

MHLUME SUGAR COMPANY LIMITED: A CASE STUDY IN COSTING AND PRICING

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Accounting

This article discusses a field study of Mhlume Sugar Company Limited. The main motivation for the study was to observe, discuss, and learn about Mhlume's activity-based costing system in order to reflect upon some fundamental issues regarding costing and pricing. This article describes: (1) the physical process of sugar refining, (2) the basic nature and principles of activity-based costing (ABC), and (3) the accounting issues raised by Mhlume's operation, including their application of activity-based costing and transfer pricing considerations in their operation.

The Sugar Refining Process

Mhlume's operation is set up in two basic parts. The **estate** operation is concerned with cultivating and harvesting the sugar cane and transferring it to the mill; the **mill** operation then takes the raw sugar cane and processes it into brown sugar. (Making white sugar involves further processing which the Mhlume mill is not equipped to do at this time.)

The estate's harvesting cycle begins roughly around 1 May each year and ends roughly in November or December. (The company's fiscal year also coincides with its physical operations.) Harvesting the cane involves two basic steps. First, the standing fields of sugar cane are burned. Burning removes the leaves from the standing cane and facilitates the harvesting process. Without the process of burning the fields, the cane would have to be harvested with its leaves intact; the leaves would then have to be removed during the milling process. Further, burning the fields heats up the sucrose inside the cane, making it easier to work with. In addition, burning the fields drives away the native snakes, making it safer for the workers to cut the cane. Eventually, environmental laws in Swaziland may prohibit burning the fields prior to harvest; at that time, Mhlume and other sugar processing plants will have to revise their harvesting and milling procedures.

After burning the fields, the sugar cane is harvested. Migrant workers are engaged each year to cut down the cane by hand. Workers are paid a fixed daily salary with the possibility of earning incentive pay for cutting more than their daily quota. Harvesting the cane is a very labor intensive process, making it well-suited to the Swazi economy, where labor resources are plentiful but machinery is not.

The cut cane is transported to Mhlume's mill. On arrival at the mill, the cut cane is crushed to extract the liquid from its core. (The crushed cane can then be burned, producing the by-product bagasse, which is used to fuel the mill's machinery.) The liquid is heated, causing the sucrose to fall to the bottom where it can be collected for further processing. At this point, the sucrose itself is dark and thick, resembling molasses (indeed, molasses is the other by-product of the process). Chemicals are added to the sucrose to cause crystallization into the brown sugar that is the mill's principal product.

With good soil, sugar cane is a perennial; that is, the cane will grow back every year without re-planting. However, because the Mhlume estates have poor soil, the cane must be re-planted approximately every five years. A specially grown seed cane is used to re-plant the fields on a rotating basis. Mhlume produces about one-third of Swaziland's total sugar output annually (the kingdom's total annual sugar output is about 450,000 tons). Approximately one-third of the kingdom's total output is used internally, with the remaining two-thirds being sold on the world market.

Activity-Based Costing Systems

Costs in most manufacturing operations can be divided into three categories: materials, labor, and overhead. Materials, sometimes referred to as direct materials, are the major raw inputs that go into producing a product or service for sale. For example, Mhlume's main raw material is sugar cane. Labor, sometimes referred to as direct labor, represents the salaries/wages and related costs of employing the workers directly involved with physical production. In Mhlume's case, the wages paid to the workers who harvest the cane is an example of a direct labor cost. Through time-and-motion studies and related physical measures of a firm's overall operation, it is a relatively simple matter to link direct materials and direct labor costs to the final product.

The third category of cost, factory overhead, is more problematic. Factory overhead, sometimes referred to as factory burden, comprises all the related costs of producing a product or service. For example, Mhlume would incur the following overhead costs in its operation: equipment depreciation, processing chemicals, water, power for the factory, and supervisor salaries. Unlike direct materials and direct labor costs, which can be linked to the product by direct attribution, overhead costs must be linked through a process of allocation. Naturally, that allocation must be done in some consistent, rational, logical manner. Activity-based costing is one way to allocate overhead to a product or service.

Activity-based costing begins with establishing cost pools. Cost pools are groups of related costs in a production operation. Some of the cost pools employed at Mhlume include: land preparation, fertilizing, weed control, and irrigating. Costs are assigned to a cost pool on the basis of a common cost driver. In activity-based costing, a cost driver is anything which causes (drives) a cost in the production operation. For example, in a typical company, purchasing costs might be a cost pool, with number of purchase orders processed being the cost driver.

Once the cost pools and cost drivers are established, accountants can determine the amount of cost absorbed by each unit of the cost driver. For example, if the total cost of a purchasing department during a period was \$10,000, and the department processed 5,000 purchase orders, the cost per purchase order would be \$2. To tie purchasing costs to the product or service, then, accountants (working with production staff) must determine how many purchase orders were processed to move a certain group of goods through the factory. If a given lot of goods required five purchased orders, the accounting system would allocate \$10 in purchasing costs to that order. A similar process would be performed for each cost pool, thus building up the overhead costs associated with a given group of goods.

Accounting Issues at Mhlume

Mhlume's operation raises at least three accounting issues: (1) the application of activity-based costing, (2) product pricing and cost control, and (3) transfer pricing.

Activity-based Costing

In general, companies establish activity-based costing systems to gain a more accurate perception of their product's cost. Knowing a product's cost, naturally, is key to setting its price in the market. However, in Mhlume's case, the motivation for establishing an ABC system was different.

As previously noted, cultivating, harvesting and processing sugar is a labor-intensive operation. In other words, most of Mhlume's costs are labor costs (as opposed to materials

or overhead costs). Prior to the introduction of activity-based costing in the harvesting operation, all of Mhlume's harvesting labor costs were aggregated in a single general ledger account. Thus, managers had a difficult time determining which parts of the cultivating operation were more expensive and which were relatively less expensive. Mhlume introduced ABC to help managers of the cultivating operation control their costs more effectively and efficiently. (Note, however, that activity-based costing has only been applied to cultivating the sugar cane. The harvesting and milling operations have not adopted ABC, nor have they asked for it to be introduced.)

For external accounting purposes, salaries and wages are still reported as a single line item on the profit and loss statement. However, for internal accounting purposes, salary and wage costs from cultivating the sugar cane are allocated to one of several cost pools: land preparation, planting, post-harvest management, fertilizing, weed control, pest & disease control, ripening, irrigating, canal construction, drainage sub-surface, or drainage maintenance. Those cost pools are reported clearly on Mhlume's internal profit and loss statements, allowing managers to see clearly how much cost was incurred in each area. Costs are allocated to the pools on the basis of labor hours.

Product Pricing and Cost Control

As mentioned previously, Mhlume introduced ABC to give managers better control over their costs. Cost control is critical in Mhlume's operation, as they have very little control over product pricing in their markets. Sugar is traded on the world commodity markets, much like soybeans and pork bellies. The world market, then, determines the price based on supply and demand factors. Any individual company, therefore, cannot influence the world price of sugar in any significant way.

Mhlume operates in the Kingdom of Swaziland. Situated in south-eastern Africa, Swaziland is surrounded on three sides by South Africa; it also shares a border with Mozambique. As a developing nation, Swaziland receives a special concession when it sells sugar to external markets. Specifically, Swazi sugar is sold on the world market at three times the established world price for sugar; that is, if sugar is sold on the world market at \$5 per ton, Swazi sugar is sold for \$15 per ton.

One of the main factors influencing the world price for sugar is its supply in the world market. Each sugar producing company in Swaziland receives a quota (allowance) for sugar production each year. For production up to the quota, Mhlume receives a fixed price. For production over the quota, Mhlume receives a price which is always less than the "quota" price. The two types of revenue are reported separately on Mhlume's internal profit and loss statement as "unsegregated" (amounts up to the quota) and "segregated" (amounts over the quota).

Transfer Pricing

Mhlume's operation also raises some interesting transfer pricing issues. Basically, transfer pricing is concerned with setting prices for purely internal transactions where market rules and constraints do not apply. Transfer pricing was pioneered by the U.S. automobile manufacturer General Motors when its divisions had to do business with one another. Normal laws of supply and demand do not apply to purely internal transactions, and much has been written about the options for establishing transfer prices and the consequences of the various options.

Mhlume confronts transfer pricing issues for two of its major inputs: sugar cane and water. Mhlume does not actually own most of the fields where its sugar cane is grown. Rather, the fields are owned by private individuals, who agree to sell all their output to Mhlume at a fixed price. In return, Mhlume assists the individual farmers with crop maintenance. Since the farmers have no option but to sell their output to Mhlume, and since Mhlume must buy all the farmers' output, a transfer price must be set which satisfies both parties. In this particular case, the transfer pricing problem is somewhat alleviated by Mhlume's participation in the cultivation and harvesting of the grain.

Water is one of the principal indirect materials used in processing sugar. All of Mhlume's water comes from IYSIS, a firm which has many common shareholders with Mhlume. Thus, IYSIS has a lot of control over the price Mhlume pays for water. With no external market forces governing the price, IYSIS could potentially raise the price of water to an exorbitant level, creating severe cost control problems for Mhlume's overall operation. In this case, however, the strong relationship between the two firms alleviates the potential problem, and IYSIS basically passes on its direct costs to Mhlume in the transfer price.

Conclusion

As a precursor to grounded research, this article has discussed operating and accounting issues for Mhlume Sugar Company Limited which arose during a field study. The company has confronted and solved unique issues in product costing and pricing through the application of activity-based costing and transfer pricing concepts.