

VARIANCE ANALYSIS OF DIRECT MATERIAL AND DIRECT LABOR COSTS

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Abstract

This research explores the pivotal role of variance analysis in managing and controlling direct material and direct labor costs in manufacturing environments. With increasing global competition, the accuracy of standard costing systems is essential for business sustainability and value creation. The study aims to analyze how price and efficiency variances impact overall production budgets and management decisions. Employing a rigorous analytical methodology, the research explores the mathematical frameworks for price and quantity variances of materials, along with labor rate and efficiency variances. The findings indicate that systematic monitoring of variances not only identifies operational inefficiencies but also serves as a strategic tool for enhancing competitive advantage. By aligning theoretical standards with practical factory floor data, the study provides a roadmap for cost accountants to minimize waste and optimize resource allocation.

Keywords: *Variance Analysis, Standard Costing, Direct Materials, Direct Labor, Cost Control, Manufacturing Efficiency.*

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1. INTRODUCTION

In today's manufacturing landscape, maintaining financial discipline is crucial for long-term survival. As companies face market volatility and rising inventory costs, implementing a robust cost control mechanism becomes critical (Rashid, 2020). Standard costing is a cornerstone of this, providing a structured framework for performance evaluation. Variance analysis is a key component of this system, serving as a diagnostic tool that enables accountants to analyze variances in total costs and derive actionable insights (Jaf *et al.*, 2025).

This paper focuses on analyzing differences in direct materials and direct labour. Direct materials often make up the largest share of manufacturing costs, making them highly susceptible to price fluctuations and supply chain inefficiencies. Similarly, direct labor represents the human element of production, where productivity and wage stability directly affect net profits. Any difference, whether positive or negative, indicates the need for management intervention.

Despite the availability of automated accounting systems, many manufacturing firms in emerging markets lack the analytical depth needed to strategically interpret these differences. This paper aims to fill this gap by examining the mathematical underpinnings and underlying causes of cost variance. By aligning theoretical models with practical realities, this paper provides a roadmap for improving efficiency and enhancing the competitive advantage of the firm.

2. MEANING AND PURPOSE

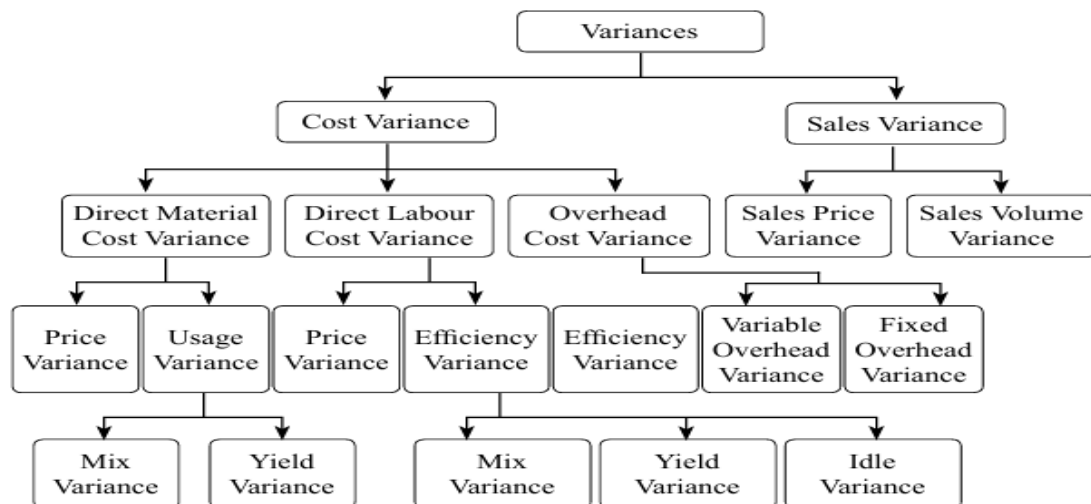
After the standard costs have been set, the next step is to ascertain the actual cost of each element and compare them with the standard already set. The difference of actual from the standard is variance, while setting standard specific method of production is to be kept in mind. If a different method of production is adopted, it gives rise to a different amount of cost, thereby causing variance, known as method variance. In standard costing, Variance means the difference between a standard cost and the comparable actual cost incurred during a period (Rashid, 2024). Variance analysis is the process of analysing variances by sub-dividing the total variance in such a way that management can assign responsibility for any off-standard performance. Thus, variance analysis

means the measurement of the deviation of actual performance from the desired performance. Variance may be favourable or unfavourable depending upon whether the actual cost is less or more than the standard cost. If the actual cost is less than the standard cost, the variance is termed as 'favourable' and if the actual cost is more than the standard cost, variance is called as 'unfavourable' or 'adverse' variance (Rashid, 2023). The effect of favourable variance increases the profit and it is a sign of efficiency of the organisation. On the other hand, unfavourable variance refers to the loss of the business and it is a sign of inefficiency of the organisation. Finding variance is not the ultimate objective of the standard costing. But their analysis and finding the causes of variance is the ultimate aim to control cost. Control of cost depends on the corrective action taken by the management (Abdullah *et al.*, 2025). The analysis of variance helps the management to locate deficiency and assign responsibility to particular person or cost centre. The next step of the management is to find out the reason for the variance to pin points where necessary corrective action should be taken over.

3. CLASSIFICATION OF VARIANCES

The variance may be broadly classified as Controllable variances and Uncontrollable variances. Variance is said to be controllable if it is identified as the primary responsibility of a particular person or department (Rashid, 2019). The excessive use of materials or labor hours than the standards can be attributable to a particular person. When the variations are due to the factors beyond the control of the concerned person or department, it is said to be uncontrolled. The rise in prices of materials, increase in wage rates, Govt. restrictions etc., are the examples of uncontrollable variance. These factors are not within the control of the management and the responsibility of the variance cannot be assigned to any particular person or division. The division of variance into controllable and uncontrollable is important from the view point of management as it can place more emphasis on controllable variance and thus facilitates to the principle of management by exception. Standard costing to be more realistic, sometimes the standards set are to be revised on account of changes in uncontrollable factors like wages, materials, etc. To take into account these factors into variance, a 'revised variance' is created and the basic standard is allowed to continue (Rashid, 2022; Torlak *et al.*, 2021). Using VIKOR with structural equation modeling for constructing benchmarks in the Internet industry. Benchmarking: An International Journal, 28(10), 2952-2976.). This revision variance is the difference between the standard cost

originally set and the revised standard cost. Variances may be classified into two categories viz., cost variances and sales variances (Rashid, 2020). The cost variance may again be sub-divided into variances for each element of cost and the sales variances may also be sub-divided into sales price variance and sale volume variance as shown in the following chart.



4. STANDARD COSTING AND VARIANCE ANALYSIS

Sub-division of variance of each element of cost gives valuable information to the management to control the cost. Another classification of Variance analysis is i) Price Variance, and ii) Volume Variance Price Variance relates to the prices of materials, rates of labor, expenditure on overheads or selling prices of products (Rashid & Jaf, 2023). The price variance may be classified as:

1. Material Price Variance
2. Labor Rate Variance
3. Variable Overhead Expenditure Variance
4. Fixed Overhead Expenditure Variance
5. Sales Price Variance

Direct Material Cost Variance

Materials constitute most important element of cost. Therefore, utmost care should take in purchasing and using the materials. Direct Material Cost Variance is the difference between the standard cost of materials specified for the output achieved, and the actual cost of direct materials consumed. Standard cost of materials is computed by multiplying the standard price with the standard quantity for actual output. The actual cost is computed by multiplying actual price with the actual quantity used (Rashid & Hamad, 2024; Torlak & Muceldili, 2014).

Direct Material Price Variance

Direct Material Price Variance is the difference between actual price and standard price of materials consumed. Material price variance may arise due to the following reasons:

- 1) Changes in the prices of materials,
- 2) Uneconomical size of purchase orders,
- 3) Failure to purchase materials at proper time,
- 4) Fluctuations in the cost of transportation and carriage of goods,
- 5) Buying efficiency or inefficiency,
- 6) Not availing cash discounts when setting standards,
- 7) Purchase of substitute material for non-availability of specified material,
- 8) Changes in the duty structure which is forming part of price,
- 9) Inefficiency of purchase department, etc

Some of the above factors are controllable if proper care is exercised by the management. Generally, the Purchase Manager will be held responsible for material price variance (Rashid, 2023; Tokgöz et al., 2018).

Material price variance will be calculated as follows:

Direct Material Price Variance = Actual Quantity (Standard Price – Actual Price) = AQ (SP – AP)

5. PRACTICAL APPLICATIONS AND NUMERICAL ANALYSIS

To illustrate the theoretical framework described, we apply the difference equations to a hypothetical manufacturing scenario (Company X).

Calculation of Direct Material Difference

Suppose that Company X has established the following standards for the production of one unit:

- Standard Quantity (SQ): 5 kg
- Standard price (SP): \$10/kg

During the production period of 1000 units, the following actual data were recorded:

- Actual quantity (AQ): 5200 kg
- Actual Price (AP): \$9.5/lb

Table 1 : Direct Material Variance Analysis

Variance Type	Formula	Calculation	Result	Status
Price Variance (MPV)	$AQ \times (SP - AP)$	$5,200 \times (10 - 9.5)$	2,600	Favorable (F)
Quantity Variance (MQV)	$SP \times (SQ - AQ)$	$10 \times (5,000 - 5,200)$	(2,000)	Unfavorable (U)
Total Material Variance	$MPV + MQV$	$2,600 + (-2,000)$	600	Favorable (F)

Calculation of Direct Labor Variance

The standards for labor are as follows:

- Standard Hours (SH): 2 hours per unit
- Standard Rate (SR): \$15 per hour

Actual data for 1,000 units produced:

- Actual Hours (AH): 2,100 hours
- Actual Rate (AR): \$16 per hour

Table 2 : Direct Labor Variance Analysis

Variance Type	Formula	Calculation	Result	Status
Rate Variance (LRV)	$AH \times (SR - AR)$	$2,100 \times (15 - 16)$	(2,100)	Unfavorable (U)
Efficiency Variance (LEV)	$SR \times (SH - AH)$	$15 \times (2,000 - 2,100)$	(1,500)	Unfavorable (U)
Total labor variance	$LRV + LEV$	$(-2,100) + (-1,500)$	(3,600)	Unfavorable (U)

6. MANAGERIAL DISCUSSION

1. **Material Analysis:** The company achieved a positive price differential, which is likely due to the purchase of cheaper and lower quality materials. However, this resulted in a negative

quantity difference due to higher amounts of material wasted (5200 kg instead of 5000 kg were used).

2. **Labor Analysis:** Both labor variance are unfavorable. This indicates that the company paid higher wages (perhaps overtime pay), but the workers were less efficient than planned, taking another 100 hours to complete the task.

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