



Adopting the Variances Analysis as a Mechanism for Rationalizing Costs in Algerian Industrial Enterprises -a Case Study of a Saida Cement Company's-

Abderrahmen AMER

Laboratory Management
of local authorities and
local development,
University of Mascara.
Algeria

*amer.abderrahmen@univ-
mascara.dz*

Moutassem DAHOU

Laboratory Public
governance and social
economy, University of
Mascara
Algeria.

*dahou.moutassem@univ-
mascara.dz*

Azzeddine NEZAI

University of Saida
Dr.Moulay Tahar
Algeria.

nezai.azzeddine@gmail.com

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Abstract :

The study aims to know the role of variances analysis in rationalizing costs. The calculating the variances depends mainly on the stander budgets, where it compares all expectations with the achievements, then treats them and takes the necessary measures. The variances were analyzed from the budget components of the Saida Cement Company's for the years 2018 and 2019 were analyzed to find out whether they were favorable or unfavorable in order to reveal the role they play in controlling costs. The results showed that the analysis of variance has a large and effective role in rationalizing the costs of the industrial Companies'. It also showed that the most unfavorable variances were in sales variance, and concluded that Saida Cement Company's took advantage of the unfavorable outcome variance in 2018 in order to achieve a positive outcome variance in 2019 by rationalizing variable costs.

Key Words: Variances Analysis; Rationalization of Costs; Estimated Budgets; Algerian Industrial Companies.

JEL Classification : D24; L21; L25; M41.

* Corresponding author: Amer Abderrahmen (*amer.kouider@univ-mascara.dz*)

Introduction:

The success of the economic foundation in carrying out its various functions, including planning and oversight, depends on its ability to make sound and rational planning of the production process, in order to achieve a significant reduction in the cost elements to the minimum. It is what leads the institution to achieve the maximum possible profits, so that its main role is manifested in providing a large amount of information required by those interested in its own affairs and its current and future financial situation to assist them in the process of sound and rational economic decision-making.



One of the most important systems that provide the institution with this information is management control, which is the group of devices and processes that ensure consistency between strategy and concrete daily procedures (Bouquin & Kuszla, 2014, p. 6). It is also concerned with planning, management within the institution, and controlling it. This allows the detection and judgment on the efficiency of these operations, through its tools, modern or traditional, including the system of estimated budgets, and cost accounting. This latter was initially concerned with the process of submitting annual decisions to absolve management of responsibility (Meyssonnier, 2012, p. 75). However, over time and the development of economic activities, especially the diversification of production processes and products and the increased competition in the markets, the corporation has become compelled to develop the foundations and accounting methods that it uses in financial and accounting measurements, and assists management in setting prices and preparing honest financial reports (Lerch & Gotsch, 2014, p. 278).

Estimated budgets are considered the most important means that depend on both planning and oversight through performance evaluation. We define it as the process of comparing achievements with estimates, calculating variances, trying to determine their causes and making the necessary corrective actions in what is known as variances analysis (Douma, Eggrickx, & Bollecker, 2019, p. 70).

The main problematic:

Considering that the Algerian Industrial Companies suffer from a tendency to not control costs, and considering a Saida Cement Company as an industrial enterprise, it has been noted that in recent years it suffers from major imbalances in the costs of inputs, especially raw materials, addition to the intense competition from other producers that made it not achieve a noticeable development either in the turnover or in the outcome between the years 2018 and 2019. Accordingly, the analysis of variance in sales, production, and materials is among the most important accounting methods to overcome these imbalances and to know their causes and correct them. Based on the above, we believe that the main problem of the study should revolve around the following basic question: *How to rely on the analysis of variances to rationalize the costs of a Saida Cement Company's?*

Hypotheses:

This study base on the following hypotheses:

- The variances are calculated at the level of Saida Cement Company's, by comparing expectations with the achievements for the same time period.
- The process of variance analysis plays a major role in rationalizing and reducing costs in Saida Cement Company's by discovering and correcting unfavorable production variance, materials variance, and sales variance, and turnover variance.

Objectives of the study:

The aim of this study is to:

- Identifying the favorable and unfavorable variances and their causes in both productions, turnover, result, and materials in Saida Cement Company's during the years 2018 and 2019.



- Explaining to what extent these differences can affect the value of costs in Saida Cement Company's, by knowing the value of unfavorable variances, and preparing and implementation of procedures to correct these variations, for rationalizing the costs in comparison with the standard costing of the Company's.

Literature review:

For the purpose of analyzing and discussing the research problem, it required the use of the most important previous studies, which we mention in the following:

- Study of Avi Rashink 2004 "THE PURE RATE VARIANCE":

The aim of the study was to apply and examine a "new" method of calculating the direct labor rate variance, by calculate a price-quantity interaction variance, explore the possibility of separating the rate-efficiency interaction variance from the direct labor rate variance in a manufacturing organization operating in a relatively stable environment over four accounting periods, and the study has shown that using standard hours rather than actual hours can provide better information than traditional methods, and the study shows that the three-variance method is a basic model for analyzing variable input cost elements, and it must be proven to deviate from it (Bradshaw, Keef, & Roush, 2004).

- Study of Sabah Fawzi Saleh 2014 "Strategic Cost Management And Its Role In Decisions Making In The Services Sector Companies On Palestine On Gaza Strip Field Study ":

The study aimed to identify the extent to which Palestinian service sector companies operating in the Gaza Strip use the strategic cost management approach and its role in decision-making. The study showed that the cost system applied in service sector companies in the Gaza Strip relies on scientific accounting principles that meet the departments 'needs in making decisions. The study shows that the strategic cost management approach helps to activate the control process and achieve the strategic objectives of the Company's, such as maximizing the value of the Company's and enhancing its competitive position. The study recommended that the Company's management should focus on methods of strategic cost management in an integrated manner (Saleh, 2014).

- Study of Anita M. McGahan, Michael E. Porter 2002 "What Do We Know About Variance in Accounting Profitability? ":

The study aimed to analyze the variance of accounting profitability among a broad cross-section of firms in the American economy from 1981 to 1994, and determine the importance of the year, industry, parent Company's, and business-specific impact on accounting profitability in cross-departmental operations, and determine the importance of year, industry, corporate-parent, and business-specific effects on accounting profitability among operating businesses across sectors. The results of the research showed that the influence of the industry and the Company's on the parent Company's is significant and related to each other and that the business-specific impacts resulting from the competitive position and other factors have a significant impact on performance (Saleh, 2014).



- **Study of Kevin Gaffney et al 2007 “A Case Study of a Variance Analysis Framework for Managing Distribution Costs”:**

The study aimed to present a comprehensive variance analysis framework developed by supply-chain managers at **Catalyst Paper** Corporation as a tool for reporting and controlling distribution costs, and it also aimed to calculating the mix variance where there is more than one mix factor within one cost component, and calculate the impact of unplanned and unrealized activities, and multiple nested mix variance calculations.

The results of the research showed that the use of Variance Analysis in Catalyst identifies the financial implications of using actual combinations of factories, warehouses, transportation patterns, and tankers that differ from the budget or a prior period, and it improves the ability to identify opportunities for significant reductions in distribution costs based on detailed reporting of variances, and it improves the financial and operating managers understanding of the drivers of distribution costs (Gaffney, Gladkikh, & Webb, 2007).

I. The theoretical literature of the study:

Budgets are necessary to clarify the financial implications of the plans developed by the managers, and to identify the resources needed to achieve these plans (Allel, 2002, p. 35). They are also a means of measuring, presenting and controlling the results obtained in comparison with the plans developed (Bufan, 2013, p. 16). The budget is considered “an important management tool that is a quantitative statement of a plan of action for some specified period of time. It is used to plan for the organization’s future activities and also to control current operations.”(Bufan, 2013, p. 17). Making plans in digital form is a budgeting process means. Budgets are another form of expected results. Financial budgets are expressions of value for the Company’s activity and each has a responsibility center. As for budget monitoring, it is the process of comparing achievements with estimates, that is, expectations for a particular responsibility center. This process goes through several stages: calculating variances between achievements and estimates, then determining the reasons for these variances, taking corrective actions, and applying these stages for each center of responsibility. The performance assessment process by means of budgets is based on the calculation of variances, which are based on a set of principles (Bufan, 2013, p. 20):

- Variance is the difference between a real and an estimated value.
- Variance is determined by a favorable or unfavorable value, which, respectively, means that the result is appropriate or inappropriate.
- Variance must be divided in order to eliminate the effect of one variance on another.
- Suggesting and taking corrective measures for deviations from the plan;
- Apply feedback of the results in order to change the plan in accordance with the new requirements.



1. The Uses of Variances:

According to Horngren, C. T., Datar, S. M., & Rajan, M. V “A variance is the difference between actual results and expected performance. The expected performance is also called budgeted performance, which is a point of reference for making comparisons” (Horngren, Datar, & Rajan, 2012, p. 249).

The variances lie in the point where the planning and control functions of management, which is the first step in the process of standard cost variance analysis, is the practice of focusing management's attention on areas that are not working as planned. That is, by highlighting the areas that deviate from expectations, and accordingly, the variances enable decision-makers in the organization to focus their efforts on the most important areas (Horngren et al., 2012, p. 250). Variances are then used in:

- Performance evaluation and to motivate managers;
- variances suggest that a change in the Company's strategy;
- It allows managers to evaluate performance and learn by providing a framework for correctly assessing current performance;
- Variances also enable managers to generate more informed predictions about the future;
- Variance analysis was easily the most popular costing tool in practice, and retained that distinction across organizations of all sizes.

2. Methods for calculating variance:

There are several methods for calculating variances, and the most common method is the one that is based on calculating a large number of variances, analyzing and interpreting them. These variances are:

2.1. Volume variance:

When it is evident that some costs fixed in nature do not change with changes in volume, and due to lower activity levels (De Luca, 2018, p. 79), the unit cost will be higher, as the fixed cost component will have to be distributed more among less units. volume variance represents how well the organization respects the hypothesis of the total activity level (Rushinek, 1983, p. 16) did it sell and produce what it wanted or what are the effects of the high or low activity level on the outcome?.

2.2. Productivity variance:

It is a variance of the quantity of resources consumed in the various productive departments, in order to know the extent of the use of resources according to the productivity estimated in the budget. That is, whether the standard quantity of materials and labor estimated for a given activity level were consumed (Horngren et al., 2012, p. 305); For example, has material consumption increased or decreased to produce one unit?. The formula for computing the productivity variance is as follows:

Productivity Variance = (Actual quantity of input used - Budgeted quantity of input allowed for actual output) × Budgeted price of input

2.3. Price variance:

Represents the level of the resource acquisition cost, that is, whether raw materials were purchased at a higher or lower price than what was estimated, and what is the



effect of this on the outcome. As for the labor force, the wage rate variance is often talked about instead of the price variance. As for the labor force, the wage rate variance is often addressed instead of the price variance. The formula for computing the price variance is as follows (Horngren et al., 2012, p. 305):

$$\text{Price variance} = (\text{Actual price of input} - \text{Budgeted price of input}) \times \text{Actual quantity of input}$$

2.4. Sales-mix variance:

This variance appears in the Company's that produces and sells several products at different prices. It is a segmentation of volume variance according to the product type. In simple words, it measures the difference in unit volumes in the actual sales mix from the budgeted sales mix. In reality, there are always some differences between budgeted and actual sales. The sales mix variance takes the percentages of sales per product that you used to create your budget and compares them to actual sales or to a different sales mix to determine if another setup is or would have been more profitable (Masters, 2020).

The formula for computing the Sales Mix Variance (where the standard costing is used) is as follows:

$$\text{Sales-mix variance} = (\text{Actual Units sold} - \text{Unit Sales at standard Mix}) \times \text{Standard Profit per unit}$$

The formula for computing the Sales Mix Variance (where marginal costing is used) is as follows:

$$\text{Sales-mix variance} = (\text{Actual Units Sold} - \text{Unit Sales at Standard Mix}) \times \text{Standard Contribution per unit}$$

3. Evaluating the performance of the profitability center:

As the basis for the performance appraisal, the performance appraisal role can be reasonably visualized if it is related to the seventh role which consists of a presentation in the master budget. In management accounting research, performance appraisal is summarized by CVP variance analysis (Emsley, 2000, pp. 1-2) because the master budget is a formal corporate forecast, account planning and delegation, the activity and performance of managers, and is measured on its basis. Desirable variance means favorable performance while unwanted variance means unfavorable performance (de Lautour, 2018, p. 222). Variance analysis is used to assess the performance of the organization as a whole, as well as the performance of its various branches. It is the first calculated variance, then this variance gets divided into a group of variances, which are (Bassili, 2007, p. 247):

- Variances related to the Sales Department (revenue center).
- Variances related to the Production Department (cost center).
- Variances related to the administration's interest (cost center).

The total variance of the result represents the difference between the actual and estimated result. If its value is favorable, it means that it is appropriate, but if the variance of its result is unfavorable, then it means that it is inappropriate.

3.1. Evaluating the performance of the revenue center:

The sales department is responsible for the variance of the selling activity and is responsible for achieving the price, quantity and structural goals of the various sales.



The number of variances for this center depends on the breadth of the production line and the degree of homogeneity of the sold products (Othman & Salem, 2006, p. 40).

The assessment and analysis of this position is done by calculating the variances of the turnover. In order to determine the responsibility of the commercial section fairly and to exempt sales representatives from the responsibility for the variance of production costs, this variance must be segmented (Skousen & Walther, 2010, p. 10).

a. The variance analysis of the selling activity into two variances in the case of a small production line:

Here, the corporate or branch produces one product or a family of products and the variance is divided into the quantity variance, which is appropriate when it is favorable and its responsibility is attributed to the sales representatives, as they are directly responsible for the sale. As for price variance, it is appropriate for its favorable value, and it is the responsibility of the sales department, because it is directly responsible for the price-fixing process.

b. The variance analysis of the selling activity into three variances in the case of a large production line:

When the variances are segmented, and due to the breadth of the production line, it is not possible to track and analyze each product separately. The analysis is performed using the sum total, and the quantity variance is segmented in a way that allows the estimated sales structure to be respected, and the total volume of sales to grow. Here, two factors must be followed (Löning et al., 2008, p. 128):

- The growth in the turnover cannot be considered a suitable phenomenon for the result. The evolution of sales volume for products with weak margins compared to products with high margins can give a growth in sales volume, but a decrease in the expected result. This is because the achieved sales structure is less appropriate to the estimated structure.
- The degree of homogeneity of the products sold. If they are of a high degree of homogeneity, the volume can be expressed in quantities. However, if these products are sold with a high degree of heterogeneity, the volume is expressed in the turnover and cannot be expressed in quantities.

c. The variances analysis in the case of a homogeneous production line:

Homogeneous production processes contain a single production or a small assortment of products, e.g. different quality plates, oils or charcoal (Malindžák, Zimon, Bednárová, & Pitoňak, 2017, p. 154). So this method of variances analysis is based on the principle of homogeneity of physical quantities, so that they can be combined with each other. The total variance of this method consists of two variances, the price variance whose responsibility is on the sales department, and the quantity variance, which in turn is divided into two variances (Löning et al., 2008, p. 130):

- Volume variance: is the difference between the actual size and the estimated size evaluated by the estimated average margin.
- Variance of the sales formula (mix): it is the effect of differences in margins with respect to the estimated average margin on the differences in quantities. The



variance of the quantity, whether with respect to volume or sales-mix, is the responsibility of the sales representatives.

d. The variance analysis in the case of a heterogeneous production line:

Here, the turnover is used instead of quantities, and it is divided into two variances (price and quantity). The latter, i.e. the variance of the quantity, is divided into two variances:

- Total volume variance: is the semi-estimated turnover, evaluated by the estimated margin rate.
- Formative variance (mix): The sales combination is evaluated by a semi-estimated margin rate.

3.2. Evaluating the performance of the cost center:

In order for us to evaluate the cost centers, and to know the causes and who is responsible for them, we must analyze the variance to its constituent elements. The best method to do so is the method of analysis centers that classify production costs into direct and indirect (Skousen & Walther, 2010, p. 10). Direct costs of production are those costs that relate to one type of product and include the cost of raw materials and the cost of direct labor. As for the indirect costs of production, they are the costs that are spent on the production departments and relate to several products, and they cannot be charged for a specific product among the rest. These costs must be addressed before being charged to the products.

a. Direct cost variance:

In manufacturing organizations, the product costs comprises three elements: raw materials, direct labor and manufacturing overhead (Drury, 1992a, p. 25). Furthermore, in management accounting the efficient and ineffective processes are identified through cost variance analysis, by comparing these standard costs with actual costs in the variance accounts (Nishimura, 2019, p. 05).

a.1. Variance of the consumed raw materials' costs:

Consist of all those materials that can be physically identified with a specific product (Drury, 1992a, p. 26). Materials are the most important cost elements, especially in industrial enterprises. The variance of these materials is due to the use of an actual amount of material that differs from the estimated quantity, or its real price differs from the estimated price (Falah, 2003, p. 117). This variance is divided into two variances, namely: the quantity variance, which is under the responsibility of production management (workshops) because it is responsible for the direct materials' efficient use when they are provided according to the required quality. However, if the quality does not meet the specifications, the responsible for the purchase is responsible for the variance. As for the cost variance, it is the responsibility of the Procurement Department, as it is responsible for purchasing the materials at the lowest prices, taking into account the required quality. Nevertheless, when it is forced to buy suddenly some products because of a certain pressure from an internal organization of the institution, it is the one that bears responsibility for this variance (Al-Rahbi, 2008, p. 241).

**a.2. The variance of direct labor costs:**

Wages are the second component of the unit cost of production, and its variance is the difference between the actual cost of direct labor minus the standard cost calculated on the basis of the actual production amount (Fakhr & Al-Dulaimi, 2003, p. 315). This variance is divided into the variance of the direct wage rate, which is under the responsibility of the variance of the authority that hires workers or the wage branch. As for the variance in the amount (efficiency) of direct wages, it occurs when there is a change in the percentage of mixing the type of labor, which is under the responsibility of the production administration (workshop workers) because it is responsible for guiding the workers. The efficiency variance can be analyzed into the mix variance of the specific type of labor in relation to the actual amount of time or to the yield variance in relation to the standard amount of time (Drury, 1992b, p. 522).

b. The variance analysis of indirect cost:

In order to analyze this variance, it must be divided into three variances, and it is not possible to return it to its main causes except by obtaining additional information. These variances are (Doriath, 2008, p. 72):

b.1. Budget variance or spending variance:

It is the difference between the actual indirect costs and the standard indirect costs according to the flexible estimated budget at the actual activity volume. It has many causes, including an increase in the efficiency of the institution, errors in the cost estimates in the estimated budget, or perhaps an increase in the actual prices than the prices taken into consideration when calculating the rates (Nour, 2007, p. 333).

b.2. Productivity variance:

It is the difference between the actual activity and the standard activity multiplied by the standard unitary cost, and the productivity reflects the consumption per unit of measurement for a specific product.

b.3. Variance of the charged fixed costs:

The Fixed cost is a factor not shifting with volume. Consequently, the fixed cost per unit of volume increases (decreases) with the decrease (increase) of volume (De Luca, 2018, p. 80). The variance is reached by adding the unitary variable cost of the real activity with the fixed costs, minus the product of the standard cost of the standard activity with the real activity.

4. Understanding variances analysis in costs:

Cost variances are understood by analyzing the relationship between actual costs and standard costs in the budget. Standard costs are the predetermined costs that must actually be incurred under normal circumstances, implies budgeting as a prospective and provisional standard schedule of standard costs and quantities (de Lautour, 2018, p. 36). But the actual cost incurred may be the same as the standard costs or different from the standard. For an act of control from the decision makers, the actual cost is compared with the standard cost and the result is found called variances. These variances can be better (favorable variances) or worse (unfavorable variances). An unfavorable variance means that the actual cost incurred is greater than the standard and vice versa. Variances, whether favorable or unfavorable, must be studied. First,



these variances are studied for each of the elements included in the standard budget, whether prices, sales, production, various costs, and inventory, and secondly, explanation of reasons for non-standard performance. In this way, the organization can make improvements to processes, correct errors, and employ inputs more effectively to reduce costs. Thus, standard costs and the analysis of variance are two sides of the same coin, says T.B. Noble's 'To be effective in the control of costs, reports and analyses must bring out causes of variations from standard while the facts are fresh, and important features or deviations must be headlined in a manner similar to that followed by your daily newspaper' (Noble, 1947, p. 1005).

In the manufacturing sector, for example, the standard cost of the final product is the sum of the standard costs and direct costs associated with production (direct materials, direct labor, and direct overheads). High costs of direct materials or ineffective processes within a production facility can be a cause of unfavorable manufacturing variances. Accordingly, the analysis of variance showed us how we can rationalize the standard cost of the final product by controlling the direct costs. Based on the results of the deviations, the top management can use the standard budget costs for the next period using the previous information about the results of the variance analysis to make the possible changes to the production components. So standard costs and analysis variances are tools for measuring and evaluating an organization's cost performance.

II. Result and Discussion of the Variances Analysis :A case study of Saïda Cement Company's

1. Presentation of Saïda Cement Company's:

Saïda's Cement Company is a newly established company. The decision to establish it was taken in 1974, and the completion of this project was assigned to the Japanese company Kawasaki and the Italian ACEC at a cost of approximately 652 billion centimes. Its actual production started on April 1, 1979 under the banner of the National Building Materials Company SNMC. In 1991, Saïda's Cement Company was divided into two units, lime and Cement. After this division, each of them established a special law, in 1997, where it became a joint stock company with a capital estimated at 10.5 million dinars. In 2010, it became under the trusteeship of the Algeria Cement Industrial Complex (GICA). The Company is engaged in producing Cement type CPJ 42.5 KGF/MM². The Saïda's Cement Company is a medium-sized company with 253 workers, and the corporation includes five main directorates, including the Sales Directorate and the Accounting and Finance Directorate.

2. How to prepare the estimated budgets in Saïda's Cement company:

The Saïda's Cement Company, like other Algerian economic institutions, relies on preparing estimated budgets, which are an ideal tool for carrying out monitoring and planning operations, as well as evaluating performance. It is also a tool for translating the goals of the institution and a tool for predicting what is to come, this institution sets sub-budgets for each department or office separately. Accordingly, Saïda's



Cement Company, when preparing the estimated budgets and sub-budgets, takes into account all the goals and figures achieved for the previous year are in line with the expectations for this year. Then it calculates the variances through comparing what was achieved in the previous year and what was achieved in this year.

2.1. Sales budget:

Table 1: « Estimated Budget for Cement sales for the year 2018-2019 »

Data	Achievements of 2019 (DZD)	Achievements of 2018 (DZD)	Achievements of 2018/2019
Turnover	3042875	3098386	98%
Added value	1816296	1828019	99%
The outcome before tax	925252	868471	106%

Source: Prepared by the researcher, using the documents of the institution.

According to the table, the company relies on the achievements and accomplishments of the year 2018 and compares them with the year 2019 that is it considers the achievements of the year 2018 as the expectations for the 2019.

2.2. Balancing costs:

Table 2: « Estimated Budget for Cement costs for the year 2018-2019 »

Data	Achievements of 2019(DZD)	Achievements of 2018(DZD)	Achievements of 2018/2019
Mechanical and electrical equipment	116109	153972	75%
Refractory bricks and concrete	88370	87729	100%
Plating	350	6497	05%
Gypsum	37526	35465	105%
Rocks crusher	60569	94358	64%
Scoria	17839	44926	39%
Packaging	104338	96389	108%
Energy	264222	272086	97%
Other materials and supplies	252763	163776	154%
Total annual consumption	942086	955198	98%

Source: Prepared by the researcher, using the documents of the institution.

According to the table, the company relies on the achievements and accomplishments of the year 2018 and compares them with the year 2019, that is, it considers the achievements of the year 2018 as the expectations for the year 2019.



Likewise, most of its expectations for 2019 came less than the achievements of 2018, which indicates an increase in the costs of raw materials.

2.3. Balancing the outcome:

Table 3: « Estimated Budget for Cement outcome for the year 2018-2019 »

Data	Achievements of 2019 (DZD)	Achievements of 2018 (DZD)	Achievements of 2018/2019
The result before the tax	925252	868471	106%

Source: Prepared by the researcher, using the documents of the institution.

The company always relies in its budgets on the achievements of 2018 and considers them as the expectations for 2019.

3. Calculating the variances of Saïda's Cement Company:

Based on the data obtained from the company for the years 2018 and 2019 we will try to calculate all possible variances for these two years.

3.1. Sales variances:

Table 04: « Calculating the sales variances for 2018 and 2019 »

Sales	Expectations (DZD)		Achievements (DZD)		Variance(DZD)	
	2018	2019	2018	2019	2018	2019
Sac Cemen t	325000	250000	288990	294234	-36010	44234
Vrac Cemen t	175000	250000	43052.09	224987.78	68052.09	- 25012.22
Total	500000	500000	532042.09	519221.78	32042	19221.78

Source: Prepared by the researcher, using the documents of the institution.

According to the table, there is an unfavorable sales variance in 2018, that is, an inappropriate value of -36010 for SAC Cement. However, there is a favorable sales variance for the VRAC Cement product, that is, an appropriate value of 68052.09. But in 2019 the sales variance is favorable for the SAC Cement product, which means that there is a high demand for this product for this year compared to 2018, which witnessed a unfavorable sales variance. However, concerning the VRAC Cement product, there has been a sharp decline in the year 2019 compared to 2018, and this can be explained by several factors, including changes in customer needs (large companies) due to the suspension of construction projects, resulting in a decrease in quantity ordered.

Accordingly, the volume of sales has the greatest impact on the inventory. The more Saïda's Cement Company plans to sell, the more inventory it will buy or manufacture. Conversely, you may not necessarily need to increase the inventory it carries with the increase in sales, as it may sell through its inventory faster than usual.



This will actually reduce the stock on hand balance. Hence, less budgeted storage costs.

3.2. Turnover variance:

Table 05: « Calculating the turnover variance for 2018 and 2019 »

Data	Expectations (DZD)		Achievements (DZD)		Variance (DZD)	
	2018	2019	2018	2019	2018	2019
Turnover	2945191	2894230	3098385	3028775	153194	134545

Source: Prepared by the researcher, using the documents of the institution.

According to the table, there is an evolution in the turnover for the years 2018 and 2019 with a value of 153194 and 134545 respectively, and it is calculated as follows:

Turnover variance = Turnover achievements - Turnover expectations

Turnover variance 2018 = (3098385 - 2945191 = 153194).

Turnover variance 2019 = (3028775 - 2894230 = 134545).

The Turnover Variance is favorable, which means that there is an evolution in sales. In order to maintain this development in sales, the sales managers of Saïda's Cement Company will want to determine and analyze the source of this discrepancy, and since it is favorable, this is due to either higher actual prices, or higher actual volume (quantity). This variance should be analyzed and divided into:

First: Price variance: calculated by the following relationship:

Price variance = (Real Quantity Sold × Real Unitary Price) - (Real Quantity Sold × Estimated Unitary Price) with a constant price, i.e. (expected and real) because the company does not set an estimated price for the product, for the price is predetermined by the state. It is constant where:

$$SAC = 6,128 \text{ DZD.} \quad VRAC = 5,449 \text{ DZD.}$$

Therefore, the calculation shows that the Saïda's Cement Company cannot calculate the price variance, which means that the variance between actual sales and expected sales cannot be known by calculating the price variance, and from it, we conclude that the company cannot produce differences in actual prices through promotional or quantity discounts, allowances, giveaways, or bundled offers, all of which are tools that sales reps use to win buyer's commitment. Which, in turn, their use affects the final price received. Which is what leads us to calculate the quantity variance.

Second: Quantity variance: is calculated by the following method:

Quantity variance = (Actual sold quantity - Expected sold quantity) × Expected unitary price

Quantity variance for SAC product 2018 = (294234-250000) × 6.128

Quantity variance for SAC product 2018 = 271065.952 favorable.

Quantity variance of VRAC product 2018 = (224987.78-250000) × 5.449

Quantity variance of a VRAC product 2018 = -136291.586 unfavorable.

Quantity variance for SAC product 2019 = (288990 - 325000) × 6.128

Quantity variance for SAC product 2019 = -220669.28 unfavorable.

Quantity variance of VRAC product 2019 = (243052.09-175000) × 5.449

Quantity variance of a VRAC product 2019 = 370,815,348 favorable.



The favorable Quantity variance of the VRAC product occurred as a result of the development in the sales market in 2018 as there was a demand for the VRAC product, especially in the concrete making process, in contrast, the SAC product witnessed a decline and a decline in the market, because the latter had mostly small customers since there would now be a smaller customer base and lower sales, knowing that the company is inflexible and insensitive to the needs of these small clients and the market conditions that created them.

Unlike the previous year, the SAC product achieved a major development in sales in 2019. Thus, the variance was favorable, which is appropriate. As for the VRAC product, it had an unfavorable variance due to the decrease in its sales in the market. Through the results of analyzing quantity variance, the Saïda's Cement Company has several options in this case, for example, increasing the quantity sold of its products by presenting a unique loyalty program or a clear explanation of why their product is superior to competitors' products and why it is suitable for the customer. A Saïda's Cement Company sells multiple products (SAC, VRAC), so the budgeted sales mix will affect its inventory balances. Sales mix is the relative ratio of each product you sell compared to your other products. For example, if you sell products A and B, then an equal sales mix will occur if each product accounts for 50 percent of your sales. But the sales mix of a Saïda's Cement Company is unstable, then as that mix changes, the inventory needs will also change to the extent that her sales mix fluctuates, she needs to keep additional inventory and is not exactly known. In this case, Saïda's Cement Company total sales dinars might be exactly what was budgeted for, but as its sales mix changes, it might not have the right kind of stock on hand. Thus, storage costs increase, and from it, we advise Saïda's Cement Company to control its sales mix by studying the market well, and thus it can control its sales, storage costs, and total costs in general.

3.3. Production variances:

Table 6: « Calculating the production variances for 2018 and 2019 in tons »

Data	Expectation		Achievements		Variance	
	2018	2019	2018	2019	2018	2019
Cement	500000	500000	535100	528400	35100	28400

Source: Prepared by the researcher, using the documents of the institution.

Production variance = the actual produced quantity - the expected produced quantity

Production variance 2018 = 535100 - 500000 = 35100 favorable

Production variance 2019 = 528 400 - 500 000 = 28 400 favorable.

The production determines the level of production business activity and plans production facilities to achieve maximum efficiency. The production budget is prepared by the chief executives of the production department. Through the results, we notice in Saïda's Cement Company that the production variance was favorable in 2018 and 2019, which is appropriate, meaning that the organization achieved more than the expected production, and this is due to several factors, for example, the sales achieved were large, especially in 2018, the availability of raw materials, and the



capacity the factory has large productivity, availability of qualified labor, and the presence of sufficient stocks. To maintain this increase and to analyze this development in production, this variance should be analyzed and divided.

a. Quantity variance:

After calculation of the production variance, this Quantity variance is prepared. The Quantity variance show the cost variance of the production determined in the production budget. The Quantity variance is calculated by the following method:

Quantity variance = (Real produced quantity - Expected produced quantity) × Real Cost price

*Quantity variance 2018 = (535100 - 500000) * 4093.76 (cost price taken from production department)*

Quantity variance 2018 = 143690976 favorable.

Quantity variance 2019 = (the actual produced quantity - the expected produced quantity) × the real unitary cost price.

Quantity variance 2019 = (528400 - 500000) × 3895.73 (cost price taken from production department).

Quantity variance 2019 = 110638732 favorable.

Through the results, we note in Saïda's Cement Company that the quantity variance was favorable in 2018 and 2019, because the quantity of production increased in 2018 and 2019 by 35100 and 28400 units, respectively.

b. The partial cost price variance: is calculated by the following method.

The partial cost price variance 2018 = (real cost price - expected cost price) × actual sold quantity

The partial cost price variance 2019 = (real cost price - expected cost price) × actual sold quantity

Based on this equation, this variance cannot be calculated due to the lack of analytical accounting in the Saïda's Cement Company, which provides all the information related to the cost price, also because of the lack of flexible budgets based on the standard cost method. But we have the following equation that allows us to calculate the partial cost price difference:

Production variance = Quantity variance - The partial cost price variance

Therefore

The partial cost price variance = Quantity variance - Production variance

Accordingly, the partial cost price difference for the years 2018 and 2019 can be calculated as follows:

The partial cost price variance 2018 = 143690976 – 35100 = 143655876 favorable

The partial cost price variance 2019 = 110638732 – 28400 = 110610332 favorable

Through the results, we notice in Saïda's Cement Company that the partial cost price variation was appropriate in 2018 and 2019, and this may be due to the company obtaining good materials or the absence of problems / malfunctions in the machines, which was reflected in a positive development in production, i.e. the presence of production variance favorable.



Accordingly, it appears that Saïda's Cement Company does not bear any additional or unexpected costs related to production.

3.4. Outcome variances:

Table 7: « Calculating the outcome variance for 2018 and 2019 »

Data	Expecta(DZD)		Achieve(DZD)		Variance(DZD)	
	2018	2019	2018	2019	2018	2019
The result before the tax	919640	720978	868471	919640	-51169	198662

Source: Prepared by the researcher, using the documents of the institution.

The Outcome variance = the achieved outcome – The expected outcome

Outcome variance 2018 = (868471 – 919640) = -51169 unfavorable

Outcome variance 2019 = 720978- 919640 = 198662 favorable.

Through the results, we note in Saïda's Cement Company that the outcome variance is an unfavorable variance of 51,169 DZD in 2018, due to the high costs of materials, especially the consumption of raw materials, electricity & gas, and material & equipment, despite the variation in the turnover in 2018.

The company also achieved a favorable variance in the result in 2019 by 198,662 DZD. The reason for this favorable outcome-variance is that the actual outcome is greater than the benchmark outcome and the actual material costs are lower than in 2018 despite a slight decrease in the turnover compared to 2018.

Through the two previous results, we conclude that Saïda's Cement Company took advantage of the reasons for the unfavorable variance of the result in the year 2018 in order to achieve a positive variance of the result in 2019 by rationalizing the total costs, especially variable costs and even fixed costs (material costs), by Making production changes after determining where variable cost differences occur.

3.5. The materials variance:

Table 08: « Calculating the materials variance for the year 2018 and 2019 »

Data	Expectations (DZD)		Achievements (DZD)		Variance (DZD)	
	2018	2019	2018	2019	2018	2019
Raw materials	282573	298473	169992	257407	-112544	-41 066
Spare parts	80040	80040	96789	77971	16749	-2 069
Electricity and gas	236300	232800	272913	265372	36613	32 572
Other materials and supplies	168515	172459	145193	164123	-23321	-8 336
Materials and equip	139292	70000	180801	82651	41509	12 651
Total	979158	853772	998621	847524	-40994	-6 248

Source: Prepared by the researcher, using the documents of the institution.



The materials variance = achievements of materials - expectations of material.

According to the table 08, in 2018 and 2019 the materials variance was generally favorable, but in view of the partial variances, we note:

We notice raw materials variance favorable in 2018 and 2019, and despite this positive result, and given that the production variance was not significantly different between 2018 and 2019, we conclude that there was a significant waste of raw materials in 2019 compared to 2018. This it can occur if the quality of the material requires more use to meet safety or other standards or if there are deficiencies in production.

We that note the spare parts variance is favorable in 2018, and the spare parts variance is unfavorable in 2019, and from it, we conclude that there is control over the costs of spare parts in 2019 compared to 2018 by Saïda's Cement Company.

We that note the Electricity and gas variance and Materials and equipment variance were unfavorable in 2018 and 2019 and despite Saïda's Cement Company significantly lowered its expectations for material and equipment costs in 2019 compared to 2018 expectations we note the corporation did not achieve a favorable variance. Therefore, we conclude that a Saïda's Cement Company has a problem estimating future costs, as more than 38% of the materials costs are not well estimated in 2019 compared to their 2018 values and that there was a cost loss of 45223 DZD (The value of unfavorable variances) in 2019 and 94871 DZD in 2018 that could be rationalized.

Conclusion:

The process of calculating and analyzing variances in the economic institution is necessary and an important stage within the stages of the estimated budget system. This is done by comparing what is expected with what is achieved and then taking the necessary corrective measures.

This process, that is, variance analysis requires a set of objectives, which are considered criteria for reference. As estimated budgets express a set of short-term goals, the calculation and analysis of variances are used in the evaluation and cost reduction process.

The process of variance analysis in each center has a responsibility within the institution in the process of evaluating the performance of these centers and controlling their costs and then evaluating the performance of the institution as a whole, thus, controlling the total costs. All of this is done by identifying the cause and responsibility for the occurrence of incoming variances and setting the necessary corrective measures. This is what made the process of variance analysis contribute to the process of evaluating the performance of the institution, as well as optimal control over its overall costs.

In this study, we discussed how to rely on the variance analysis in the rationalization of costs, by examining how these variances are calculated, analyzed, and divided, and the possibility of their application in the Algerian industrial establishments, including the Saïda's Cement Company.



In view of the foregoing, a set of results can be reached:

- The Saïda's Cement Company took advantage of the reasons for the unfavorable variance of the result in the year 2018 in order to achieve a positive variance of the result in 2019 by rationalizing the total costs, especially variable costs and even fixed costs by making production changes after determining where variable cost differences occur.
- A Saïda's Cement Company lacks cost accounting, as it does not prepare a budget for each unit or cost center, which made it not shed light on every cost component in the budget expenditures for each product VRAC and SAC, and therefore it, cannot accurately determine the deviations in costs for each of its products.
- We conclude that Saïda's Cement Company has a problem estimating future costs, as more than 38% of the costs are not well estimated in 2019 compared to their 2018 values, especially costs of Electricity and gas and Materials and equipment.
- Most of the unfavorable variances were in the outcome variance, due to the economic crisis that Algeria went through between 2018 and 2019, which was caused by the decline in oil revenues which prompted the Algerian authorities to freeze construction projects and cancel some of them, and because of the entry of new competitors in the field of Cement production, especially in the southwest in both the states of Adrar and Al-Bayyad, these reasons gave rise to unfavorable variances in the quantity sold by the SAC and VRAC producers in Saïda's Cement Company.
- The process of preparing budgets and calculating differences in the Saïda's Cement Company is a secondary work, and the Saïda's Cement Company lacks the process of procedure of the feedback, because it repeats the same unfavorable variances in every budget for the years 2018 and 2019, and it has been observed that it resorted to covering the unfavorable variances with favorable variances for material costs, as these the coverage costs a cost loss of 45223 DZD in 2019 and 94871 DZD in 2018 that could have been rationalized.

From the above, a set of suggestions can be put forward as follows:

- Algerian industrial enterprises should prepare the estimated budget system on scientific grounds and for the purpose of the performance evaluation process.
- The necessity to rely on cost accounting, by preparing a budget for each unit, department, or cost center that highlights each cost component in the budget expenditures for each activity level.
- Algerian institutions should prepare a comparison or recording system that allocates all actual costs and to the cost center and registers the work level achieved.
- The necessity of informing the officials about the variances, whether these variances are appropriate or inappropriate. In addition, they must be analyzed, and the responsibility for them and their causes must be determined.



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