printing businesses, cost information per order is important because it can be used to determine the costs required to produce a product and compare them with the selling price.

The calculation results also show that the direct material cost component is the largest part of production costs. Total DMC of Rp32,750,000 accounts for approximately 86.75% of total production costs of Rp37,750,000. DLC of Rp1,800,000 or approximately 4.77%, while FOC of Rp3,200,000 or approximately 8.48%. The dominance of DMC indicates that information on material usage is an important part of production cost control at Anugrah Photo. Thus, Job-Order Costing can support cost control by providing information on the cost of each order, COGM per unit, and the margin obtained.

c. Volume Variance Analysis

The third stage of data analysis is to conduct volume variance analysis. In this study, production volume variance is used as an indicator to evaluate target achievement and production capacity utilization. Variance interpretation is based on the comparison results. A negative variance indicates that actual production is below the target, while a positive variance indicates that actual production exceeds the target. The results of the volume variance analysis are presented in Table 4.

Table 4. Volume Variance Analysis of Production Targets and Actual Realization

Product Type	Production Target	Actual Realization	Variance	Achievement Percentage	Shortfall Percentage
4R Photo	33,600 sheets (20 Rolls)	25,000 sheets (15 Rolls)	-8,600 sheets (-5 Rolls)	74.40%	25.60%
10R Photo	25,200 sheets (15 Rolls)	16,800 sheets (10 Rolls)	-8,400 sheets (-5 Rolls)	66.67%	33.33%
Total	**58,800 sheets (35 Rolls)**	**41,800 sheets (25 Rolls)**	**-17,000 sheets (-10 Rolls)**	**71.09%**	**28.91%**

Source: Primary data, processed (2026).

By product type, 4R Photo has an achievement rate of 74.40%, while 10R Photo has 66.67%. Thus, the achievement rate of 10R Photo is lower by 7.73 percentage points than that of 4R Photo.

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The analysis shows that Anugrah Photo's actual production has not reached the established target. From a target of 58,800 sheets, actual production was 41,800 sheets, resulting in a negative variance of 17,000 sheets. Overall production achievement was 71.09%, while the achievement shortfall was 28.91%. In this study, the negative variance indicates that actual production volume was lower than the targeted volume. This condition can be used as evaluation information for production planning and control, particularly in assessing the achievement of the planned production capacity.

2. DISCUSSION

The research findings reinforce that the effectiveness of production cost control at Anugrah Photo Printing MSME is largely determined by the accuracy of cost structure tracing and the achievement of operational volume targets. In terms of expenditure structure, Direct Material Costs (DMC) were identified as the most dominant element, absorbing 86.75% of total production costs (Rp32,750,000 of Rp37,750,000). This high proportion indicates that the entity's operational efficiency depends heavily on strict material control, considering that even small deviations in the use of glossy paper, lutter paper, or chemicals may significantly erode the profitability margin.

The application of Job-Order Costing also reveals a strategic weakness in the company's pricing policy. Although both product lines generate relatively healthy profit margins (32.89% for 4R Photo and 33.42% for 10R Photo), management's decision to set a uniform selling price of Rp1,350.00 per unit for products with different dimensions and material consumption risks obscuring the actual profitability potential.

On the other hand, Anugrah Photo's inability to meet the target quantity quota across all product lines indicates systematic constraints in operational planning and production capacity control. The high negative volume variance (unfavorable volume variance) has direct implications for the company's manufacturing cost efficiency. From a management accounting perspective, failure to achieve the planned output volume may trigger idle capacity, both in terms of printing machine facilities and the allocation of labor hours.

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This under-production condition hinders the optimal allocation of fixed factory overhead costs to each unit produced. As a result, the overhead burden allocated per unit tends to increase and distort the calculation of actual Cost of Goods Manufactured (COGM). This phenomenon confirms that the use of volume variance analysis is vital as a feedback-control instrument for MSME management. This deviation information provides a strategic basis for reassessing the accuracy of production targets,

Overall, this study demonstrates that integrating the Job-Order Costing method and volume variance analysis produces a comprehensive managerial evaluation framework. Job-Order Costing provides a detailed information base on COGM per order, COGM per unit, and profit margins to prevent financial distortion, while volume variance analysis provides a benchmark for output volume achievement to evaluate production capacity effectiveness. The synergy of these two instruments functions as a holistic feedback-control mechanism: management not only assesses efficiency based on the amount of funds spent, but can also measure the business's ability to realize production quantity targets. This integrated information becomes a strategic foundation for Anugrah Photo management to eliminate workflow bottlenecks, establish standard costs, and control operating costs sustainably.

CONCLUSION

Based on the results of the analysis and discussion, this study concludes that the integration of the Job-Order Costing method and volume variance analysis provides a comprehensive framework for optimizing production cost control systems at the MSME level. The application of Job-Order Costing is proven capable of identifying and allocating Direct Material Costs (DMC), Direct Labor Costs (DLC), and Factory Overhead Costs (FOC) in a structured manner for each order calculation. This transparent tracing produces precise estimates of COGM per order, COGM per unit, and profitability margins, while minimizing the risk of financial distortion in the form of COGM understatement that frequently occurs under traditional accounting methods.

On the other hand, volume variance analysis functions as a managerial evaluation instrument for measuring the level of achievement of operational quantity targets. The research

findings emphasize that the effectiveness of production cost control is not measured solely by the efficiency of accumulated cash expenditures, but also by the entity's ability to systematically present order-based cost data and realize the planned production volume capacity.

Nevertheless, the existence of a negative volume deviation (unfavorable volume variance) does not necessarily indicate internal operational inefficiency alone. If the decline in production volume is triggered by market demand contraction dynamics, the deviation is external. Conversely, if the deviation occurs due to manufacturing capacity limitations or technical obstacles in the workflow, it becomes an indicator of operational inefficiency. Therefore, the continuous implementation of variance analysis requires empirical verification through variance investigation to provide an objective and rational basis for strategic decision-making by management.

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