“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

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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 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, Durler & Downs, 2007; Roztocki & Scultz, 2003). According to Kennett et al. (2007), the *new* activity-based cost accounting methodology was developed by academic researchers, Proff Robert 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 fundamen-tal 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 informa-tion and better operational budgeting, planning and perfor-mance 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 & Tati-konda, 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).

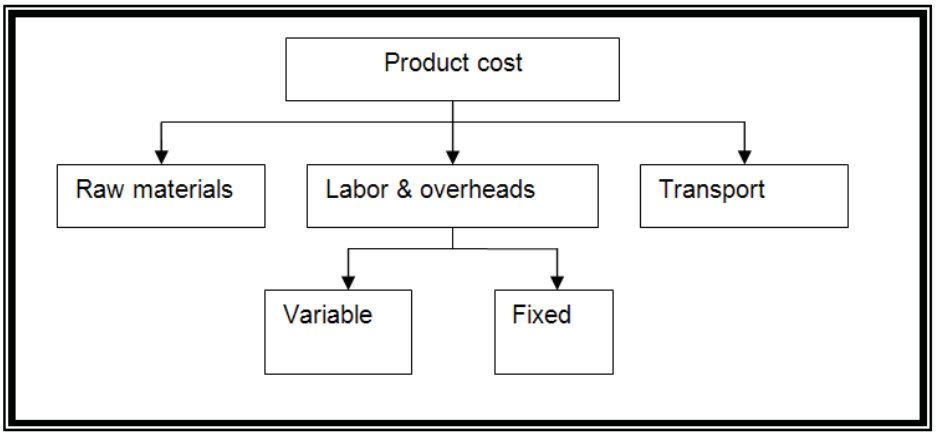

Fig. 1. Current product cost accounting structure

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

processes as per the above primary objectives. 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 497 500 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

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

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

Activity	Resource	Cost hierarchy	Allocated overhead (R)
Customer orders	Customer services	Unit level	49 000
Raw material order	Procurement	Unit level	34 000

Table 2 (cont.). Proposed activity dictionary and allocated overhead

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

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)

Activity	Products						Total
	1	2	3	4	5	6	
Customer orders	4 000	3 000	8 000	17 500	2 500	5 000	40 000
Raw material order	100	120	80	250	110	60	720
Receiving	5 300	3 850	7 060	6 500	2 080	3 100	27 890
Handling	180 000	130 000	240 000	220 000	70 000	105 000	945 000
Machine set-up	56	12	18	75	5	2	168
Blending	-	-	120	100	75	95	390
Manufacturing	200	175	-	-	-	-	375
Bagging	165 000	115 000	230 000	220 000	-	85 000	815 000
Product sorting	165 000	115 000	230 000	220 000	40 000	85 000	855 000
Transport	130 000	105 000	210 000	210 000	10 000	80 000	745 000

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

Activity	Total	Overhead	Rate (*R*/activity)
Customer orders	40 000	49 000	1.23
Raw material order	720	34 000	47.22
Receiving	27 890	54 000	1.94
Handling	945 000	223 000	.24
Machine set-up	168	1 189 000	7 077.38
Blending	390	2 085 000	5 346.15
Manufacturing	375	3 934 000	10 490.67
Bagging	815 000	3 012 000	4 .31
Product sorting	855 000	435 000	0.51
Transport	745 000	1 075 000	1.44

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

Activity	Rate (R/activity)	Activity requirements	Total budgeted overhead (*R*)
Customer orders	1.23	17 500	21 437.50
Raw material order	47.22	250	11 805.56
Receiving	1.94	6 500	12 585.16
Handling	.24	220 000	51 915.34

Table 5 (cont.). Illustrative overhead cost per activity of Prod4

Activity	Rate (*R*/activity)	Activity requirements	Total budgeted overhead (*R*)
Machine set-up	7 077.38	75	539 803.57
Blending	5 346.15	100	534 615.38
Manufacturing	10 490.67	-	948 024.54
Bagging	4.31	220 000	-
Product sorting	0.51	220 000	111 929.82
Transport	1.44	210 000	303 020.13
			2 526 137.01

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

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

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

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

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

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

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.

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