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Homework #4_Set #1: DM and DL – Variance Analysis

1. **What are two possible sources of information a company might use to compute the budgeted amount in variance analysis?**

   Two possible sources a company might use to compute the budgeted amount in variance analysis are:
   1. **Historical Data:** Past performance and trends of the company.
   2. **Industry Benchmarks:** Average metrics or standards from the industry they operate in.

2. **Distinguish between a favorable variance and an unfavorable variance.**

   Favorable Variance: This occurs when the actual performance is better than the budgeted or standard performance. For example, having higher actual revenues than budgeted revenues or lower actual costs than budgeted costs would result in a favorable variance.

   Unfavorable Variance: This arises when the actual performance is worse than the budgeted or standard performance. For instance, having lower actual revenues than budgeted or higher actual costs than budgeted would result in an unfavorable variance.

3. **What is the key difference between a static budget and a flexible budget?**

   Static Budget: Prepared for a single, predetermined level of activity. It remains unchanged regardless of the actual level of activity experienced during the period.

   Flexible Budget: Adjusts or "flexes" based on the actual level of activity experienced during the period. It provides budgeted amounts at various activity levels, allowing a more relevant comparison between actual and budgeted performance.

4. **Why might managers find a flexible-budget analysis more informative than a static-budget analysis?**

   Managers often find flexible-budget analysis more informative than static-budget analysis because it adjusts to actual activity levels, offering a more apples-to-apples comparison. By adapting to real performance levels, a flexible budget isolates variances due to efficiency or price from those caused by volume changes. This clearer distinction empowers managers to better pinpoint the sources of discrepancies and make more informed operational decisions, rather than comparing against a fixed, potentially outdated prediction as in a static budget.

5. **Describe the steps in developing a flexible budget.**

Developing a flexible budget involves a series of steps to create a budget that can adjust to different levels of activity. Here's a brief overview of these steps:

1. **Identify Relevant Activity Levels:** Determine the range of activity levels for which the budget will be prepared, often based on historical data and future projections.

2. **Classify Costs:** Categorize costs as fixed, variable, or semi-variable. Fixed costs remain constant regardless of activity levels, variable costs change proportionally with activity, and semi-variable costs have both fixed and variable components.

3. **Determine Variable Cost per Unit:** Calculate the variable cost per unit of the activity base.

4. **Develop Budget Formulas:** For each cost, develop a formula that considers the variable cost per unit and the fixed costs.

5. **Compute Budget Amounts for Different Activity Levels:** Apply the budget formulas to various anticipated activity levels to determine the budgeted costs at each level.

6. **Prepare the Flexible Budget:** Compile the data into a budget format, which shows the expected costs for various activity levels.

6. **How might a manager gain insight into the causes of a flexible-budget variance for direct materials?**

A manager can gain insight into the causes of a flexible-budget variance for direct materials by analyzing both price and efficiency variances. The price variance identifies if there were differences between actual and standard prices paid for materials, while the efficiency variance indicates if more or fewer materials were used than originally budgeted for the actual production. By examining these variances, the manager can determine if the flexible-budget variance arises from paying different prices for materials, using materials inefficiently, or a combination of both. Investigating the underlying causes, such as supplier price changes, bulk purchasing discounts, wastage, or production inefficiencies, can further pinpoint the source of discrepancies.

7. **List three causes of a favorable direct materials price variance.**

   Three causes of a favorable direct materials price variance are:

   1. **Discounted Purchases:** Acquiring materials in larger quantities can sometimes result in bulk purchase discounts, thereby reducing the per-unit cost of materials.

   2. **Price Negotiations:** Proactive negotiations with suppliers or switching to a more cost-effective supplier can lead to materials being sourced at prices lower than initially budgeted or expected.

   3. **Substitute Materials:** Using a less expensive, yet equally effective alternative or substitute material can result in savings.

8. **Describe three reasons for an unfavorable direct manufacturing labor efficiency variance.**

   An unfavorable direct manufacturing labor efficiency variance suggests that more labor hours were used than were originally budgeted for the actual production achieved. Three reasons for this variance include:

   1. **Inadequate Training:** Workers might lack the necessary skills or training, causing them to take longer to complete tasks.

   2. **Outdated or Malfunctioning Equipment:** Using equipment that frequently breaks down or isn't efficient can slow down the production process, requiring more labor hours.

   3. **Complex Product Designs:** If a product's design is more intricate or changed frequently, workers might take longer to produce it, leading to inefficiencies.

9. **How does variance analysis help in continuous improvement?**

   Variance analysis plays a pivotal role in continuous improvement by identifying deviations between planned and actual performance. By scrutinizing these variances, organizations can pinpoint areas of inefficiencies, waste, or other operational challenges. This diagnostic capability offers actionable insights, prompting managers to investigate root causes, implement corrective actions, and refine processes. Over time, the systematic identification and resolution of these issues drive performance enhancements, reduce costs, and improve overall operational efficiency. Thus, variance analysis serves as a feedback mechanism that fosters a culture of constant evaluation and iterative improvement within organizations.

10. **Why might an analyst examining variances in the production area look beyond that business function for explanations of those variances?**

An analyst examining variances in the production area might look beyond that specific business function for explanations because many variances can be influenced by external factors or other departments. For instance, purchasing might source lower-quality materials, leading to production inefficiencies; the design department could introduce complex product changes without timely notice, causing labor inefficiencies; or the sales department might provide inaccurate demand forecasts, leading to overproduction or stockouts. Furthermore, external market dynamics, such as supplier disruptions or sudden shifts in customer preferences, can also impact production. Hence, to truly understand and address the root causes of production variances, it's crucial to consider interconnected processes and broader organizational and external factors.

11. **Comment on the following statement made by a plant manager: "Meetings with my plant accountant are frustrating. All he wants to do is pin the blame on someone for the many variances he reports."**

The statement by the plant manager highlights a common sentiment about variance analysis, which is sometimes viewed merely as a tool for assigning blame. Ideally, variance analysis should be approached collaboratively, emphasizing its role in problem-solving and continuous improvement rather than finger-pointing. The frustration expressed by the manager suggests that the plant accountant might be focusing too narrowly on identifying culprits, rather than facilitating constructive dialogue to understand root causes and develop solutions. For variance analysis to be truly effective, it should foster a culture of teamwork, shared responsibility, and a forward-looking approach to rectify issues and improve overall performance.

12. **A company is a manufacturer. For their most recent month, the company had the following standards for Product A:**
Direct materials per unit – 3 square yards of input at $5.50 per square yard
Direct manufacturing labor per unit – 0.5 hour of input at $10.50 per hour

The following data were compiled regarding *actual performance*:

Actual output units of Product A produced	**2,200**	
Square yards of input purchased and used	**6,200**	
Price per square yard		**$5.70**
Direct manufacturing labor costs	**$9,844**	
Actual hours of input	**920**	
Labor price per hour	**$10.70.**	

A. Show computations of price and efficiency variances for direct materials and direct manufacturing labor. Give a plausible explanation of why each variance occurred.

Direct Materials:

	Actual	As - If	Flexible	
Quantity	6,200	6,200	6600	
Price	5.7	5.5	5.5	
Total	35340	34100	36300	
				U/F
Price Variance	-1240			U
Efficiency Variance		2200		F
Budget Variance	960			F

The unfavorable variance in material price might not have any connection with the favorable efficiency variance for the materials. This could be because:

(a) The individual responsible for purchasing might not have been as proficient as budgeted expectations, or

(b) There might have been an unexpected surge in the price per square yard of materials due to a decrease in market competition.

On the other hand, the favorable variance in material efficiency might not correlate with the unfavorable price variance. This could arise if:

(a) The production supervisor managed to hire more skilled labor, or

(b) The original material standards in the budget might have been set too leniently.

Additionally, there could be a relationship between both variances. The elevated price of material inputs might result from the procurement of higher quality materials. This superior quality could have contributed to less material usage than initially budgeted.

Direct Manufacturing Labor:

	Actual	As - If	Flexible	
Quantity	920	920	1100	
Price	10.7	10.5	10.5	
Total	9844	9660	11550	
				U/F
Price Variance	-184			U
Efficiency Variance		1890		F
Budget Variance	1706			F

The negative variance in labor price might be attributed to factors such as:

(a) a rise in labor costs because of a thriving economy, or
(b) the benchmark being established without a thorough examination of labor wages.

Conversely, the positive labor efficiency variance could result from situations like:

(a) hiring of more competent workers,
(b) modifications in the plant layout that boost worker productivity, or
(c) the utilization of superior quality materials.

B. Suppose 8,700 square yards of materials were purchased (at $5.70 per square yard), even though only 6,200 square yards were used. Suppose further that variances are identified at their most timely control point; accordingly, direct materials price variances are isolated and traced at the time of purchase to the purchasing department rather than to the production department. Compute the price and efficiency variances under this approach.

Direct Manufacturing Price Variance:

	Actuals		Purchased "As If"	Production "As If"	Flexible Budget	
Purchased Quantity	8,700		8,700			
Production Quantity				6,200	6600	
Price	5.7		5.5	5.5	5.5	
Total	49590		47850	34100	36300	
						U/F
DM Purchase Price Variance		-1740				U
DM Efficiency (Quantity) Variance				2200		F

13. A company manufactures products which it distributes in lots of 12 dozen units. In the most recent month, the company produced 5,000 lots of its Product A at each of its two plants, their East Plant and their West Plant. The CEO inquires about the precise per-unit budgeted variable costs at the two plants and the variable costs of a competitor, Competitor X, who offers similar-quality products at cheaper prices. The following information is collected for each lot:

Per lot	East Plant	West Plant	Competitor X
Direct materials	74 lbs. @ $3.20 per lb.	76.5 lbs. @ $3.10 per lb.	70 lbs. @ $2.90 per lb.
Direct manufacturing labor	2.5 hrs. @ $12.00 per hr.	2.4 hrs. @ $12.20 per hr.	2.4 hrs. @ $10.50 per hr.
Variable overhead	$20 per lot	$22 per lot	$20 per lot

Required:

A. What is the budgeted variable cost per lot at the East Plant, the West Plant, and at Competitor X?

	Quantity (lbs.)	Cost (per lb.)	Quantity (hrs.)	Cost (per hr.)	Variable Overhead (per lot)
East Plant	74	3.2	2.5	12	20
West Plant	76.5	3.1	2.4	12.2	22
Competitor X	70	2.9	2.4	10.5	20

Budgeted Variable Cost:

	Direct Materials	Direct Labor	Variable Overhead	Budgeted Variable Cost
East Plant	236.8	30	20	**286.8**
West Plant	237.15	29.28	22	**288.43**
Competitor X	203	25.2	20	**248.2**

B. Using the Competitor X data as the standard, calculate the direct materials and direct manufacturing labor price and efficiency variances for the East and West plants.

Actual:

	Lots	Quantity(lbs.)	Cost (per lb.)	Direct Materials	Quantity(hrs.)	Cost (per hr.)	Direct Labor
East Plant	5000	74	3.2	**1184000**	2.5	12	**150000**
West Plant	5000	76.5	3.1	**1185750**	2.4	12.2	**146400**

As-If:

	Lots	Quantity(lbs.)	Cost (per lb.)	Direct Materials	Quantity(hrs.)	Cost (per hr.)	Direct Labor
East Plant	5000	74	2.9	**1073000**	2.5	10.5	**131250**
West Plant	5000	76.5	2.9	**1109250**	2.4	10.5	**126000**

Flexible:

	Lots	Quantity(lbs.)	Cost (per lb.)	Direct Materials	Quantity(hrs.)	Cost (per hr.)	Direct Labor
East Plant	5000	70	2.9	**1015000**	2.4	10.5	**126000**
West Plant	5000	70	2.9	**1015000**	2.4	10.5	**126000**

	Price Variance	U/F	Efficiency Variance	U/F
	DM		**DM**	
East Plant	**-111000**	U	**-58000**	U
West Plant	**-76500**	U	**-94250**	U
	DL		**DL**	
East Plant	**-18750**	U	**-5250**	U
West Plant	**-20400**	U	**0**	NA

C. What advantage does the company get by using Competitor X's benchmark data as standards in calculating its variances? Identify two issues that the CEO should keep in mind in using the Competitor X data as the standards.

Utilizing a neutral, external reference point, such as a competitor's standards, can help in mitigating perceptions of bias or favoritism among different plants. Given that Competitor X has a record of success, it serves as a motivation for the plants to enhance their performance, especially when all variances are either neutral or negative. However, the CEO should consider the following points:

1. Ascertain that Competitor X truly represents the most appropriate and relevant benchmark. Are there other competitors in the market that might be more fitting?
2. Confirm the accuracy and reliability of the data.
3. Ensure that Competitor X's operations are sufficiently comparable to be used as a reference. If, for instance, Competitor X follows a distinct business approach, such as cost-cutting measures that the company might not wish to adopt due to its own product differentiation strategy, it may not be a suitable benchmark.
4. The wage disparity, based on hourly rates, might not be easily addressed by the company. This discrepancy is typically tied to the prevailing wage rates in the respective plant locations.

14. A company produces a product. The company participates in a supply chain that consists of suppliers, manufacturers, distributors, and elite shops. For several years the company has purchased titanium from suppliers in the supply chain. The company uses titanium for its product because it is stronger and lighter than other metals and therefore increases the quality of the product. Earlier this year, the company hired a new purchasing manager. The purchasing manager believed that they could reduce costs if they purchased titanium from an online marketplace at a lower price.

The company established the following standards based upon the company's experience with previous suppliers. The standards are as follows:

Cost of titanium	**$18 per pound**
Titanium used per unit of product	**8 pounds.**

Actual results for the first month using the online supplier of titanium are as follows:

Units of product produced	**400**
Titanium purchased	**5,200 pounds for $88,400.**
Titanium used in production	**4,700 pounds.**

Required:

A. Compute the direct materials price and efficiency variances.

	Actuals		Purchased "As If"	Usage "As If"		Flexible Budget	
Purchased Quantity	5,200		5,200				
Usage Quantity				4,700		3200	
Price	17		18	18		18	
Total	88400		93600	84600		57600	
							U/F
DM Purchase Price Variance		5200					F
DM Efficiency (Quantity) Variance					-27000		U

B. What factors can explain the variances identified in requirement A? Could any other variances be affected?

The positive price variance arises from the $1 discrepancy ($18 - $17) between the standard price set based on past suppliers and the actual amount paid via the online marketplace. Numerous factors could contribute to the negative efficiency variance, such as novice workers or equipment breakdowns. However, the probable reason in this case is that the more affordable titanium was of inferior quality or not as refined, leading to increased waste. This subpar quality of titanium might also have resulted in workers spending more time on tasks, impacting the labor efficiency variance.

C. Was switching suppliers a good idea for the company? Explain why or why not.

It appears that changing suppliers was an ill-advised move. While there was a saving of $5,200 on the titanium's purchase, it was eclipsed by the additional $27,000 spent on material consumption. Moreover, the unfavorable efficiency variance of $27,000 doesn't fully capture the repercussions of the inferior titanium quality. Out of the 5,200 pounds bought, only 4,700 pounds were utilized.

D. Should the production manager's evaluation be based solely on efficiency variances? Why is it important for the owner of the company to understand the causes of a variance before she evaluates performance?

The performance assessment of the purchasing manager shouldn't hinge solely on the price variance. While there was an immediate decrease in procurement expenses, it was surpassed by elevated usage costs. The evaluation of the purchasing manager should encompass the total expenses of the entire company. Similarly, the production manager's review shouldn't be restricted to just efficiency variances. In this instance, the production manager wasn't at fault for acquiring the substandard titanium, which culminated in the negative efficiency outcomes. It's pivotal for the business owner to recognize that not every positive material price variance signifies a beneficial outcome. This is due to the potential adverse impacts on the production phase stemming from procuring subpar resources. Such decisions can result in negative efficiency variances concerning both materials and labor. The business owner should also grasp that efficiency variances can emerge from various causes, and it's essential to identify these factors before making performance judgements.

E. Other than performance evaluation, what reasons are there for calculating variances?

Variances serve as tools to aid the company in deciphering the factors that contributed to the present financial outcomes and in charting a path for enhanced future performance. They play a crucial role in the company's ongoing enhancement endeavors. Instead of merely zeroing in on the titanium's price, the purchasing manager should weigh both price and quality in upcoming procurement decisions.

F. What future problems could result from the company's decision to buy a lower quality of titanium from the online marketplace?

Potential challenges might surface within the supply chain in the future. The company might find itself in a position where it needs to revert to its former suppliers. However, there's a possibility that past relations with these suppliers might have been strained. Consequently, these suppliers might have redirected all their titanium stocks to other producers. Additionally, the compromised quality of the company's products could tarnish its standing with distributors, premium stores, and end consumers. This could result in a spike in warranty claims, customer discontent, and subsequently, a dip in future sales.