“Proposing an activity-driven operational accounting framework at an agricultural chemical company”

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Proposing an activity-driven operational accounting framework at an agricultural chemical company

Abstract

An activity-based approach to operational management aims to address the shortcomings of traditional resource management methodologies and to provide enhanced management information. Since effective cost management is of critical importance, operational processes not adding value to the business must be identified. As such, activity-based operational management techniques provide an opportunity to strive towards cost-competitive excellence. By properly analyzing the business operations’ results, the non-value adding processes can be eliminated, allowing management to properly focus on those activities that will effectively contribute towards better decision-making and competitiveness.

The main objective of this case study is to evaluate the feasibility of an activity-driven operational accounting framework within a South African agricultural chemical manufacturer and provides a comparison between its traditional cost accounting methodology and a proposed activity-based operational accounting framework. The results indicate that with the traditional costing method, not all operational costs are visible, and that the product costs are probably incorrectly allocated, and as such much of the operational costs are not properly recovered, which, in turn, will have an adverse effect on the company’s sustainability. The recommendation is therefore that the company should consider phasing in certain aspects of an activity-driven operational accounting framework.

Keywords: activity-based cost accounting, cost management, operational management, process reengineering, management information.

JEL Classification: M11, M41, M49.

Introduction

Companies in the contemporary global economy are under constant pressure to optimize – albeit in terms of productivity, social responsibility or profitability. As part hereof, it becomes important to understand both the product cost behaviour patterns and the operational value chains in delivering products or services. It is therefore not surprising that companies that were successful in the past are continuously exploring new initiatives to maintain its growth and sustainability. According to Chen and Jones (2007), such initiatives include adopting alternate management tools and techniques to be able to deliver their products and services faster, better and cheaper without compromising quality. Optimising business processes and operational value chains should therefore be key focus areas of corporate management (Fei & Isa, 2010; Furniss & Spencer, 2005). Such a focus creates the need for a management system that can focus on better cost control, as well as an understanding of the mechanisms that drive product manufacturing and service delivery cost. Drury (2008) actually states that corporate decision-making relies on incremental cost behavior analysis, which considers the revenue and cost fluctuations attributable to a particular business decision.

As inferred above, sustainable companies need to focus on product and customer profitability and potentially the elimination of non-value-adding products and customers. An operational management accounting system should therefore generate the relevant information for planning, control and performance management purposes, thereby providing reliable information, relevant cost allocations and useable management reports to assist in decision-making. However, one of the key challenges facing many organizations is the disconnect between what actually happens in the operational environment and the cost management methodology applied in the broader corporate accounting function. In many cases, cost accounting data is based on operational assumptions that are nothing other than easy and convenient options to determine product manufacturing and service delivery cost. Cost allocation to the cost objects (i.e. products and/or services) are not always based on operational facts, but often on whatever the financial information is available or easily obtainable, which, in turn, will probably lead to distorted management information.

To increase the relevancy and accuracy of operational management information, an activity-driven operational accounting framework aims to reduce the allocation of unnecessary costs to a particular cost object, and to deliver a more reliable cost picture (Chen & Jones, 2007). This will bring relevant operational information into the broader managerial accounting framework and provide adequate information necessary to improve the quality of related business decisions (Tardivo & Di Montezemolo, 2009). The essence hereof is achieved by properly analyzing and understanding...
the business operations and the impact thereof on cost behavior. It is therefore important to understand (1) the cost of running the business operations and (2) the costs associated with each job function or activity within the operational processes.

South African Agricultural Chemicals (SAAC) is a growing South African-based company whose operations extend into various other Southern African countries. In terms of market growth, the International Agricultural Chemicals Industry Association expected that the annual demand for agricultural chemicals will increase by between four and five percent per annum in the immediate future (Prud’homme & Heffer, 2011), while the International Grains Council estimated that the global maize demand will exceed 825 million metric tons and wheat will exceed 650 million tons as from 2011 (IGC, 2011). Furthermore, modern agricultural chemicals play an important role in social and environmental sustainability, among others, by helping to restore the nutrient balance within the soil and promoting crop growth. In light of this, it is obvious that the demand for agricultural chemicals is on the rise, which bodes well for companies such as SAAC.

In order to achieve the objectives of the study, the remainder of the paper is set out as follows. Section 1 sets research problem firstly, objective and method. Section 2 provides a theoretical framework on activity-based principles is provided; Section 3 gives a high-level overview of the current cost accounting methodology; Section 4 presents business operations. Section 5 gives the comparative empirical results. The final section provides a concluding discussion with some recommendations.

1. Research problem, objective and method

As highlighted above, a key challenge for many companies (not just manufacturing companies) is the lack of a proficient and robust operational (cost) accounting framework that is able to provide relevant and reliable management information. In light hereof, the primary research problem to be considered here is whether an activity-driven operational accounting framework will be able to provide SAAC with better and more relevant and realistic cost management information. The primary research objective is therefore to evaluate the feasibility of an activity-driven operational accounting framework within a specific chemical manufacturer. In achieving this objective, a case study research approach was followed, which, according to Blumberg, Cooper and Schindler (2008), is a widely used research method allowing for replication logic (theoretical propositions), as opposed to sampling logic (generalized to populations), thereby emphasizing the potential implementation of concepts within its real life context.

Furthermore, according to Blumberg et al. (2008), case studies typically rely on multiple sources of evidence including interviews, documentation and observation. This empirical study is aimed at evaluating the results of the currently used costing methodology against a proposed activity-driven operational accounting framework. In achieving this, the following methods were used to collect the empirical data and design the proposed framework:

- Firstly, interviews were held with key SAAC internal stakeholders in the accounting, supply chain and operational functions. All stakeholders had a possible influence on product cost, whether it was in material procurement, stock handling (raw materials, work-in-process or completed goods) or the manufacturing process.
- Secondly, SAAC management reports as well as other related internal reports and data were analyzed to gain a perspective on the competitive situation, and how an activity-driven operational accounting framework could potentially affect profit margins on certain products.

2. Theoretical framework

2.1. Introduction. One of the key reasons why companies are not sustainable is because somewhere in its past, bad management decisions have been made. Even though it is very important to control and manage operational costs (Narong, 2009), the road to sustainability does not necessarily require such costs to be cut, but rather to be properly managed in order to assist in retaining good cashflow and liquidity (Dwyer, 2009). Conventional cost accounting methods allocate overheads to the cost objects based on only one volume-sensitive driver, which often distorts cost estimates (Christie, 2008; Kennett, Duler & Downs, 2007; Roztoki & Scultz, 2003). According to Kennett et al. (2007), the new activity-based cost accounting methodology was developed by academic researchers, Prof K. Kaplan and Robin Cooper, in the late 1980s, to overcome some problems with conventional cost accounting and -management techniques.

The principles of activity-based costing (ABC) aim to provide the enabling management tools by empowering managers to pursue effective cost management on route to more sustainable growth (Stout & Bedenis, 2007). The principles of ABC are also not limited to manufacturing processes and – costs only, but include non-manufacturing processes and other overhead costs such as selling, marketing, distribution and administrative expenses that can be traced to the cost objects via related activities (Christie, 2008). With this approach, the cost objects
get charged for the cost of the capacity (or the resources) it actually uses, with idle times not taken into consideration (Kaplan & Anderson, 2007). Identifying and allocating costs based on an activity rate should therefore assist in making decisions not only about product costs, but also on related management decisions.

2.2. Fundamentals of activity-based costing. Turney (2005) considers ABC as a technique to measure the cost and performance of both the operational activities and the related cost objects. This is achieved by allocating the associated resource costs to the various activities, which, in turn, are allocated to the cost objects based on resource consumption estimates. Fundamentally, the ABC methodology estimates the cost objects’ costs where its manufacture and delivery consist of various operational activities. The cost of performing the activities is estimated by summing all relevant costs, such as labour, materials, equipment, subcontracting costs etc., to the specific activity (Christie, 2008; 2011; Kennett et al., 2007; Stratton, Desroches, Lawson & Hatch, 2009). The final cost of the cost object is then the sum of all the activity costs based on the consumption of the required activities (Kennett et al., 2007). By following this basic allocation route, it is argued that it will contribute to more accurate estimates of the actual cost object cost, which, in turn, is an important step towards better decision-making and long-term sustainability.

ABC is therefore a cost accounting philosophy that aims to trace costs to the operational activities based on resource consumption and/or capacity usage, and then further on to the cost objects that caused the activity to be incurred (Kennett et al., 2007; Stratton et al., 2009; Tardivo & Di Montezemolo, 2009; Turney, 2005). This ability to analyze business processes and identify cost cutback opportunities should be very helpful in the contemporary competitive economic environment. A key motivation behind ABC is therefore to be in control of the operational costs. Considering this fundamental objective of ABC, it is argued that companies with little product differentiation and/or with labor-intensive operations will not stand to gain much, while companies with significant overheads, should seriously consider such an approach.

2.3. Arguments for and against activity-based costing. Some of the key arguments in favor of following an activity-driven cost management approach include the following:

♦ Providing better visibility into the essence of the cost objects’ cost, which, in turn, should help with better resource allocation (Christie, 2008; Stratton et al., 2009);
♦ the activity costs and work processes can be directly assigned to the relevant cost object (Christie, 2008; Stratton et al., 2009);
♦ productive resource utilization can be maximized throughout the operational processes, together with operational improvement opportunities being identified (Stratton et al., 2009; Stout & Bendenis, 2007);
♦ providing more effective cost management tools, more accurate decision-making information and better operational budgeting, planning and performance evaluation tools (Stratton et al., 2009);
♦ identifying profitable customers, products and resources (Christie, 2008; Furniss & Spencer, 2005; Stratton et al., 2009); and
♦ identifying non-value-adding, redundant and under-utilised resources (Tatikonda & Tatikonda, 2001).

Notwithstanding the potential benefits, some arguments against such a methodology may also be made. These include the following:

♦ The implementation and maintenance thereof are often time-consuming and costly (Christie, 2008, p. 70; Kaplan & Anderson, 2007);
♦ the accuracy of the results is dependent on the correctness of the information generated, which, in turn, is vulnerable to human error and legacy integration problems (Christie, 2008);
♦ activities and resources are perceived to be linear, absolute and certain, while internal limitations or constraints are not considered (Geri & Ronen, 2005); and
♦ the identification of relevant cost drivers is often difficult, and sometimes has little or no relevance to the activity (Adkins, 2008; Christie, 2008; Geri & Ronen, 2005).

Irrespective of the above criticisms, before a company rejects ABC outright, they should first be sure that it is not the best approach for their needs, and that the benefits of the methodology oftentimes do justify the implementation and maintenance costs thereof.

3. Field of research

3.1. Current cost accounting methodology. In terms of its current operational accounting processes, SAAC uses a basic hybrid weighted average/standard cost accounting methodology with three primary factors included in their product costs, namely (1) raw material costs, (2) labor and overheads (which have fixed and variable cost considerations), and (3) transportation costs (see Figure 1 below).
Historically, the costs of the primary raw materials used in manufacturing have been based on weighted average costs, while the secondary raw material costs have been based on historical standard cost information. The labor and overhead rates, in turn, have been based on broad average annual calculations using budgeted overhead cost and forecasted production outputs/demands, while transportation costs are based on historical actual amounts. The current cost accounting methodology also assumes that all processes are the same and that all processes per work centre consume the same activities, in the same proportions, and only tracks against budget compliance. Costing of products is therefore done on the assumption that it costs the same to manufacture all product units (measured in tons). The reality, however, is that some product lines are more costly to manufacture than others, even if the manufacturing processes occur in the same facility.

In light of the aforementioned, SAAC is faced with several challenges in respect of its cost accounting methodologies:

- Forecasted costs are often overstated, while forecasted production levels are often understated with resultant incorrect recovery rates.
- Cost information is based on generalized assumptions about resource availability, resource consumption and production times.
- The same labor and overhead rates are used in cost allocation, without considering the actual manufacturing effort of the various products.

4. Operations overview

Michael Porter introduced the Value Chain model in his book ‘The Competitive Advantage’, as the overall representative process during which products and services gain value as they progress through different operational activities (Fei & Isa, 2010). According to Tardivo and Di Montezemolo (2009), Wang et al. (2010), and Zhang (2010), the analytical principles of ABC will compliment Porter’s value chain model in improving customer satisfaction, market efficiencies and competitive advantage, and consequently better profit margins and sustainability. Within this value chain concept, there are both primary and secondary activities. Within the context of this paper, SAAC’s primary activities are as follows:

- Inbound logistics: This includes the quality control, receiving, raw materials, and control and supply chain functions inside a business. Raw materials are sourced based on the anticipated demand, while the forecast and planning model keeps track of the raw materials requirements.
- Operations: Since the agricultural chemicals industry is very seasonal, outsourced services and contract workers are often used. In respect of the production processes, the business units ensure that all product types have a corresponding, approved bill-of-material (BOM) and corresponding routing (labor and overheads rates), which are used to determine the standard cost of the final products.
- Outbound logistics: Operations and outbound logistics include the manufacturing, packaging, dispatching and delivery of the final product.
- Marketing and sales: Sales are recorded in an order bank on the internal mainframe, approved by the respective business units and included in the forecasting model. The supply chain department will determine the raw materials requirements and source the required raw materials.
- Service: Internal services are intended to provide training so that the employees are comfortable and can perform optimally.

The secondary (or support) activities contribute indirectly toward the value-adding opportunities and
These include the following:

♦ Procurement: SAAC must keep up a good relationship with suppliers in order to receive timely deliverables.
♦ Technological development: The operational systems should be updated and available in order to ensure optimal usage.
♦ Human resource management: SAAC must recruit the correct people for a job.
♦ Firm infrastructure: SAAC has six different factories that are located nationally.

5. Empirical case study

5.1. Case scenario. The key objective of this paper is to consider a single contextual management scenario from two different perspectives, being the comparative product costs based on i) SAAC’s current cost accounting methodology and ii) a potential activity-based approach to SAAC’s operational cost management. For the purpose of this case study, the following assumptions are made:

♦ SAAC produces six different agricultural chemical products, namely Prod1, Prod2, Prod3, Prod4, Prod5 and Prod6.
♦ SAAC uses eight primary raw materials in the production of the above, namely Raw1, Raw2, Raw3, Raw4, Raw5, Raw6, Raw7 and Raw8.
♦ The budgeted product demand in tons is correct and remains constant, while the total overhead cost component will remain unchanged for both scenarios.

The total 201X demand for SAAC’s products is 945 000 tons with the associated budgeted cost amounting to R34 825 000, resulting in the current average labor rate per production ton of R36.85. Similarly, the budgeted overhead cost amounted to approximately R12 590 000 and the current average overhead rate per production ton of R13.32 per ton. The historic argument for this averaging of rates is based on the arguments of similar products and manufacturing processes as well as ease of calculation. Within this scenario, the raw material and transportation components of the products should remain constant, irrespective of the cost accounting methodology used and are per definition excluded from this case study.

5.2. Activity-based operational accounting framework. Based on the MRP II system, the detailed 201X demand for SAAC’s products can be broken down as follows:

♦ Prod1: 180 000 tons
♦ Prod2: 130 000 tons
♦ Prod3: 240 000 tons
♦ Prod4: 220 000 tons
♦ Prod5: 70 000 tons
♦ Prod6: 105 000 tons

As indicated earlier, the labor and overhead rates are determined once a year based on the budgeted expenses and production tonnage. In terms of the 201X year, the total budgeted labor hours were 497 000 hours, which would result in an average hourly rate of R70.00 per hour and an average hourly overhead rate of R25.31 per hour.

5.2.1. Labor cost recalculation. Utilizing an activity-based approach, distinguishing between the different product lines, it is proposed that a labor rate per ton for each product line is determined. Based on the analysis of the production time per product line, the associated production hours together with the labor overhead cost components for the products are summarized in Table 1 below.

Table 1. Production hours and labor cost

<table>
<thead>
<tr>
<th>Product</th>
<th>Demand (tons)</th>
<th>Production time/ton</th>
<th>Total time (hrs)</th>
<th>Labor cost (@R70 p/hr)</th>
<th>Labor rate (R/ton)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prod1</td>
<td>180 000</td>
<td>45 min</td>
<td>135 000</td>
<td>9 450 000</td>
<td>52.50</td>
</tr>
<tr>
<td>Prod2</td>
<td>130 000</td>
<td>45 min</td>
<td>97 500</td>
<td>6 825 000</td>
<td>52.50</td>
</tr>
<tr>
<td>Prod3</td>
<td>240 000</td>
<td>30 min</td>
<td>120 000</td>
<td>8 400 000</td>
<td>35.00</td>
</tr>
<tr>
<td>Prod4</td>
<td>220 000</td>
<td>30 min</td>
<td>110 000</td>
<td>7 700 000</td>
<td>35.00</td>
</tr>
<tr>
<td>Prod5</td>
<td>70 000</td>
<td>15 min</td>
<td>17 500</td>
<td>1 225 000</td>
<td>17.50</td>
</tr>
<tr>
<td>Prod6</td>
<td>105 000</td>
<td>10 min</td>
<td>17 500</td>
<td>1 225 000</td>
<td>11.67</td>
</tr>
<tr>
<td>Total</td>
<td>945 000</td>
<td></td>
<td>497 000</td>
<td>34 825 000</td>
<td></td>
</tr>
</tbody>
</table>

5.2.2. Overhead cost recalculation. Since SAAC is not currently allocating the overhead costs per activity, but rather per production ton of product, a proposed activity dictionary is developed and the overheads allocated to these activities. The budgeted overheads of R12 590 000 for the FY201X can be broken down into different activities and resources (see Table 2 below), which will give an indication of the overhead costs applicable to the various value-adding activities.

Table 2. Proposed activity dictionary and allocated overhead

<table>
<thead>
<tr>
<th>Activity</th>
<th>Resource</th>
<th>Cost hierarchy</th>
<th>Allocated overhead (R)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Customer orders</td>
<td>Customer services</td>
<td>Unit level</td>
<td>49 000</td>
</tr>
<tr>
<td>Raw material order</td>
<td>Procurement</td>
<td>Unit level</td>
<td>34 000</td>
</tr>
</tbody>
</table>
Table 2 (cont.). Proposed activity dictionary and allocated overhead

<table>
<thead>
<tr>
<th>Activity</th>
<th>Resource</th>
<th>Cost hierarchy</th>
<th>Allocated overhead (R)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Receiving</td>
<td>Scheduling</td>
<td>Unit level</td>
<td>54 000</td>
</tr>
<tr>
<td>Handling</td>
<td>Warehouse</td>
<td>Batch level</td>
<td>223 000</td>
</tr>
<tr>
<td>Machine set-up</td>
<td>Manufacturing</td>
<td>Batch level</td>
<td>1 189 000</td>
</tr>
<tr>
<td>Blending</td>
<td>Manufacturing</td>
<td>Batch level</td>
<td>2 085 000</td>
</tr>
<tr>
<td>Manufacturing</td>
<td>Manufacturing</td>
<td>Batch level</td>
<td>3 934 000</td>
</tr>
<tr>
<td>Bagging</td>
<td>Manufacturing</td>
<td>Batch level</td>
<td>3 012 000</td>
</tr>
<tr>
<td>Product sorting</td>
<td>Manufacturing</td>
<td>Batch level</td>
<td>435 000</td>
</tr>
<tr>
<td>Transport</td>
<td>Logistics</td>
<td>Batch level</td>
<td>1 075 000</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>12 590 000</td>
</tr>
</tbody>
</table>

The overhead cost allocated to the different activities then needs to be allocated to the six different product lines, based on the consumption of these activities or resources. The consumption of the activities was noted by direct observation at SAAC’s facilities. Based on activity consumption, the total number of consumption units can be summed (see Table 3 below). This is necessary when a rate per activity needs to be calculated.

Table 3. Activity utilization per product (units)

<table>
<thead>
<tr>
<th>Activity</th>
<th>Products</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Customer orders</td>
<td>4 000</td>
<td>3 000</td>
</tr>
<tr>
<td>Raw material order</td>
<td>100</td>
<td>120</td>
</tr>
<tr>
<td>Receiving</td>
<td>5 300</td>
<td>3 850</td>
</tr>
<tr>
<td>Handling</td>
<td>180 000</td>
<td>130 000</td>
</tr>
<tr>
<td>Machine set-up</td>
<td>56</td>
<td>12</td>
</tr>
<tr>
<td>Blending</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Manufacturing</td>
<td>200</td>
<td>175</td>
</tr>
<tr>
<td>Bagging</td>
<td>165 000</td>
<td>115 000</td>
</tr>
<tr>
<td>Product sorting</td>
<td>165 000</td>
<td>115 000</td>
</tr>
<tr>
<td>Transport</td>
<td>130 000</td>
<td>105 000</td>
</tr>
</tbody>
</table>

Using the information in Tables 2 and 3, it becomes possible to determine an activity-specific overhead rate (see Table 4 below). This indicates the activity rate in order to cover the overhead costs, with the assumption that the budgeted overhead costs and activity consumption are correct and true.

Table 4. Activity-specific overhead rates

<table>
<thead>
<tr>
<th>Activity</th>
<th>Total</th>
<th>Overhead</th>
<th>Rate (R/activity)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Customer orders</td>
<td>40 000</td>
<td>49 000</td>
<td>1.23</td>
</tr>
<tr>
<td>Raw material order</td>
<td>720</td>
<td>34 000</td>
<td>47.22</td>
</tr>
<tr>
<td>Receiving</td>
<td>27 890</td>
<td>54 000</td>
<td>1.94</td>
</tr>
<tr>
<td>Handling</td>
<td>945 000</td>
<td>223 000</td>
<td>.24</td>
</tr>
<tr>
<td>Machine set-up</td>
<td>168</td>
<td>1 189 000</td>
<td>7 077.38</td>
</tr>
<tr>
<td>Blending</td>
<td>390</td>
<td>2 085 000</td>
<td>5 346.15</td>
</tr>
<tr>
<td>Manufacturing</td>
<td>375</td>
<td>3 934 000</td>
<td>10 490.67</td>
</tr>
<tr>
<td>Bagging</td>
<td>815 000</td>
<td>3 012 000</td>
<td>4.31</td>
</tr>
<tr>
<td>Product sorting</td>
<td>855 000</td>
<td>435 000</td>
<td>0.51</td>
</tr>
<tr>
<td>Transport</td>
<td>745 000</td>
<td>1 075 000</td>
<td>1.44</td>
</tr>
</tbody>
</table>

Using the above information, it becomes possible to calculate the total budgeted overhead per product line based on the expected activities required to meet the expected demands. For detailed illustrative purposes, consider the case of Prod4 (Table 5 below).

Table 5. Illustrative overhead cost per activity of Prod4

<table>
<thead>
<tr>
<th>Activity</th>
<th>Rate (R/activity)</th>
<th>Activity requirements</th>
<th>Total budgeted overhead (R)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Customer orders</td>
<td>1.23</td>
<td>17 500</td>
<td>21 437.50</td>
</tr>
<tr>
<td>Raw material order</td>
<td>47.22</td>
<td>250</td>
<td>11 805.56</td>
</tr>
<tr>
<td>Receiving</td>
<td>1.94</td>
<td>6 500</td>
<td>12 585.16</td>
</tr>
<tr>
<td>Handling</td>
<td>.24</td>
<td>220 000</td>
<td>51 915.34</td>
</tr>
</tbody>
</table>
Table 5 (cont.). Illustrative overhead cost per activity of Prod4

<table>
<thead>
<tr>
<th>Activity</th>
<th>Rate (R/activity)</th>
<th>Activity requirements</th>
<th>Total budgeted overhead (R)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Machine set-up</td>
<td>7 077.38</td>
<td>75</td>
<td>539 903.57</td>
</tr>
<tr>
<td>Blending</td>
<td>5 946.15</td>
<td>100</td>
<td>534 615.38</td>
</tr>
<tr>
<td>Manufacturing</td>
<td>10 490.67</td>
<td>-</td>
<td>948 024.54</td>
</tr>
<tr>
<td>Bagging</td>
<td>4.31</td>
<td>220 000</td>
<td>-</td>
</tr>
<tr>
<td>Product sorting</td>
<td>0.51</td>
<td>220 000</td>
<td>111 929.82</td>
</tr>
<tr>
<td>Transport</td>
<td>1.44</td>
<td>210 000</td>
<td>303 020.13</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>2 526 137.01</td>
</tr>
</tbody>
</table>

The total activity-based overhead costs for each product line together with the activity-based overhead rate per production ton are provided in Table 6 below:

Table 6. Overhead cost per activity summary

<table>
<thead>
<tr>
<th>Product</th>
<th>Demand (tons)</th>
<th>Total activity cost (R)</th>
<th>Activity cost (R/ton)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prod1</td>
<td>180 000</td>
<td>3 539 376.49</td>
<td>19.66</td>
</tr>
<tr>
<td>Prod2</td>
<td>130 000</td>
<td>2 673 845.56</td>
<td>20.57</td>
</tr>
<tr>
<td>Prod3</td>
<td>240 000</td>
<td>2 263 967.68</td>
<td>9.43</td>
</tr>
<tr>
<td>Prod4</td>
<td>220 000</td>
<td>2 526 137.01</td>
<td>11.48</td>
</tr>
<tr>
<td>Prod5</td>
<td>70 000</td>
<td>499 931.56</td>
<td>7.14</td>
</tr>
<tr>
<td>Prod6</td>
<td>105 000</td>
<td>1 086 741.70</td>
<td>10.35</td>
</tr>
<tr>
<td></td>
<td>945 000</td>
<td>12 590 000</td>
<td></td>
</tr>
</tbody>
</table>

5.3. Comparative analysis. When comparing the current labor and overhead rates of South African Agricultural Chemicals as currently used, and proposed activity-based rates (see Table 7 below), it is obvious that there are substantial differences to be found.

Table 7. Comparative rate analysis

<table>
<thead>
<tr>
<th>Product</th>
<th>Labor rate variance</th>
<th>Overhead rate variance</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>ABC Traditional Variance</td>
<td>ABC Traditional Variance</td>
</tr>
<tr>
<td>Prod1</td>
<td>52.50 36.85 15.65</td>
<td>19.66 13.32 6.34</td>
</tr>
<tr>
<td>Prod2</td>
<td>52.50 36.85 15.65</td>
<td>20.57 13.32 7.25</td>
</tr>
<tr>
<td>Prod3</td>
<td>35.00 36.85 -1.85</td>
<td>9.43 13.32 -3.89</td>
</tr>
<tr>
<td>Prod4</td>
<td>35.00 36.85 -1.85</td>
<td>11.48 13.32 -1.84</td>
</tr>
<tr>
<td>Prod5</td>
<td>17.50 36.85 -19.35</td>
<td>7.14 13.32 -6.18</td>
</tr>
<tr>
<td>Prod6</td>
<td>11.67 36.85 -25.18</td>
<td>10.35 13.32 -2.97</td>
</tr>
</tbody>
</table>

With regard to Prod1 and Prod2, both the labor and overhead rates are higher than the conventional rates, which means that the company is currently over-recovering the associated costs for these two product lines (i.e. lower cost of sales and higher profit), while the other product lines are under-recovering their associated costs (i.e. higher cost of sales and lower profit) (see Table 8 below).

Table 8. Over- and under recovery

<table>
<thead>
<tr>
<th>Product</th>
<th>Demand (tons)</th>
<th>Total rate difference (R/activity)</th>
<th>Difference (R)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prod1</td>
<td>180 000</td>
<td>21.99</td>
<td>3 958 200</td>
</tr>
<tr>
<td>Prod2</td>
<td>130 000</td>
<td>22.90</td>
<td>2 977 000</td>
</tr>
<tr>
<td>Prod3</td>
<td>240 000</td>
<td>-5.74</td>
<td>(1 377 600)</td>
</tr>
<tr>
<td>Prod4</td>
<td>220 000</td>
<td>-3.69</td>
<td>(811 800)</td>
</tr>
<tr>
<td>Prod5</td>
<td>70 000</td>
<td>-25.53</td>
<td>(1 787 100)</td>
</tr>
<tr>
<td>Prod6</td>
<td>105 000</td>
<td>-28.15</td>
<td>(2 955 750)</td>
</tr>
</tbody>
</table>

The disadvantage if the costs of sales are lower than what it should be is that it means another product is carrying the additional labor and overhead costs. This might create an unavoidable issue when an ‘unfairly loaded’ product line might not perform well in a specific year and the budgeted tonnage might not be made. In such a case, SAAC may suffer losses, but will not truly know the reasons therefore. The cumulative effect hereof is that poorly informed business decisions will impact on the company’s sustainability.

Concluding discussion and recommendations

The primary objective of this case study was to assess the feasibility of an activity-driven operational accounting framework. In order to
achieve this objective, the theoretical framework of
the ABC philosophy was highlighted and applied in
the specific case study. Subsequently, the difference
in unit rates, calculated on the basis of the current
cost accounting methodology and a proposed
activity-driven operational accounting framework,
highlights the difference that a change in cost
accounting methodology can have on SAAC’s cost
object’s allocated cost.

The findings of this case study indicate that the
allocated costs differ with different methodologies
followed and that it is clear that for some product
lines the current cost accounting method is under-
recovering the associated labor and overhead costs,
while with other product lines it is over-recovering.
This can become a very risky business scenario when
actual product demands differ from the forecasted
product demand. In the case of SAAC, the under-
recovery of labor and overhead costs largely gets
smoothed out by the over-recovery of other products,
as is illustrated by the empirical data of the case
study. Notwithstanding, if the costs of a product are
inaccurate and unreliable, management’s decisions
will be made on such information, which might
impact on the long-term sustainability of the
company. The study also considered SAAC’s
business model and costing methodology within the
context of Porter’s value chain. The purpose was to
provide a contextual background of how the cost
objects (in various stages of completion) must go
through different channels and activities in order to
add value to the end result.

There are several reasons why SAAC should consider
implementing an activity-based operational
accounting framework. Fundamental hereto is the
fact that the production processes can be mapped out
and analyzed in support of better business decisions.
By eliminating the non-value-adding activities or
resources, money can be saved and the resources
more effectively allocated to optimize resource
utilization. Unprofitable products can therefore be
discontinued, while focusing on those that are
profitable. Such a framework should therefore help
SAAC management in making better business and
financial decisions. An activity-based methodology
also supports continued improvement, a balanced
scorecard and performance measurement. This case
study demonstrated both theoretical and practical
benefits of an activity-based operational accounting
framework, including more reliable product cost
calculations, operational quality improvement and
better informed decision-making at various
management levels. It will also leave management,
sales and marketing personnel with a better
understanding of when to walk away from a business
opportunity, for example when the market price is
lower than the actual cost of sales of a product, or
when a customer becomes too ‘cost consuming’.

Finally, an activity-based operational accounting
framework should be used in parallel with SAAC’s
current ERP system. When the costs are visible, the
non-value-adding processes and activities can be
eliminated and financial benefits can be received.
The challenging part is to use the successful
implementation of an activity-driven operational
accounting framework to improve operational
processes to drive costs lower. Based on the case
study, SAAC needs to revisit their business plan and
identify areas of potential resource savings,
streamlining processes and eliminating non-value-
adding activities. Opportunities for improvement in
terms of cost efficiencies have been identified
within the procurement department by hedging
exchange rates, economies of scale price
negotiations and tender processes. Furthermore,
both fixed and variable cost categories/resources
must be reviewed and eliminated if it is not adding
value. SAAC should evaluate which of their product
lines are not profitable (or strategic in nature) and
consider discontinuing such products.

Limitations and future research
In order to complete this study, a questionnaire
survey was completed and it was assumed that the
results were correct and not misleading. As this is a
specific case study, the reader must take cognisance
of this fact and be careful not to generalize any
findings and recommendations – therefore, the study
remains limited to this case. The interviews held with
SAAC’s financial and operational representatives
were restricted to their knowledge. For the purpose
of this study, it was also assumed that all commodity
prices (supply and demand) as well as any foreign
currencies remain constant. Finally, the study leaves
the following opportunities for further research:

♦ The impact of alternative costing methodologies
  in service industries on the costing of services.
  Other costing methodologies, such as TDABC,
  can be investigated in order to overcome current
  issues that are too complex to be dealt with
  within the ABC model.

♦ A stronger focus on the financial benefit vs. the
cost of implementation by increasing the sample
size based on statistical information can be
beneficial and will prove the benefits to
companies who are considering ABC.

♦ Alternative but relative costing methodologies,
such as TDABC, can be investigated in order to
overcome current issues that are too complex
within the ABC model.
References


