

# An evaluation of a standard costing framework to manage transport costs for a South African logistics company

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Mini-dissertation submitted in *partial* fulfilment of the requirements for the degree *Master of Commerce* in *Management Accountancy* at the Potchefstroom Campus of the North-West University

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Graduation October 2017

<http://www.nwu.ac.za/>



## **ACKNOWLEDGEMENTS**

Firstly I give thanks to my study leader, Prof. Sanlie Middelberg of the NWU, for guidance and support (and a lot of patience).

I give thanks to my loving wife, Amanda, for love, support and understanding during this undertaking.

Lastly, to God for the honour and the opportunity to take on and complete this study.

“The beauty of grace is that it makes life not fair”

## **ABSTRACT**

**TITLE:** An evaluation of a standard costing framework to manage transport costs for a South African logistics company.

**KEYWORDS:** Standard costing, variance analysis, performance management, logistics industry, transport cost, South Africa.

Logistics costs form an integral part of costs accumulated through the value chain of any product. Logistics costs can be broken down into various components. One of these components is the transportation cost of products. The component that constitutes the largest part of transportation cost is fuel. As fuel constitutes the largest portion of variable costs and impacts the rate charged to customers for transportation, any overspending in fuel cost will lead to lower profitability for a company. To stay competitive in the market of any industry, not only the logistics industry, companies need to ensure that costs are kept within reason.

Standard costing is a model used to allocate overhead costs to products in an environment of repetitive operations. Standard costing requires the setting of standards for input costs and for input quantities to produce one unit of measure. When actual costs are compared to standard costs, the resulting variance is generally one-dimensional and is only a monetary value. The variance does not guide management as to why overspending is occurring and that limits their ability to manage the said variance.

The main objective of this study was to evaluate a standard costing framework for Company A, a South African logistics company, to establish if standard costing could assist logistics companies in managing fuel cost, and in turn assist in managing product costs. The logistics company, Company A, was investigated under a case study approach. The research was conducted from a pragmatic research paradigm and a mixed method approach was followed. A qualitative method, in the form of a semi-structured interview with the management of Company A, was followed to establish the current understanding and application of standard costing in Company A, while quantitative data was collected and utilised in the development of a standard costing framework.

The findings of the study included that, in order to address and manage identified standard costing variances, companies need formal structures and accountability centres to assign corrective actions to. To achieve this, a performance management system will guide and assist management with variances in a formal and structured manner. A performance management system was further developed as per the framework put forward by Ferreira and Otley (2009) to assist Company A.

The study concluded by illustrating the findings of the standard costing model and by developing a framework whereby identified areas of concern could be managed. Standard costing highlighted areas that required further investigation and illustrated possible savings for Company A.

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## **CHAPTER 1**

### **1 INTRODUCTION TO THE STUDY**

#### **1.1 INTRODUCTION**

Logistics costs form an integral part of costs accumulated through a value chain in any industry. Logistics costs can be defined as all costs required for the transportation, storage and handling of the material required for production up to distribution, handling and shipment of finished goods from producer to consumer (Zakariah & Pyeman, 2013). The components of logistics costs include: i) transport costs, ii) warehousing, iii) cost management/administration costs, and iv) inventory carrying costs (CSIR, 2013).

Reducing the various components of logistics costs by better management thereof will lead to higher profits for any logistics company. It will result in lower logistics costs in the value chain of a particular product, in turn lowering that product's costs and ultimately the product price paid by the end consumer. Lower product prices could increase the accessibility of products that are generally not affordable, due to high prices, to certain consumers. One such example of the influence of price on the accessibility of products was found by Ward, Coveney, Verity, Carter and Schilling (2012) in Australia. It was found that healthy food was more expensive, thus less affordable, in rural areas than in metro areas in Australia. According to Ciobanu (2014) lower product prices could lead to increased sales, as consumers use a range of personal arguments before deciding to buy a product - one of these arguments include the balance between cost and quality.

When considering the first component of logistics costs in South Africa, i.e. transport cost, the table below (table 1.1) indicates the significance of transport costs in the South African economy. The table shows the transport cost value, the percentage of total logistics costs it represents as well as the percentage that the total logistics costs signify in the South African Gross Domestic Product (GDP) (Havenga *et al.*, 2016).

**Table 1.1: Transport cost from 2010 to 2016**

Year	Transport Cost R'billion	% of Logistics Cost	Logistics Cost % of GDP
2010	176	56	11.4
2011	193	58	11
2012	229	60	11.7
2013	235	60	11.1
2014	244	57	11.2
2015 (Estimate)	268	57	11.7
2016 (Forecast)	277	55	11.8

Source: Havenga *et al.* (2016)

The fuel portion of transport cost constitutes on average 25% to 27% of the transport cost in smaller truck operations, while this percentage can increase to 40% to 50% of the transport cost in larger truck, tractor and interlink operations (Schulz, 2013:10). Using these averages on the forecasted transport cost for South Africa in 2016 (refer table 1.1), depending on the mix of transport used, the fuel cost can range between R69.25bn and R138.5bn per annum (Havenga *et al.*, 2016). However, this fuel cost is directly influenced by the driver's performance and it is therefore necessary to assess and manage the driver's performance with accurate information.

As transport cost can constitute a significant portion of a company's expenses, the management thereof is a key aspect that companies should consider in developing their strategy. Moreover, in a logistics company the ability to manage transport cost is critical. As the transport cost forms the basis for determining the price that the company demands in the market for its services, the effective and efficient management thereof would assist the company to be competitive. All logistics companies form part of a larger market supply chain, either locally and/or internationally. According to Jansen van Rensburg (2000:180) transport cost can be seen as one of the factors which, when not adequately managed, could create a barrier to trade internationally.

### 1.1.1 Pricing

Logistics companies determine and quote a transport rate (price) to potential and existing clients. One method of determining such a price or transport rate by logistics companies is the theory of marginal costing. Marginal costing is a sophisticated and comprehensive method of planning and monitoring costs based on resource drivers (Offenbacher, 2004:7). An example of the use of marginal costing in the banking industry is suggested by Spaller (2006:52). Spaller (2006:52) proposed that, when a bank costs a new product, it would only cost below the variable cost to the bank if the intention is to build volumes and as such increase market share. Any cost above variable cost would contribute to covering the bank's fixed cost. A profit could be generated if the amount above the variable cost is enough to cover all the fixed cost for a period. Spaller (2006:52) further indicated that a new product could be priced at total cost, i.e. fixed and variable cost, but this could lead to inflated prices that could result in the bank being uncompetitive.

When applying this theory to a logistics company, determining pricing/transfer rates based on *only* variable cost could lead to profits - if fixed costs are ignored. If, however, other projects cover the company's fixed cost, determining transfer rates at variable cost could lead to the company recording an overall profit - if the other projects also record a profit. On the other hand, determining transfer rates/prices at variable cost while other projects do not cover fixed costs, will lead to losses. This argument highlights the reasoning that a logistics company, intending to be and remain competitive, should have a thorough understanding of both pricing and its cost behaviour.

The question can therefore be raised what costs constitute the variable costs of a logistics company's transport cost. When using the kilometres travelled as a cost driver for variable cost, the main variable costs include: i) maintenance cost of a vehicle, ii) the cost of tyres used, and iii) fuel. As discussed earlier, the largest portion of variable cost will, however, be fuel.

### **1.1.2 Competitive market**

Logistics companies will have to be highly competitive to ensure their survival in any market. Helms and Dibrell (1997) found that local and international rivalry would lead to rivalry imitation and ultimately excelling of efficiency, which in turn would contribute to a company gaining competitive advantage. The remaining companies in the market would therefore have to become competitive in all aspects of the business. According to Havenga (2015) logistics, as one of the competitive components, is a relatively new term. During the early 1980's competitive advantage was achieved by superior products and evolved to superior service, but both these components became exhausted due to emulation by competitors. Logistics offered the opportunity for sustainable advantage (Havenga, 2015).

Helms and Dibrell (1997) further found that companies adopting a strategy of aggressive price discounts will gain a temporary increase in sales. However, this will be short-lived only until competitors start matching prices to regain lost market share. Helms and Dibrell (1997) maintained that firms obsessed with competing in terms of low cost would have limitations. Firms focussing on cost cuts for higher profits would find more growth in better service delivery and differentiation. Performance management is a technique available to enable a company to better manage various aspects of the business that could result in improved logistic services to a client. This was reiterated by Cokins (2013: 22) who stressed that enterprise performance management, that includes performance management, can assist executive teams to realise strategic goals and to gain more control at operational levels. In essence these factors, when managed correctly, all lead to improved financial performance.

### **1.1.3 Logistics costs in South Africa**

Research shows logistics costs in South Africa to be higher than the global average. It also shows that the largest part of transport cost is made up of fuel cost (Havenga, 2010). Havenga (2015) found that fuel cost can account for as much as a third of transport cost. Fuel cost is largely determined by the volatile oil price. Effective cost reduction can only be achieved by tracking the components of logistics costs. Due to a lack of adequate information, South Africa's energy generating sector is

experiencing a severe backlog in generating infrastructure and it was found that the logistics sector will face the same challenges (Havenga, 2010).

In 2011, South Africa's logistics costs constituted 11% of the GDP (refer table 1.1). When comparing this to the United States of America's (USA) 8.5% and 7.2% of the European Union (EU), it highlights a large variance. This variance resulted in South Africa ranking 53 out of a total 148 countries in the 2013 Global Competitive Report (Havenga, 2015).

All the above aspects are amplified as risks not only to the economy, but also to competitiveness - due to the dependence on road transportation for all long-distance transport requirements in South Africa. Current estimates show that road transport makes up 90% of all long-distance transport (Havenga, 2015).

#### **1.1.4 Case Study**

Holding Company H is a JSE Limited (JSE) listed South African based international group of companies active in three major areas of mobility: i) consumer and industrial logistics, ii) vehicle import, distribution, retail and aftermarket parts, and iii) vehicle related financial services.

Company A is a wholly owned subsidiary of Holding Company H. Division D of Company A (hereafter called Company A) will be used for the case study. Company A had 91 employees during the company's 2016 financial year. The distance travelled by Company A's vehicles were 723 040 kilometres (KM) and consumed around 234 921 litres (Lt) of fuel during the company's 2016 financial year.

## **1.2 PROBLEM STATEMENT**

Christopher and Gottarno (2005) asserted that deflationary trends are creating pressure to reduce costs so as to maintain healthy profit margins. The supply chain was furthermore identified as the last remaining opportunity for cost reduction (Christopher & Gottarno, 2005).

As indicated previously, cost management plays a crucial role in ensuring optimisation of transport prices offered to customers. Standard costing has been identified as a

possible performance management system to manage the transport cost of Company A. Standard costing has various applications, but the most relevant include cost control, budgeting and cost reduction (De Zoysa & Herath, 2007). Standard costing gained popularity under management due to its ability as a powerful control tool. Standard costing allows managers to manage by exception. The most significant deviations from predetermined performance levels can be investigated as to manage managers' time and attention better (De Zoysa & Herath, 2007). Various studies have found that, despite criticisms, standard costing is still relevant in businesses today (De Zoysa & Herath, 2007; Marie *et al.*, 2010). Even with changing business environments, standard costing has stayed relevant by adapting rather than abandoning all together (Sulaiman *et al.*, 2005).

For purposes of this study the following primary research question can be posed:

P<sub>1</sub>: To what extent can a standard costing framework be used to manage the transport costs of Company A?

### **1.3 OBJECTIVES**

The objectives are categorised in terms of a main objective and secondary objectives.

#### **1.3.1 Main Objective**

The main objective of this study will be to evaluate a standard costing framework for Company A, a South African logistics company, in the management of transport costs. The standard costing framework can be used as the performance management system.

#### **1.3.2 Secondary Objectives**

The main objective will be achieved by the following secondary objectives:

- Identifying and describing the research method followed to achieve the objectives (chapter 2);
- Conducting a literature review of the various applications of standard costing within different industries as a performance management system (chapter 3);

- Developing a standard costing framework to be used as a performance management system for Company A (chapter 4); and
- Concluding the study by providing recommendations based on the empirical study conducted (chapter 5).

## **1.4 RESEARCH METHODOLOGY**

The methodology used will consist of a literature review and an empirical study.

### **1.4.1 Literature Review**

Firstly, the literature study will focus on standard costing and the various applications thereof. The literature study will enable the researcher to gain a fundamental understanding of the concept. An in-depth review of other published academic studies in the research field will be conducted in order to gain an understanding of new developments and different applications.

Secondly, the literature review will focus on the use and effective development of performance measurement and the use thereof as a management tool.

The knowledge gained through the literature review will assist in developing a standard costing framework for the variable transport costs in Company A.

### **1.4.2 Empirical Study**

The empirical study will be conducted as a case study focusing on Company A's variable transport costs. This study will collect both quantitative and qualitative data.

The aim of the empirical study is to develop a standard costing framework that can be used by the management of Company A to measure the variable transport costs of Company A and furthermore to use this framework as a performance management system. Ferreira and Otley (2009) developed a performance management system framework to assist in the design and use of a performance management system. This framework will be utilised in the development of a performance management system for Company A.

A motivation for why a case study research approach was chosen, will be provided in chapter 2 (refer to section 2.4.1, page 14).

The data collection will be conducted in two phases. The first phase will focus on collecting quantitative data (refer section 1.4.3 and section 1.4.4 below), while the second phase will collect qualitative data (refer section 1.4.5).

### **1.4.3 Standards development**

The first step will be to identify selected routes that Company A's trucks travel. Each time a route is serviced, it can be seen as a completed load. The number of loads signify the main cost driver of the variable transport costs of Company A.

The second step will be to set standards for variable costs (SVC) on a cost per load basis. These standards will be based on historical data together with changing variables between selected routes.

### **1.4.4 Actual measurements**

The third step will utilise historic financial records to determine the actual variable costs (AVC) per load. The actual number of loads completed will be multiplied by SVC (as discussed above), resulting in the standard costs that should have been incurred for the period under review.

The fourth step will compare the standard costs to actual costs to identify any variances. The variances will indicate whether over- or under-spending occurred and whether the variances were as a result of price variances or quantity variances.

Finally, the various reasons for these variances will be investigated and highlighted and will furthermore assist in the development of a standard costing framework. This framework can be used by the management of Company A as a performance management tool to manage their transport costs.

### 1.4.5 Interview

An interview with the management of Company A will be conducted to collect data based on the current standard costing system and the extent of the company's performance management system.

## 1.5 KEY DEFINITIONS

The following definitions and key terms are applicable to the study:

**Performance measurement:** Comparison against budgets or plan that involves costs, revenues, volumes, time scales and profitability (BPP, 2011).

**Standard costing:** Specify in advance what should be achieved and then measuring the extent to which it is being achieved (Sulaiman *et al.*, 2005).

**Transport costs:** Transport costs are measured by calculating the cost of transport by road (both distribution and line haul), rail, air, coastal shipping and pipeline (Havenga, 2010).

## 1.6 OVERVIEW

Chapter 1: Introduction

This chapter will create the context of logistics and transport costs in South Africa. The problem statement will be presented and clear objectives will be set to address the problem statement. A brief overview of the research method to be followed will be provided.

Chapter 2: Research Methodology

The second chapter will present the research methodology. Case study research will be discussed as the preferred method to conduct this study. The case study design will be presented as well as the advantages and disadvantages thereof.

### Chapter 3: Standard costing and performance management

This chapter will consist of a literature review of previous studies conducted on standard costing and the different applications thereof in business. A literature study will also be performed on aspects affecting performance management systems.

### Chapter 4: Standard costing framework and performance management system for Company A

This chapter will develop and present the standard costing framework that Company A can apply to measure its variable transport costs. The chapter will include the explanation of the selected routes to be used in the research. Internal data from the selected routes will be gathered and the developed framework will be applied to the data.

### Chapter 5: Conclusion

This chapter will conclude the study and provide recommendations based on the literature and empirical study conducted.

## **CHAPTER 2**

### **2 RESEARCH METHODOLOGY**

#### **2.1 INTRODUCTION**

The purpose of this chapter is to address the first secondary objective, as set in chapter one (refer paragraph 1.3.2, page 6), of identifying and describing the research method followed to achieve the objectives. The chapter will firstly define what research and research methods are. Research is frequently done based on certain assumptions by the researcher, and these assumptions guide the researcher in his or her own approach towards the study. These assumptions will be defined and discussed to highlight the assumptions of this study. With the understanding of what research is, a general understanding of the methods used to conduct research and the assumptions made toward this study, this chapter will continue to present case study research as a research methodology. Case study research will be explained and some perceived limitations of case study as a methodology will be discussed. This will highlight the appropriateness of this methodology for this study. The chapter will also address concerns of this approach and outline safeguards of the study.

To make the gained knowledge of what research is, what methods are used to conduct research and the methodology used in this study more relevant to the subject field of study, the chapter will present the current trends in management accounting research. This will ensure the study is not only academically sound but also contributes to the academic bank of knowledge of management accounting in general.

The penultimate part of the chapter will show the applied theory discussed thus far by discussing the methods used in this study to obtain data and the reasons for specific data collected in support of the problem, as discussed in chapter 1.

The final part of the chapter will discuss ethics in general and how ethics affect research. Ensuring that research is conducted ethically will not only ensure the trust of this study but also trust in research as a profession.

## **2.2 RESEARCH DEFINED**

DeMarrais and Lapan (2004) stated that research is conducted to discover a new understanding or knowledge about a problem. Phophalia (2010) further defined research as an original contribution to the existing body of knowledge of our society for its advancement. Phohalia (2010) continued to define research as the pursuit of truth with the help of study, observation, comparison and experiment.

Phophalia (2010) stated that research definitions are abstract and that its characteristics can better clarify the meaning thereof. Some of the more relevant characteristics of research include:

- Research is based on observation, experiences or empirical evidence;
- Knowledge of the field of study will be a prerequisite for research;
- Research is directed to the solution of a social and business problem;
- Research needs use of scientific methods and logical reasoning to probe and reach the truth or as near as possible; and
- Research aims at quantification of social or commercial facts.

From the above it can be seen that this study should create a new understanding and awareness of the cost management of Company A. Cost management is not a new concept in businesses. Standard costing, however, if applied in a new approach, can create new knowledge not only for Company A, but also for future studies into cost management.

It can therefore be gathered that the characteristics of research imply that different methods need to be followed to find a solution to the problem and to quantify the commercial facts. New knowledge will furthermore have to be gained before the research can be conducted.

## **2.3 PHILOSOPHICAL ASSUMPTIONS**

Research should be started off by considering how the researcher observes the phenomena. How the researcher views the phenomena gives lead to a paradigm. Deciding on a paradigm leads to the methodology. Research design then needs to link

research methodology and research method to enable logical and valid inferences (Wahyuni, 2012).

De Villiers and Fouché (2015) defined a paradigm as a model or pattern containing a set of legitimate assumptions and a design for collecting and interpretation of data. Each paradigm is based on different ontological, epistemological and methodological assumptions (De Villiers & Fouché, 2015).

Wahyuni (2012) defined ontology as the view of how the researcher would perceive reality. De Villiers and Fouché (2015) stated that epistemology is where the questions regarding how the researchers view knowledge are determined. Wahyuni (2012) further defined epistemology as generating the understanding and use of knowledge. De Villiers and Fouché (2015) and Wahyuni (2012) identified two types of paradigms, namely positivism and interpretivism. Apart from these, Otley and Berry (2014) extended the list with functionalism and insights and Wahyuni (2012) further added pragmatism, that is a combination of positivism and interpretivism.

De Villiers and Fouché (2015) highlighted that positivism could be seen as the development of explanation of some phenomena, further the only phenomenon that can deliver knowledge is one derived from the senses: touch, sight, smell and taste. This explanation of the phenomena can then be modified based on new evidence. There is also a view that the explanation can be thrown away if a “better” explanation is arrived at (Otley & Berry, 2014).

Interpretivism is grounded in the fact that views are based on the participant’s point of view, allowing for various views and not only one view as seen by the positivism approach. The interpretivist uses deductive reasoning to move forward by viewing a specific observation and then repeating the observation and finally drawing on conclusions (De Villiers & Fouché, 2015).

From the above, the contrast between positivism and interpretivism is evident. An interpretivist will conduct research from the particular to the general, while positivists will conduct research using deductive reasoning to move from what is known about some phenomena towards the unknown.

As stated, paradigms give a lead to methodology. Methodology is seen as the model behind the research process (Wahyuni, 2012). Methodology is divided into qualitative and quantitative research. Positivism is grounded in quantitative research, while interpretivism is grounded in qualitative research (Wahyuni, 2012).

The aim of this study is to evaluate the effectiveness of standard costing within Company A. This indicates elements of quantitative and qualitative elements. As this study will draw on the strengths of both the quantitative and qualitative, a pragmatic approach is followed, i.e. a combination of positivism and interpretivism. To compile the standard costing framework qualitative data is required; while - to determine effectiveness – interview(s) will supply qualitative information to ultimately address the research question.

## **2.4 RESEARCH METHODOLOGY**

### **2.4.1 Case Study**

For this study, a case study approach has been decided on. Case study involves close examination of people, topics or programs (Hays, 2004). McCutcheon and Meredith (1993) highlighted the need for more case study research in operation management, due to the gap between academic sources and the real world. McCutcheon and Meredith (1993) further commended case study research for the investigation of real world conditions and stated that case study research can even produce discoveries if enough rigor is applied to the study.

In this study, the problem statement does not require the discovery of unknown elements in cost management, but rather the application of a theory to direct it. From the above it can be gathered that, by applying enough rigor to this study, the need for future research could be created and in turn broaden the collection of knowledge on this topic.

Dooley (2002) stated that case study, as any other research, should ensure it addresses the concerns of rigor, validity and reliability (refer paragraph 2.6.3, page 19). To accomplish this, Dooley (2002) suggested six elements. These six elements will be discussed as an approach to design and execute case study research.

The researcher should firstly determine and define the research question. In case study research, questions normally address a *how* or *why* question (Dooley, 2002). The same is evident for this study's research question. The question that guide this study states: To what extent can a standard costing framework be used to manage the transport costs of Company A (refer paragraph 1.2, page 5)?

Secondly, cases need to be selected and data collection techniques confirmed. Company A has been selected as a single data source. As stated before, both qualitative and quantitative methods will be applied. Qualitative methods will include interview(s), while the quantitative data collected will be discussed in chapter 4.

Thirdly, the researcher will have to prepare for the collection of data.

Fourthly, the researcher will collect data in the field. Dooley (2002) noted that data should be collected and managed systematically to ensure that, if new data is required, all data is systematically saved to ensure accurate evaluation.

Fifthly, data needs to be analysed. Results have to be compared and linked to the research question (Dooley, 2002). This study's results will be analysed and shown how the findings assisted in the primary research question (refer paragraph 4.4, page 37).

Lastly, the report to users is prepared. Dooley (2012) stated that the final report should be prepared with enough evidence to address the research question. This study can be viewed as the report. The study will illustrate the findings from the qualitative and quantitative information and finally show to what extent the findings answer the research question.

#### **2.4.2 Addressing some of the concerns**

Various sources agree that the main goal of case study research is not generalisation of the findings (Hays, 2004; Flyvbjerg, 2006). Hays (2004) suggested users of case studies to determine its own worth, while the reader constructs his or her own generalisation with the information supplied. Flyvbjerg (2006) viewed case study research as *part* of scientific development for generalisation, after a few case studies have been conducted it could aid in generalisation. Flyvberg (2006) saw formal

generalisation as overvalued in scientific development, while force of example by means of a case study is underestimated. This illustrates the impact that examples derived from case studies could have on research.

The view that case studies cannot be generalised derives from the next misunderstanding that case studies are most useful for hypothesis generation in the first step of research, while other methods are suitable for hypothesis-testing and theory-building (Flyvbjerg, 2006).

The basis of theory hypothesis-testing also needs to take into account the view on generalisation of a case study, but the generalisation in turn depends on the strategic selection of cases. Flyvbjerg (2006) identified different types of cases, each with different approaches that have different strategic values to the user and that guide a researcher to keep to the goal of the study. The first type mentioned is “extreme cases”, the aim of which is to obtain information on unusual cases. These cases are valuable in a more closely defined sense. Next is a “maximum variation” case. These cases aim to gain information from different extremes regarding the subject. These cases gain information for various outcomes and circumstances. The next case is a “critical case”. This case’s information permits a logical deduction, “if this is (not) valid for this case, then it applies to all (no) cases” (Flyvbjerg, 2006). Lastly to be mentioned is a “paradigmatic case” that aims to develop a metaphor or establish a school for the field with the case concerns.

From the above it is clear that different cases can be used in different applications of research. Identifying the purpose of the study should guide the researcher in whether the case should be used to build a hypothesis, for testing or providing of a hypothesis and lastly in support of theory building.

Another concern about case studies is that researchers are biased towards verification. This happens when researchers have predetermined notions of making the study doubtful. Flyvbjerg (2006) stated that this is not only applicable to case study research, but rather a fundamental human characteristic, thus affecting all types of research. To ensure any study’s accuracy, predetermined notions of the researcher must be able to change if the information or findings suggest it.

When applying the above statements to this study, it must be stated that this study is not set out to generalise standard costing as an industry possibility for cost management, but rather - as the research problem states - a solution for Company A. This puts the study out of a “critical case” scope that attempts to generalise the finding to all transport companies within the industry. To ensure that this research has no predetermined notions towards Standard Costing as a cost management or any determined notion or view on performance management, all alternative findings and conclusions will be stated in the study to ensure it gives a wide range of information for the paradigmatic scope of the study.

## **2.5 MANAGEMENT ACCOUNTING THEORY**

To make any management accounting research relevant to practitioners at the present time, a study has to address a relevant concern. The researcher should avoid presenting the study as a “consultant”. To do this, a research study should be presented as academically challenging and relevant to practice (Al-Htaybat & Von Alberti-Alhtaybat, 2013).

To achieve this, a theoretical approach needs to be used to address various societal elements that an organisation will be facing. The theory needs to be existing theory in accounting, but should also be based on empirical inputs from practising accountants (Al-Htaybat & Von Alberti-Alhtaybat, 2013).

One such approach is interventionist research which actively instigates change in the field. The research should be academically sound and should have an impact on accounting where the study takes place. The research should instigate change and should not just be another theory-informed case study (Al-Htaybat & Von Alberti-Alhtaybat, 2013).

Taking on this approach of research will support the type of case selected to form a conclusion at the end of the study, which will create a metaphor for standard costing, cost management and performance management, while instigating change in Company A.

## **2.6 DATA COLLECTOIN TECHNIQUES**

DeMarrais and Lapan (2004) suggested methods as techniques to gather information about a phenomenon. Examples of these methods could include, but are not limited to interviews, questionnaires and observations. These methods will be discussed in the context of this study.

As highlighted in chapter 1 (refer section 1.4.2, page 7), the empirical study will be conducted in two phases. The first phase of the collection of quantitative data was described in chapter 1. The second phase will focus on collection of qualitative data in the form of conducting an interview with the management of Company A.

### **2.6.1 Sample selection of quantitative data**

The data will be collected by selecting a sample of routes travelled by Company A's trucks. This will be achieved by compiling a list of all routes serviced by Company A and ranking them according to the number of times the route had been serviced. Routes will have to meet certain criteria to be eligible for this study. That will be discussed in chapter 4 (refer paragraph 4.3, page 35).

### **2.6.2 Interviews**

A simple definition of interviews can be that an interview is a conversation with a specific purpose and that purpose is to gather information (Berg, 2004). With regard to this study, an interview can be seen as qualitative in nature that will give an insight into the quantitative data collected (discussed later in this chapter). The goal of the interview will be to gain knowledge of the current understanding of Company A's management of standard costing, the application thereof (if any) and finally the performance management systems of Company A.

With the understanding of what information would be required, the researcher must decide on an approach to the interview. Berg (2004) contrasted three types of interviews based on their level of structure. These range from standardised (also known as formal or structured) to unstandardised (also known as informal or unstructured) and finally the semi-standardised (guided, semi-structured or focussed).

Berg (2004) characterised the differences between the different types of interviews on a number of points. These include that the structure of the interviews – on the one hand - can be formally structured with no deviations, as in the case with standardised interviews. On the other hand there can be completely unstructured questions, as is the case with unstandardised interviews. Another noteworthy point is the statement that the interviewer may not give clarification in a standardised interview, while with unstandardised interviews the interviewer may make clarifications. Semi-standardised characteristics will fall in between these two extreme views, being more or less structured but with the freewill regarding clarification, as with unstandardised interviews.

The aim of the interview with regard to this study is to determine management's level of understanding of standard costing, and secondly to gain an understanding of the current performance management system in Company A. For this reason, a simple yes/no answer will not be appropriate, as explanations would be needed to better understand the systems. Therefore, for this study, the interview will follow a semi-structured approach. This will ensure that the questions could give guidance to the conversation to gain the best results while still keeping the interview open for commentary by the interviewee.

### **2.6.3 Validity and reliability**

Bashir, Afzal and Azeem (2008) stated that, without rigor, research becomes fiction and loses its worth. How one avoids this from happening is by validity and reliability.

Joppe (as cited by Golafshani, 2003) defined reliability as: "The extent to which results are consistent over time and an accurate representation of the total population under study is referred to as reliability and if the results of a study can be reproduced under a similar methodology, then the research instrument is considered to be reliable." Even if a researcher is able to reproduce a research instrument time after time, thus proving that the said instrument is reliable, the instrument may not be valid.

To understand validity one must attempt to explain it. Joppe (as cited by Golafshani, 2003) posed: "Validity determines whether the research truly measures that which it was intended to measure or how truthful the research results are". In other words,

does the research instrument allow you to hit "the bull's eye" of your research object? Researchers generally determine validity by asking a series of questions, and will often look for the answers in the research of others.

The data gathered for this study comes from internal data captured over time in the same information system environment from a single source. It can therefore be assumed that the data could be reproduced if the selection is made again. With the researcher's prior knowledge of the transport industry, it can be concluded that the information is relevant and broad enough, covering all implications and impacts to ensure that the data best addresses the research question.

## **2.7 ETHICS**

When considering ethics, one might think of morals and standards that we live by and that distinguish right from wrong. How one comes to this insight might be internal: "Do unto others as you would have them do unto you" seen as the golden rule; from society: "First of all, do no harm" as seen in the Hippocratic Oath; or lastly by religious believes: "Thou shall not..." as in the Ten Commandments (Resnik, 2011).

No matter from where a researcher finds his or her personal moral compass, this will be brought into a research study. Why is ethics important in research? Resnik (2011) compared ethics in research to crime in a city. It would not take a lot of violent crimes in a city to erode the trust in the police of that city. The same is true in research, it would not take a lot of ethical crimes, i.e. fabrication, falsification and plagiarism to erode the trust in not only the researcher, but also in the science of research as a whole.

## **2.8 SUMMARY**

Research is defined as the creation of a new understanding of a current problem and an original contribution to the existing knowledge of society. All research is based on certain assumptions made by the researcher, namely the philosophical assumptions made by the researcher. This study is conducted from a pragmatic paradigm, i.e. a combination between positivism and interpretivism.

There are various ways to collect research data. For this study, both quantitative and qualitative methods will be used. Quantitative information will be collected from Company A's information system to be utilised in the standard costing model. On the other hand, an interview will be used as qualitative method and will take on a semi-structured form. The interview will support the gaining of comprehension of the current level of understanding and application of standard costing in Company A. A further aim of the interview will be to understand the current working and application of company A's performance management system.

A case study approach will be followed. Six elements of case studies were discussed to ensure this study is undertaken with enough rigor to address validity and reliability. Although there are some criticism of case studies, its strengths will supply the most appropriate approach to this study.

The study will address the current field of cost management and performance management. If research is done without enough rigor, it loses its value and usefulness. To ensure the study keeps its usefulness it must address its validity and reliability. The information obtained can easily be reproduced and with the current understanding of the logistics industry, the validity and reliability of the study will be addressed.

To not lose value in any research, certain ethical standards have to be applied. Upholding these standards would keep trust in not only research as a whole, but also the researcher.

Chapter 3 will present a literature review on standard costing and performance management.

## CHAPTER 3

### 3 STANDARD COSTING AND PERFORMANCE MANAGEMENT

#### 3.1 INTRODUCTION

The purpose of this chapter is to address the secondary objective, as set in chapter 1 (refer paragraph 1.3.2, page 6), of conducting a literature review of the various applications of standard costing within different industries as a performance management tool. The origin of standard costing will be discussed in order to gain an understanding of how it has evolved over the years and the current use thereof in business today. Some key components of standard costing will be defined and explained to gain a better understanding thereof. Standard costing will then be evaluated by addressing some of its applicable advantages and disadvantages. Next, the practical implementation of a standard costing system will be addressed. The chapter will continue by gaining an understanding of performance management in the context of this study. Performance management will be investigated as management tool for control and evaluation of costs.

Stating that a company should closely manage its costs is no new concept in today's competitive market. The reason *why* a company would want to manage costs more closely is a unique and sometimes crucial part of understanding the current condition of a company. Costs may need to be investigated to simply understand an over- or underspend in retrospect, while poor financial performance may compel the management of a company to initiate a cost cutting drive to improve financial results or productivity. Buehler and Pucher (2011) that conducted research on the financial sustainability of Germany's public transport system found that, to improve financial sustainability, focus needs to be placed on increased productivity and lowering of costs. Non-financial reasons for a company to manage costs may include the maintenance of records to determine trends or performances of not only assets, but also of labour-related costs in a company over time.

Irrespective of the reasons for a company to initiate a cost analysis, i.e. for decision making or control, standard costing has historically been promoted in varying degrees to support these two activities (Fleischman & Tyson, 1998).

## **3.2 STANDARD COSTING**

### **3.2.1 Definition**

According to the Chartered Institute of Management Accountants' (CIMA) official terminology, standard costing is a performance measurement tool but can also be used for control, inventory valuation and in the establishment of a selling price (Edwards-Nutton, 2008:3). Standard costing is most relevant in manufacturing companies or companies with repetitive operations (Edwards-Nutton, 2008:3). The concept of standard costing is to assign pre-determined standard costs of direct labour, direct cost and manufacturing overheads to products rather than actual costs. Sulaiman, Ahmad and Alwi (2005) defined standard costing as to specify in advance what should be achieved and then measuring the extent to which it is being achieved. The differences between these actual costs and standard costs are referred to as variances and can be used for evaluating performance and in turn enable timely action by management (Edwards-Nutton, 2008:3). Drury (2006:490) supported the view that standard costing can be used in stock valuation but also added that standard costing can: i) assist with decision making, ii) assist in setting budgets, iii) act as a control device, and iv) provide a challenge for staff to work towards.

### **3.2.2 The origin and original purpose of standard costing**

Standard costing was not initially developed as a tool to control costs, but rather as a system to determine an optimal approach or "rules" of using material and labour resources to minimise waste in a manufacturing environment (Fleischman & Tyson, 1998). Fleischman and Tyson's (1998) study focussed on the evolution of standard costing from decision making to control in both the United States of America (USA) and the United Kingdom (UK). The findings of the study indicated that past or expected costs data was used in pricing and business decisions such as make or buy or outsourcing. The study, however, found no evidence that cost information used was norm-based or used to monitor subordinates.

### **3.2.3 Standard Costing in business today and in Company A**

Standard costing is a popular performance measurement system and according to research conducted by Marie, Cheffi, Louis and Roa (2010) it is used by as many as

73% of companies in the UK and 86% of companies in Japan. Furthermore, 90% of the 231 companies surveyed used standard costing for the purpose of cost control (Marie *et al.*, 2010). This trend is supported by Edwards-Nutton (2008) who found that more than 70% of manufacturing companies employed standard costing.

In the past, the focus of studies in the field of standard costing was different from that of performance management. After the evaluation of a standard costing system in a manufacturing company, Morelli and Wiberg (2002) found that the view of standard costing among employees was that the system was used predominantly for benchmarking and cost allocation. The study's focus did not extend to the management of the identified variances to said benchmarks.

Other areas of standard costing studies focused on the accuracy of the results when comparing standard costing to other costing systems. As in the case of research conducted by Van der Linde (2011), activity based costing (ABC) was compared to a traditional costing system in a fertiliser company, the traditional system being a standard costing system. The focus of the study was to determine which one of the two systems was more accurate in allocating costs to products. The findings of the study highlighted that the activity based system allocated costs more accurately than the traditional standard costing system.

Manjunath and Bargerstock (2011) attempted to answer the question whether standard costing and variance analysis are being utilised by mature lean manufacturers. The study concluded with the view that lean manufactures would eliminate the use of standard costing and variance analysis. This proposition, however, requires the determination of the criteria of "mature lean".

From the studies mentioned above it can be seen than studies in the field of standard costing focus more on the usefulness and accuracy of standard costing as an accounting system to ensure the accuracy of product costs. The studies did not continue to address the management of costs, but rather operated in the scope investigating the accuracy of input costs.

In terms of this research study, standard costing will be an appropriate performance measurement system. Odendaal (2009:96) and Drury (2006:490) affirmed that

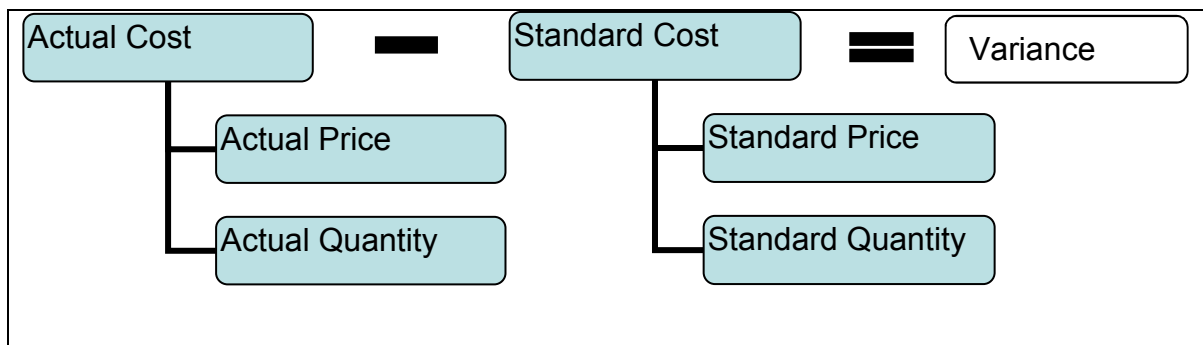
standard costing is best suited for companies that have common or repetitive operations, as the input required to produce the output must be measurable. As transport cost is driven by the number of kilometres travelled, this can be viewed as the input that is measurable.

Drury (2006:491) stated that comparing actual cost for a product serves no purpose if the product is produced by more than one responsibility centre. This is in line with the management of transport costs, as the total operating costs are managed by different responsibility centres. Cost control is best achieved through action at the point where the costs are incurred (Drury, 2006:493). This highlights the need for different levels of measurement for the different responsibility centres in Company A.

### 3.2.4 Components of standard costing

Garrison, Noreen and Brewer (2006) explained that, in our everyday lives, we place expectation on various aspects of our lives - with the simplest example being the driving of a car. When we insert the key, turn the key and the vehicle starts, our expectation is met. There is no need to investigate, for example, if the battery is connected. If, on the other hand, the car does not start, there is a discrepancy or variance. The same can be applied to budgeted costs and actual costs. Any difference or discrepancy between the two costs yields a variance that requires further investigation. This variance in its current form is one dimensional and will not assist management as to the nature of the variance, as illustrated in figure 3.1.

**Figure 3.1: Calculating a variance**



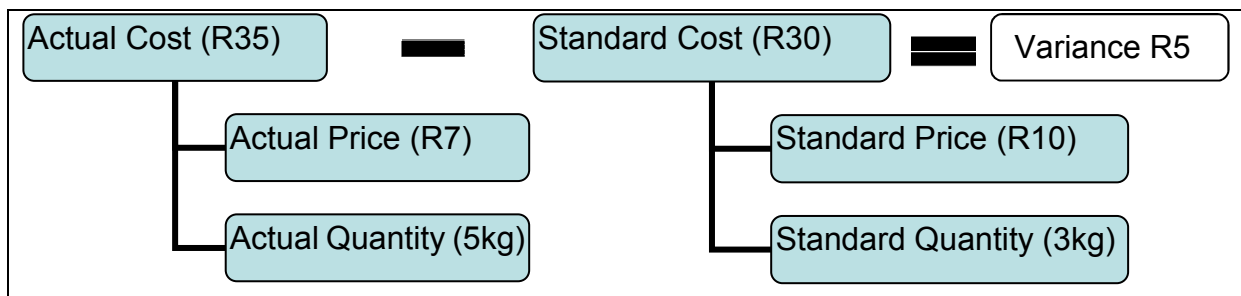
To better understand a variance between standard cost and actual cost, standard costing variance analysis can be applied. Standard costing variance analysis breaks

down the total variance into two components. Each identifies the price variance and quantity variance component of the total variance, as seen in figure 3.1. By keeping a common denominator in each variance, the resulting changing figure will show the other components' variance impact on the total variance. To better illustrate the concept and components of standard costing, Example 1 shows the basic workings of standard costing and the different components.

### Example 1

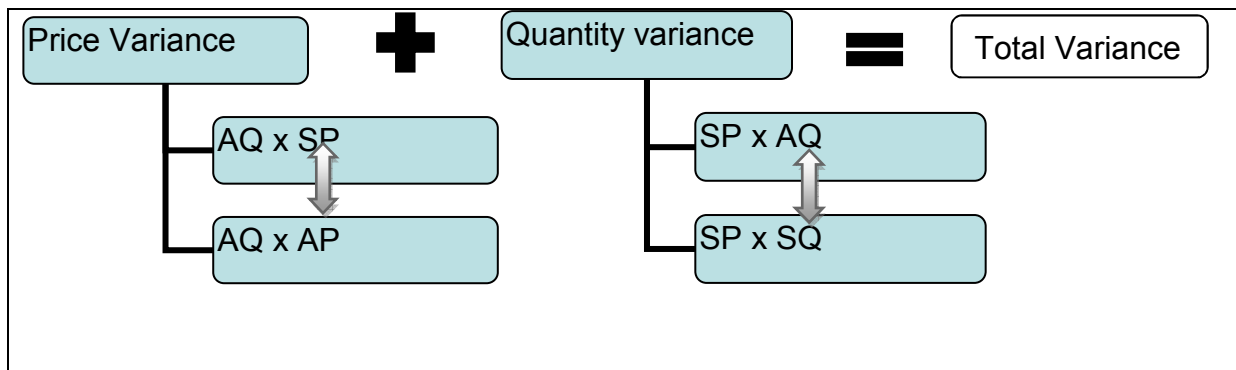
The first component of the standard costing calculation is the cost driver. For purposes of this example, Product A will be used as cost driver. A company budgeted that, to produce one unit of Product A, the number of units of raw material required was 3kg, while the cost per kg was set to be R10.00. When the actual figures were finalised, it showed that the actual cost was R7.00 per kg and the units used were 5kg. When applying the standard costing model as illustrated in figure 3.1, it illustrates how the total standard cost (3kg x R10 = R30.00) is compared with the actual amount (5kg x R7.00 = R35.00). This yields a total variance of R5 (R35.00 – R30.00) budget overspend in actual cost versus standard cost, as seen in figure 3.2.

**Figure 3.2: Breakdown of total variance**



As mentioned, investigating the R5.00 total variance within the standard costing model, figure 3.3 illustrates the breakdown of the total variance, as calculated in figure 3.1.

**Figure 3.3: Variance analysis**



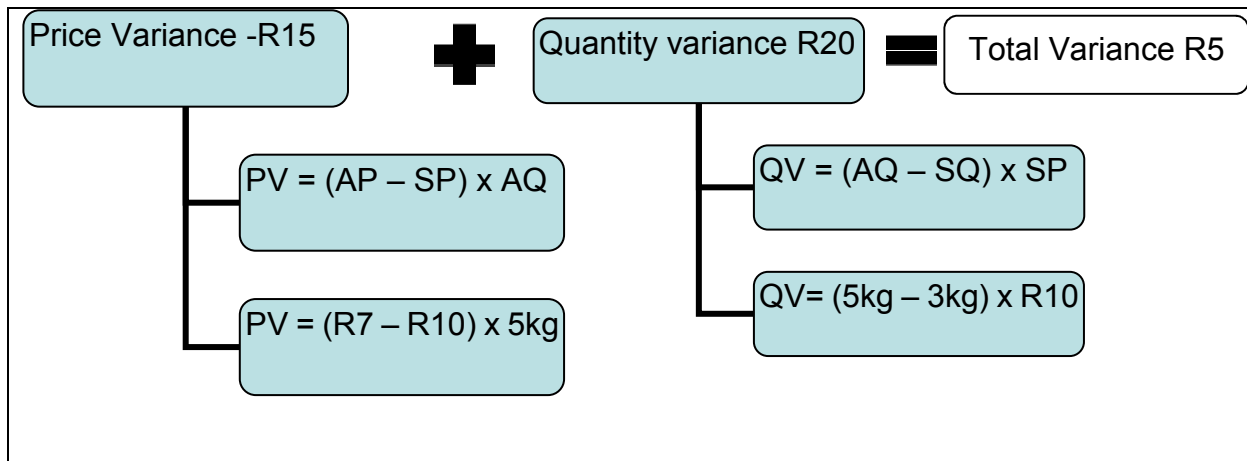
SQ – Standard quality  
 AQ – Actual quality  
 AP – Actual price  
 SP – Standard Price

Using the example as above, standard costing illustrates how the movement in price ( $AP - SP$ ; R7 – R10), with the actual number of units used in production (5kg) (ignoring any unit variance), resulted in a budget saving of R15.00 ( $R7 - R10 \times 5\text{kg}$ ). This can be seen as a variance arising from the different price paid for a unit  $(AP - SP) \times AQ$ .

Furthermore, by comparing movement in quantity of units used in production ( $AQ - SQ$ ; 5kg – 3kg), with the standard or budgeted price used (R10), a budget overspend of R20.00 ( $5\text{kg} - 3\text{kg} \times R10$ ) has been incurred. This can be seen as a variance relating to the incorrect number of units used in production  $(AQ - SQ) \times SP$ .

Adding the Price and Quantity variance together illustrates a total price and quantity variance of R5.00 ( $R15 + -R20$ ) overspend, as is evident in figure 3.4.

**Figure 3.4: Breakdown of total variance**



### 3.3 PERFORMANCE MANAGEMENT

Performance management in the context of this study relates to the interpretation of information to better understand the operations of Company A. This will enable management to base decisions and evaluate company performance on accurate information. Performance management needs to be carried out on a continuous basis to ensure that the most relevant and recent information is used in the decision-making cycle.

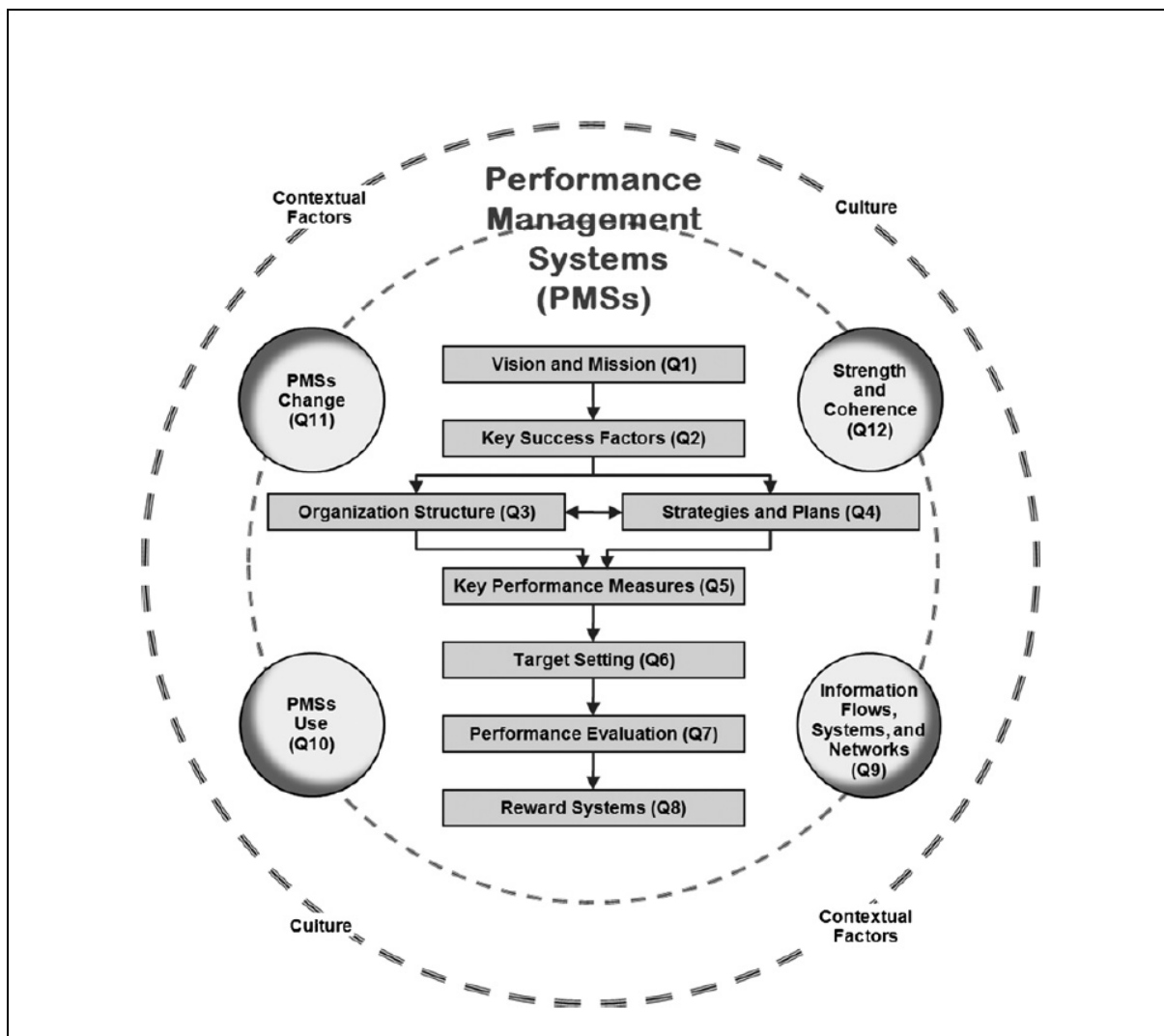
Why would a company want to undertake performance management? Poister, Pasha and Edwards (2013) found that consistent performance management does lead to better performance in the public transport industry. Poister *et al.* (2013) further found that the use of past performances and variables leads to better effectiveness and profitability. The study lastly showed that performance management could improve the business environment and enable management to make more informed and better decisions.

Ferreira and Otley (2009) put forward a framework for the design and use of a performance management system (PMS). The framework is established by asking 12 questions. These questions cover all aspects of a PMS and supply a logical approach to all aspects of a PMS. The approach taken in the framework will enable Company A to address all the components of establishing a standard costing framework and in turn enable better decision making. The framework illustrated in figure 3.5 indicates

the logical flow and external aspects that need to be taken into account when using and developing a performance management framework.

The framework would suit Company A, as the area of focus would include all business functions of the company. The development of the framework requires inputs from all business functions. This range of inputs from different skills levels will result in more cooperation from staff in the development and use of the framework.

**Figure 3.5: The performance management system framework**



Source : Ferreira and Otley (2009)

The questions proposed by Ferreira and Otley's (2009) framework will now be discussed (refer figure 3.5).

#### Questions 1 to 4: Strategic aspects

Questions 1 to 4 relate to the strategic aspects of general business, and these questions can be applied to any business system or operations of the business. Company A should consider what it would want to achieve with the PMS system. These questions can be compared to the mission and vision that guide strategy development of a company as a whole, while the same can be used to set clear guidelines regarding the PMS system and its ultimate goal. As with any business, there are key factors that determine the success of the business. These key aspects should also be addressed to ensure the success of the system. Company A should further consider the structures as currently employed by it to implement and administer the system. Any system or company requires the correct structure of human and technological resources to be able to function optimally. Company A would therefore need to investigate the current staff and technological resources to make sure that adequate resources are available to achieve the PMS goal.

#### Question 5: Key Performance Measures

In order to better comprehend the operations of Company A, management must understand the current utilisation and resource consumption of its fleet. Utilisation and resource consumption drive variable costs, and any variance from set standards needs to be highlighted by the performance management system. Without accurate key inputs, the management of variances would not be possible.

#### Question 6: Target Setting

Management should establish targets to be used as benchmarks for comparison to actual results. These benchmarks of variable costs will have to be predetermined or, if not predetermined, to be developed. This can be achieved by reviewing budgets and historical operational information or, if non-existent, standards can be determined by observation, investigation or manufacturing specifications (Drury, 2006).

#### Question 7: Performance Evaluation

Ferreira and Otley (2009) stated that both formal performance evaluations and informal considerations are covered in this question. Formal evaluations can include actual performance that is measured against targets, as established under Question 6. Any variance needs to be evaluated, and this evaluation will form the basis for interpreting data into meaningful information.

Informal considerations also need to be taken into account. These considerations include all generic and industry specific aspects that is applicable to the operation. As Company A is a transport company, considerations that need to be taken into account would include age and type of equipment and the environment the equipment is operated in.

#### Question 8: Rewards system

Once questions 1 to 7 have been addressed and feedback received, Company A will have to decide how the results of questions 1 to 7 would be applied. The goal, as set out in questions 1 to 4, is to ultimately improve and manage performance. The rewards system will have to be financial or non-financial in nature, depending on the users' purpose. Financial rewards can be given in proportion to achieving targets. Financial rewards can also be viewed on a miss or hit bases where rewards are only given when targets have been achieved in full.

#### Question 9: Information flow

Information flow is crucial in the development of an effective PMS. The way information is gathered and ultimately fed back to management in a useful manner is critical in any PMS. The way information flows between departments in large organisations is crucial to maintain any value in a PMS. This is evident from Nha, Lau and Kaung (2001), who stated that one of the key success factors for implementing enterprise resource planning is effective communication at every level of business.

In Company A, standard costing will be used as the information flow centre. Inputs will be given from different responsibility centres and compared to targets. The results will afterwards be communicated to Company A's management, who will be able to use the data in accordance to their own requirements.

#### Questions 10 to 12: Uses, Changes and Strengths and Coherence

Evaluating the system itself is just as important as the evaluation of the information. This can be seen as a closed-loop system. Developing a framework to better interpret information can only be achieved when the whole framework operates in an environment where the framework itself can be changed to build on its strengths and to address any weaknesses.

Coherence will be a function of management to ensure that the framework is at all times being provided with correct information, to ultimately provide accurate results back to management.

These results should be compared to the goals set out under questions 1 to 4 in order to determine whether the required goals have been met. Company A will need to take corrective actions to remedy any faults identified to enable the PMS to get the best use out of the system.

### **3.4 SUMMARY**

Standard costing is a performance measurement tool and is most relevant in manufacturing companies or companies with repetitive operations (Edwards-Nutton, 2008:3). Initially, a standard costing system's primary function was to determine an optimal approach for using material and labour resources to minimise waste in a manufacturing environment (Fleischman & Tyson, 1998). Over time, standard costing evolved from its original function to a cost control tool. It was found by Marie, Cheffi, Louis and Roa that 90% of the 231 companies - surveyed in their study to determine if standard costing was still relevant - were using standard costing for the purpose of cost control (Marie *et al.*, 2010).

As illustrated in figure 3.1 and figure 3.2, calculating a variance does not yield any useful information as to the root cause of a variance. To understand the root causes

of a variance, figures 3.3 and 3.4 showed how standard costing breaks down a variance into two components, each supplying useful information that can be investigated and measured.

Using standard costing to produce a breakdown of a variance does not initiate corrective action. With the support of a formal approach, these variances could be better addressed and managed by responsibility centres. This formal approach forms the basis of the performance management system for Company A.

The chapter concluded with a discussion of Ferreira and Otley's (2009) framework that suggested twelve questions to formulate an effective PMS. Company A could use this framework to formally address and manage the variances identified by the standard costing framework (developed and presented in chapter 4) within a structured system with a logical information flow and accountable staff members.

The next chapter will present the development of the standard costing framework for Company A.

## **CHAPTER 4**

### **4 STANDARD COSTING FRAMEWORK AND PERFORMANCE MANAGEMENT SYSTEM FOR COMPANY A**

#### **4.1 INTRODUCTION**

The purpose of this chapter is to address the third secondary objective, as set in chapter 1 (refer paragraph 1.3.2, page 6), of developing a standard costing framework to be used as a performance management system for Company A.

This chapter will start by explaining the different data collected and its necessity in the development of a standard costing framework for Company A. With the understanding of the different data of the study, the components and principles of the standard costing framework will be illustrated, as explained in Chapter 3. Different calculations to illustrate the different types and levels of variances will follow. These calculations will be divided into three levels. The three levels will each yield a variance, each level illustrating a more extensive breakdown of the previous level.

The variances are explained, also indicating why investigation is required to manage these variances better. Finally, the questions proposed by Ferreira and Otley's (2009) framework were utilised when an interview with the management of Company A was conducted.

#### **4.2 STANDARD COSTING**

As illustrated in chapter 3 (refer section 3.2.4, page 25), standard costing comprises of three components. These components consist of a cost driver, input price per raw material and quantity of input units. For this study, the three components consist of number of loads, fuel price and the total amount of fuel used by each vehicle. These components will enable the calculation of a variance and furthermore provide information in order to break the variance down into the mentioned price and quantity variance (refer Example 1, page 26).

The data will be collected in four phases. Phase one will consist of the amount of loads each route has completed. The loads will serve as the cost driver. Phase two will be about the actual kilometres travelled by each vehicle. Thirdly the litres used by each

vehicle on the individual routes will be collected. Lastly, as phase four, the fuel price will be collected. All data will cover a 12-month period that coincides with Company A's financial year. All of the data will include both actual data and standard data. The data collection process will now be discussed in detail.

### **4.3 DATA COLLECTION**

#### **4.3.1 Phase 1: Cost driver / loads**

A load in Company A is defined as the transportation of goods from one point, i.e. the loading point, to another point, i.e. the offloading point. The information pertaining to each load is captured onto the operational system of Company A. The information generated when capturing the load is comprehensive and includes: i) the customer, ii) the loading site, iii) the offloading site, and iv) the distance travelled for this load. Operational data was obtained from Company A which provided access to detailed information and statistics for the 12-month period.

From this data, a route selection was done to determine the routes with the highest number of loads undertaken for the 12-month period. The total number of loads conducted for the 12-month period were 9 863 loads. These loads serviced a total of 531 routes ranging from the lowest number of loads, namely one, to the highest number of loads of 894 for the specified 12-month period. These routes are serviced by a fixed number of vehicles, allocated to undertake a load based on operational requirements. The 10 highest-travelled routes were selected and evaluated for suitability for the purposes of this study. As stated in chapter 3 (refer page 32), standard costing is most suitable in companies with repetitive operations. Therefore only single drop load customers were selected and not multi drop load customers. A single drop load is defined as transporting a fully utilised vehicle from loading point to offloading point and then returning to the loading point to start another load. A multi drop load can, in turn, be classified as transporting a fully utilised vehicle from the loading point to multiple customers and once all products have been offloaded, return to the loading point to start a new load.

The reason these multi drop loads cannot be used in the development of the standard costing model is due to the nature of the offloading cycle. With no predetermined combinations of offloading points, no standards can be developed to compare to

actuals results. Multi drop load's offloading points will only be known once ordered from a customer, making the standard setting impossible due to endless possible routes that could be taken. Multi drops, therefore, do not form part of the scope of this study due to the nature of the routes not being compatible with standard costing. Table 4.1 below summarises the top 10 routes and details of each.

**Table 4.1: Route summary**

Route	Numbers of Loads	% of totals loads	Load type
Route 1	894	9,1%	Single Drop
Route 2	335	3,4%	Multi Drop
Route 3	326	3,3%	Multi Drop
Route 4	314	3,2%	Multi Drop
Route 5	309	3,1%	Single Drop
Route 6	302	3,1%	Multi Drop
Route 7	281	2,8%	Multi Drop
Route 8	192	1,9%	Single Drop
Route 9	190	1,9%	Multi Drop
Route 10	189	1,9%	Single Drop
Remaining	6531	66,2%	Multi/Single Drop

From the table above, taking into account the multi drop exclusion, routes taken under consideration were routes 1, 5, 8 and 10.

#### **4.3.2 Phase 2: Actual and standard kilometres travelled**

As in the case of the collection of the number of loads, as described in section 4.3.1, the actual number of kilometres for each load is captured in the operational system of Company A. These kilometres captured are used as the actual kilometres. Standard kilometres travelled for each load are collected from Company A's annual budgets. Each route in the budget has a route standard that includes the standard kilometres for each route.

### **4.3.3 Phase 3: Actual and standard litres of fuel used**

The next data that was obtained relates to the fuel consumption reports of Company A's fleet for a specified 12-month period. The consumption is expressed as Lt/100km. This is calculated by using the formula:  $100 / (A / B)$  - where A is the kilometres (km) travelled for a vehicle and B the litres (Lt) of fuel used for the kilometres travelled. The data contains each vehicle's actual consumption on a monthly basis. As in the case of the standard kilometres travelled, the standard consumption can also be obtained from the annual budgets.

With the actual and standard kilometres collected, and the actual and standard fuel consumption established, it is possible to calculate the actual and standard litres used on each load. The final phase can now be addressed.

### **4.3.4 Phase 4: Actual and standard fuel price**

The last data obtained was the price of fuel where Company A's fleet fills up with fuel. This data is used as the actual fuel price. This data, combined with the litres of fuel used by a vehicle, could provide the fuel cost for each route. Phase 1 to 4 of the data collection process is now complete.

## **4.4 STANDARD COSTING FRAMEWORK**

The components of the standard costing framework will be illustrated below and analysed in the next section. Firstly, each selected route was broken down into 12 months. This is done to compensate for the fact that the fuel price changes each month in South Africa. Next, the variances are broken down into three levels, highlighting the application of a standard costing framework in a logistics company. The three levels of variances will be explained after table 4.2.

These three levels can be illustrated as in figure 4.1 below, showing the breakdown of the variances. Using route 1 (refer table 4.2, page 39) as an example to illustrate the different levels, it can be seen how the levels integrate to better explain a variance.

**Figure 4.1: Different levels of variance breakdown**

Level 1 Variance:		
Actual Fuel Cost	- Standard fuel cost	= L1 Variance
R 3 263 152	- R 3 347 708	= -R84 556
Level 2 Variance:		
L1 variance	= L2 Price variance	+ L2 Quantity variance
-R 84 556	= R32 476	+ -R 117 032
Level 3 variance:		
L2 Quantity variance	= L3 KM variance	+ L3 Consumption variance
-R 117 032	= R 32 524	+ -R 149 556

Figure 4.1 shows that, by subtracting the standard cost from actual cost, a level 1 variance is created ( $R\ 3\ 263\ 152 - R\ 3\ 347\ 708 = -R\ 84\ 556$ ). To further explain this variance, the variance is broken down into a level 2 variance. A level 2 variance explains the quantity and price variance component of the level 1 variance, i.e. a level 2 variance equals price variance and quantity variance added together ( $-R\ 84\ 556 = R\ 32\ 476 + -R\ 117\ 032$ ). This illustrates how the favourable level 2 quantity variance is negatively influenced by the adverse fuel price increase.

A third level is added to better explain the variances. A better understanding of the “traditional” quantity variance is needed as to understand the causes of the quantity variance. The quantity variance can then further be broken down in order to better explain the factors that affect the quantity used. The amount of fuel used can be affected, mainly by the distance travelled and consumption of a specific vehicle. To illustrate these components of the quantity variance of level 2, a level 3 variance is calculated. The level 3 quantity variance can be expressed as kilometre variance and consumption variance added together ( $-R\ 117\ 032 = R\ 32\ 524 + -R\ 149\ 556$ ). This illustrates how the original favourable variance could have been more favourable if the correct number of kilometres was travelled for the specific route.

Table 4.2 below indicates the fuel cost variance for each route for each month, together with formulas to illustrate each calculation. The level 1 variance is calculated by subtracting standard costs from actual costs. Standard fuel cost is calculated by

the formula  $(A / 100) * B * C$ , where A is the standard kilometres that should have been travelled for the specific route, divided by 100. This is then multiplied by the standard consumption as budgeted by Company A. The answer is then multiplied by C, which is the standard fuel price as budgeted by Company A. As stated, Company A uses estimates based on historic information, together with relevant information relating to each vehicle's age, make and model that affects consumption. Company A uses market data to estimate future fuel prices based on expected exchange rates that affect global fuel prices. To calculate actual fuel cost, the same formula is applied to the actual costs but using actual data instead of standard data.

Standard fuel cost is then subtracted from actual standard fuel cost to show a fuel cost variance. This variance, for purposes of this study, can be seen as a level 1 variance as presented in figure 4.1 (refer page 38).

Firstly, table 4.2 will reflect the level 1 variances. The monthly variances per route can be found in appendix 1 to 4 (refer page 63 to 66).

**Table 4.2: Total fuel variance (level 1 variance)**

	ACT Cost = (ACT KM / 100) * ACT Consumption * ACT Fuel price	STD Cost = (STD KM / 100) * STD Consumption * STD Fuel price	ACT Cost – STD Cost
	Actual Cost	Standard Cost	Total Fuel Variance
Route 1	3 263 152	3 347 708	-84 556
Route 5	1 050 911	1 049 117	1 794
Route 8	603 825	628 296	-24 471
Route 10	537 451	566 183	-28 732
Total	5 455 340	5 591 304	-135 964

The above variances only show a monetary variance without much use for decision making purposes. The variance only indicates the difference between the expected fuel cost and the actual fuel cost. To enable Company A to better understand this variance, a standard cost approach is applied to understand the different components affecting this variance. As discussed in chapter 3, the variance is split into price and

quantity variance (refer Example 1, page 26). For Company A, the price variance will relate to the price planned to be paid for each litre of fuel and the actual price paid for each litre of fuel. This variance will indicate the impact due to paying a higher or lower fuel price per litre. On the other hand, the quality variance will indicate the impact which the different amounts of fuel used had on the level 1 variance.

When considering routes 1, 8 and 10, it is clear that a budget saving has been realised on expected fuel costs, namely R 84 556, R 24 471 and R 28 732, while route 5 shows a marginal budget overspend on expected fuel cost of R 1 794.

When analysing these variances with effective cost management as the purpose, it is difficult to understand the corrective actions that are needed to manage costs better, as the variance is only a monetary value and does not identify the components affecting each of them.

As stated earlier, to understand the level 1 variance better, a level 2 variance is calculated to better explain the causes for the variance. To calculate the level 2 variance, the formulas - as stated in chapter 3 (refer figure 3.4, page 28) - need to be adjusted to use the variables relevant to Company A. The standard price and quantity variance formula, as illustrated in chapter 3, were:

$$PV = (AP - SP) \times AQ$$

$$QV = (AQ - SQ) \times SP$$

Adjusting the standard formula for use by Company A:

$$PV = (\text{ACT Fuel price} - \text{STD Fuel price}) \times (\text{ACT KM} / 100 \times \text{ACT Consumption})$$

$$QV = ((\text{ACT KM} / 100 \times \text{ACT Consumption}) - (\text{STD KM} / 100 \times \text{STD Consumption})) \times \text{STD Fuel price.}$$

The total fuel variance is split between price variance and quantity variance.

**Table 4.3: Price and variance components of fuel variance (level 2 variance)**

	ACT Cost – STD Cost	(ACT Fuel price – STD Fuel price) X (ACT KM / 100 X ACT Consumption)	((ACT KM / 100 X ACT Consumption) – (STD KM / 100 X STD Consumption)) X STD Fuel price.
	Total Fuel Variance	PV	QV
Route 1	-84 556	32 476	-117 032
Route 5	1 794	15 971	-14 177
Route 8	-24 471	12 425	-36 896
Route 10	-28 732	6 708	-35 440
Total	-135 964	67 580	-203 544

The above tables (tables 4.2 and 4.3) enable Company A to manage their fuel cost by understanding the impact of the two components affecting their total fuel cost variance. The monthly variances per route can be found in appendix 1 to 4 (refer page 63 to 66).

In each of the routes a quantity variance “budget saving” had been realised, which was due to less fuel used on each of the routes as seen in table 4.3. Although a budget saving was realised, Company A needs to investigate the reasons that resulted in this budget saving. The reasons might include: a better route identified, resulting in less kilometres travelled that resulted in less fuel usage, or the driver behaviour of the fleet has improved, resulting in less fuel usage. The reason for these savings needs to be further investigated to understand the saving and to possibly extract maximum budget savings.

On the other hand, the price variance has had a negative effect on all the routes and their fuel costs. The reason for a price variance can only be ascribed to operators of these vehicles using filling stations with higher fuel price per litre than the planned price per litre. In South Africa, the price of petrol is regulated by government, while the diesel price is not regulated, resulting in filling stations being able to charge diesel at any price. This results in different diesel prices charged at each filling station based on their individual region.

From analysing the variances, it can be gathered that the budget saving, realised from less fuel used, has been eradicated by the higher cost of fuel price per litre on all four routes. Calculating the percentage that the price variance represents of the total quantity variance, illustrates the additional percentage budget saving that could have been realised if the correct price was paid. Company A could absorb the full saving of the quantity variance if the negative impact of the incorrect fuel price paid has been managed. Table 4.4 presents a summary of the percentage that the price variance represents of the quantity variance.

**Table 4.4: Summary of level 2 variances with the price variance as a percentage of quantity variance**

Route	PV	QV	PV % of QV
Route 1	R 32 476	- R 117 032	27.7%
Route 5	R 15 971	- R 14 177	112.6%
Route 8	R 12 425	- R 36 896	33.6%
Route 10	R 6 708	- R 35 440	18.9%

As stated earlier, by expanding on the “traditional” standard costing calculations of price variance and quantity variance, it is possible to further understand components affecting the quantity variance components of fuel cost variance. By quantifying the components that affect the level 2 quantity variance, a level 3 variance will further enable Company A to manage the components affecting fuel consumption.

Quantity variance in essence shows the monetary value of the difference in litres of fuel used. This value will be affected by two other main components, namely the number of kilometres travelled and the fuel consumption of a vehicle. Gaining an understanding of these two factors will ultimately enable Company A to fully manage these costs. Furthermore, additional kilometres travelled will result in more fuel consumed by the vehicles. With that stated, even if the correct number of kilometres are travelled, if a vehicle’s consumption is above the set standards, more fuel will be consumed - leading to increased cost.

The same quantity variance formula is used as in chapter 3:

$$QV = (AQ - SQ) \times SP$$

The formula above has been adjusted to quantify the effect of additional/less kilometres travelled and the consumption a vehicle had on a route.

The kilometre variance can be expressed as:

$$(ACT\ KM - STD\ KM) \times STD\ Consumption \times STD\ Price.$$

$$(ACT\ Consumption - STD\ Consumption) \times ACT\ KM \times STD\ Price.$$

Table 4.5 presents these variances and will represent a level 3 variance for purposes of this study.

**Table 4.5: Consumption and kilometre components of quantity variance (level 3 variance)**

	$((ACT\ KM / 100 \times ACT\ Consumption) - (STD\ KM / 100 \times STD\ Consumption)) \times STD\ Fuel\ price.$	$(ACT\ KM - STD\ KM) \times STD\ Consumption \times STD\ Price.$	$(ACT\ Consumption - STD\ Consumption) \times ACT\ KM \times STD\ Price.$
	QV	KM variance	Consumption Variance
Route 1	-117 032	32 524	-149 556
Route 5	-14 177	47 486	-61 662
Route 8	-36 896	3 230	-40 126
Route 10	-35 440	2 978	-38 418
Total	-203 544	86 218	-289 762

As illustrated above, budget savings were realised by using a smaller amount of fuel, with the two main reasons determining the amount of fuel used being: i) the amount of kilometres travelled, and ii) the consumption rate of a vehicle. It is for this reason that an understanding of these two factors is required in order to control cost.

Looking at all four routes it is clear that all vehicles were utilised at better consumptions than planned, resulting in saving - which in turn made up the largest part of the quantity variance. This saving was negatively affected by budget overspend being incurred by the additional amount of kilometres travelled, compared to the standard kilometres. The result shows that a better budget saving can be achieved if the number of kilometres travelled is controlled.

By dividing the kilometre variance by the quantity variance, the result shows by what percentage the quantity variance can improve if Company A can manage the kilometres travelled. The calculations are illustrated in table 4.6 below.

**Table 4.6: Possible saving by controlling kilometres travelled as percentage of quantity variance**

Route	QV	KM variance	Additional% Possible Saving
Route 1	-117 032	32 524	27.7%
Route 5	-14 177	47 486	334.9%
Route 8	-36 896	3 230	8.7%
Route 10	-35 440	2 978	8.4%

#### **4.5 STANDARD COSTING FRAMEWORK CONCLUSION**

The calculation of the various levels of variances highlights the aspects that require investigation. By understanding and measuring these variances, costs can be better controlled and performance can be measured. On the level 2 variance analysis it is clear why the price variance would amount to such large amounts. Investigation is needed to ensure that Company A makes use of the most economical filling stations to keep the fuel price per litre as low as possible.

The level 3 variance analysis identifies more details that should be addressed by Company A to maximise its cost control. The reason Company A's vehicles travelled more kilometres than the set standard could possibly be due to route deviation from the planned route. By reviewing the size of the kilometres' variance, it could also be possible that the set standard could have been inaccurate. The consumption variance

could possibly be due to the condition of the vehicle used, or possibly the type of vehicle allocated to a route in a budget but then not utilised in that regard. The vehicle used could differ from planned vehicles due to operational requirements. The next possibility is that the driver operator driving the vehicle - that controls the consumption with driving behaviour - has not achieved the required consumption due to poor driving habits.

It can therefore be concluded that three main components need to be measured and controlled to ultimately control fuel costs in Company A. These three components are: 1) kilometres travelled, 2) Vehicle consumption, and 3) the fuel price. Having used the standard costing framework to measure these components, the next step is to place these components in a PMS to design a formal control system with measurable output that enables control.

#### **4.6 PERFORMANCE MANAGEMENT SYSTEM**

To understand the various concerns identified in section 4.5 above, the need arises for a formal approach to not only understand, but also to enable management of Company A to make decisions by using a performance measurement system. The PMS development steps identified in chapter 3 (refer section 3.3, page 28) was applied to develop a PMS as a formal approach for Company A to enable the investigation and management of the components identified in section 4.6.

##### **4.6.1 Interview with management of Company A**

An interview was conducted with the management of Company A. The interview was conducted with the managing director of Company A. During the interview field notes were taken and the responses replicated as presented below. The length of the interview was more than 2 hours in a semi-structured format guided by the questions proposed by Ferreira and Otley's (2009) framework. Opportunity for new and relevant insights were provided as and when the questions prompted new ideas. The questions, as proposed by Ferreira and Otley's (2009) framework (refer section 3.3, page 28), were used as the questions posed during the interview. Each question will be covered in detail in the following section, but the background to standard costing

and performance management that was provided by the management of Company A can be summarised as:

Company A currently employs standards against which to measure actuals. These standards are documented in the company's annual budget that guides the company in its performance management. Management summarises its standards as guides rather than targets that should be worked towards.

The culture of Company A is one in which the budget guides the setting of standards and it is measured simply as a level 1 variance. The variances in Company A are managed as a monetary value.

With reference to standard costing components and fuel consumption, the components are managed individually as standalone components. The components currently do not contribute to explaining the total variance of Company A. Currently the number of kilometres travelled is not measured against standards on a load basis or over a period base.

The approach to performance management is currently done on an average basis over a period of time, not on per load basis as this study's approach. The users and operational systems used for performance management is segregated and not connected. This results in the management of components individually and not against standards, but rather historic trends that may include inefficiencies.

Company A's culture with regard to performance management is namely the setting of targets by management, and this is communicated to managers. These targets are worked towards, but not formally addressed if not reached. Performance standards are not formally part of employees' key performance indicators.

#### **4.6.2 PMS Framework**

The PMS framework was developed by Ferreira and Otley (2009) as thoroughly described in chapter 3. Each of the questions covered in the framework will now be contextualised from Company A's perspective.

Question 1: Vision and Mission can be interpreted as the strategic purpose of this PMS. For Company A, this can be summarised as “Cooperative system enabling informed cost management”.

Question 2: Key success factors: this question relates to all the factors Company A needs to take into consideration when not only using, but maintaining the system.

From a non-numerical approach, Company A needs to ensure a clear understanding of the system by staff members. Staff members need to understand the uses and purpose to ensure their buy-in. This can be achieved by consultation sessions, as well as workshops to enable an initial accurate setup of the system and a platform for feedback from staff to keep the PMS system relevant and accurate.

This PMS system will also require a level of accountability from staff involved to ensure clear actions can be taken with the correct staff members when and if needed. Without clear accountability, the fulfilment of management’s instructions cannot be guaranteed.

Numerical indicators that will determine the success of the PMS will include: 1) accurate information capturing, 2) accurate standard settings, and 3) a level of system integration. Inaccurate capturing and standards will deliver inaccurate results and will lead to incorrect analysis and inaccurate decision making.

Company A should ensure daily review of fuel consumptions on each vehicle as this information is not static - for example the fuel price that is set for a specific month. The fuel price requires less management input. Kilometres travelled can be reviewed after each load has been completed to manage the KM travelled, while fuel consumption needs to be monitored daily as loads may only be completed over more than one day.

Question 2 will therefore require a high level of accuracy when setting up and using the PMS. Company A needs to ensure review and feedback by users of PMS to ensure the continued relevancy of the system.

Question 3 investigates the structures of Company A to identify and allocate accountability, as mentioned above in question 2. Clear segregation of duties should be made between populating the input data of the PMS, evaluation and interpretation

of the data and ultimately the users of the information. This segregation is to ensure the integrity of the data to avoid the manipulation of the results for personal gain or rewards.

The structure can also have an impact on the design of the PMS, as geographical diversity of staff will impact timing of data captured and reported.

For Company A the segregation of duties are clear and there is no overlapping staff responsible for capturing reports to a supervisor that has no reporting lines to other users. This will address the need for accurate information. Standards are set by different responsibility centres, each responsible for its own unique function. Marketing will set kilometre standards, while technical standards will be set by a technical division. This segregation also ensures that standards are set by trained staff, making the reliability higher than when standards are set by unqualified employees.

Question 4 relates to the strategies and plans that Company A should have in place or develop and how they should be communicated to employees to ensure the success of the PMS.

Company A's current procedures and policies will have to be reviewed and adapted to be more relevant to a standard costing PMS, as the current policies only cater for the current non-integrated systems used by Company A.

Suggesting a standard set of policies and procedures for Company A will involve establishing a position for a system administrator that will oversee the PMS as a project and that will require interaction with the various departments. This is required as current systems are not integrated, and it will require a central consolidation of data under the new PMS before distribution thereof. Secondary objectives of an administrator will include not only reviewing captured data to ensure accuracy, but also the reviewing and feedback of standards.

Question 5 lists the key performance measurements of the PMS. As this PMS is concerned with fuel cost management as presented by the standard costing framework, there are clear performance measures that need to be set and investigated to enable cost management.

The top measurements, when considering the findings in 4.5 that derived from the issues raised when analysing the information, are 1) input costs, 2) fuel consumption, and 3) KM travelled.

These components are currently individually being investigated in Company A and will need to be aligned and consolidated. Only with consolidation of the individual components there can be a useful interpretation of the data, as all three components together can supply Company A with a platform to better manage costs.

Question 6 acts as follow up to question 5: it aims to set targets for each of the components. As targets will form the cornerstone that performance will be measured against, Company A will have to ensure that it sets challenging but still realistic targets with regard to fuel consumption, as kilometres and fuel price are set quantities.

Currently Company A does capture the data required for the measurements, but in order to be useful for a standard costing, PMS formal targets need to be set. Targets for input costs need to be set by weighing. As fuel costs differ from region to region, Company A needs to weigh the percentage they expect to fill in a region to get to an average fuel price. Fuel consumption cannot be set on per route basis, as the operational constraints do not allow the same vehicles to service the same route constantly. All fleet vehicles of Company A need to have different consumptions based on the type of route. This approach will allow the performance management of the individual fleet. As KM travelled is set, the only deviation will be when suggested routes are not followed and this measurement will allow for route investigation by Company A.

Question 7: Performance measurement relates to the evaluation of individual, group and organisational performance. For the standard costing PMS, performance evaluation relates to performance of routes and individual fleet. The performance of the one will be reliant on the other. The better the individual fleet performs on a certain route, the better certain routes will perform overall. For Company A to improve route performances it will have to improve individual driver performances.

To evaluate the performance of the individual fleet, Company A should implement grading variances of each fleet. Variance grading will allow a certain level of variances to be grouped together to easily enable management thereof. This variance is under

full discretion of management to decide on the strictness of the levels. Suggested grading can be seen in table 4.7.

**Table 4.7: Suggested grading of variances**

	Input Cost	Consumption	Km Travelled
Acceptable Variance	+1%	+1%	+1%
Corrective actions needed	+2%	+2%	+2%
Unacceptable Variance	Above 2%	Above 2%	Above 3%

If the management of Company A applies the results of tables 4.2, 4.3 and 4.5, it should guide management to manage the fuel price variance and additional kilometres travelled that is eroding the positive budget savings achieved by the better than expected consumptions.

Question 8: Rewards system. Companies might consider financial or non-financial rewards for achieving set standards or penalties for non-compliance to targets.

Management of Company A is of the opinion that performing duties to the best of an individual's ability should be achieved through personal motivation, and not to gain additional compensation. The classic view of the carrot and the stick is not an approach the company would like to adopt, as this behaviour could lead to employees expecting additional compensation for achieving what could be considered as normal standards.

Questions 9 to 12 deal with the environment that the PMS will operate and function in and which entail important factors to be taken into consideration, as they will determine the "softer" functions. These questions cover aspects of different uses on different levels of the hierarchy of Company A. The system feedback and feed-forward aspects needs to be documented to ensure good communication. Good communication will ensure the continued relevance and adaptability of the system. Lastly, as part of a system review, the strengths and weaknesses must be reviewed with the purpose to extract strengths and to work on improving weaknesses.

It is suggested for Company A that formal monthly meetings should be arranged with the suggested administrator, as discussed in question 4. These meetings will be held to address any system concerns or suggestions. The meetings will also assist in any queries staff members might have regarding findings or inputs.

Lastly it is suggested that Company A schedules meetings between management, the administrator and staff members to enable management feedback and inputs so as to ensure that the PMS aligns with company strategy and directions.

#### **4.7 SUMMARY**

This chapter covered the fourth secondary objective as set in Chapter 1 (refer paragraph 1.3.2, page 6), namely to establish a performance management framework. To establish a PMS, a framework is required. The basis of this framework is a standard costing framework. As discussed in chapter 3, the components of a standard costing framework are cost driver, price and quantity variances. For Company A this translates to the number of loads completed that drives costs, and any variance will be due to the fuel price and amount of fuel used. The standard costing variance was broken down into three levels.

In this chapter, data was collected that included the actual and standard or budgeted figures for these three components. The collected standards were applied to the actual number of loads done to determine the standard amounts allowed for the given route. These standards were compared to actuals and the differences and variances were broken down into three levels, each supplying additional insight and detail into the source of the overall variance.

A variance analysis was undertaken, identifying a possible reason for each variance. These reasons ultimately have no use if not addressed by management. To better address these variances, the performance management framework was put forward to guide Company A's management in managing these variances. The goal of the PMS is to guide management in not only addressing variances, but also to have a sustainable management system with guidelines and procedures that will ultimately lower the fuel cost of Company A.

Chapter 5 will provide a summary and conclusion of the study.

## **CHAPTER 5**

### **5 CONCLUSION**

#### **5.1 INTRODUCTION**

This chapter addresses the fifth and final objective of this study, namely to conclude the study by supplying recommendations based on the empirical study conducted.

Firstly, the chapter will address the research objectives as set in chapter 1 (section 5.2) and then recommendations will be made based on the findings of the empirical study (section 5.3).

The chapter will conclude with a discussion of the limitations of this study (section 5.4) and suggestions for future studies (section 5.5).

#### **5.2 RESEARCH OBJECTIVES**

Standard costing as discussed in chapter 3 (refer figure 3.2 and figure 3.3, page 26) was applied to Company A's fuel cost to evaluate if standard costing can be applied to manage the transport cost of Company A. To achieve this, a literature review was undertaken together with an empirical study during which both qualitative and quantitative data had been collected to support this research question.

##### **5.2.1 Main Objective**

The research question, as stated in chapter 1, is namely: to what extent can a standard costing framework be used to manage the transport costs of Company A. To establish the extent to which standard costing can be used, the current uses and applications of standard costing needed to be established. From an interview with the management of Company A, it was established that the only components currently being managed by Company A is fuel consumption. The kilometres travelled by its vehicles and the actual fuel price is currently being measured, but it is not compared to standards as determined by Company A's annual budget.

With regard to performance management, Company A currently conducts performance management over a period and not on a per load basis. Company A

further conducts performance management based on historical data, that might include inefficiencies, and not against standards as set by the annual budget.

The findings from the data collected during the four phases, discussed in chapter 4 (refer paragraph 4.3, page 35), identified areas that require further investigation.

These findings illustrated that, when done through a formal PMS, Company A could improve cost management with the assistance of a standard costing framework.

### **5.2.2 Secondary Objectives**

Various secondary objectives were achieved during the time that this research was conducted. The secondary objectives, as stated in chapter 1 (refer paragraph 1.3.2, page 6), will be discussed below.

The first secondary objective was to identify and describe the research method. This was achieved by illustrating the philosophical assumptions and how a case study approach would assist the study.

The second secondary objective related to conducting a literature review of the applications of standard costing and performance management. The objective was achieved by reviewing the original uses and applications of standard costing and establishing an understanding to the current applications of standard costing. This was done to illustrate this study as a performance management study. Current studies include investigating standard costing as a costing model and comparing it to other models such as ABC. Performance management models were reviewed, including an appropriate and applicable model put forward by Ferreira and Otley (2009) to be used in the development of a PMS for Company A.

The third secondary objective entailed the empirical study, both quantitative and qualitative, and the development of a standard costing framework to be used as a performance management system. This objective was achieved by collecting all the data as discussed in chapter 4 (refer paragraph 4.3, page 35) and by illustrating to the extent that standard costing can identify areas that Company A should investigate in order to assist with cost management. These areas were discussed in Chapter 4 (refer section 4.4, page 37).

The Ferreira and Otley (2009) framework was used to guide the development of the PMS for Company A. The PMS for Company A was developed based on a series of questions that guided the user in the development of PMS. The standard costing model and PMS framework assisted in the completion of the development of a standard costing framework objective.

The fifth and final secondary objective related to the conclusion and recommendations, based on the empirical study. This is the objective of this chapter, chapter 5.

### 5.3 RECOMMENDATIONS

Based on the analysed empirical data and the interview conducted with the management of Company A, it can be recommended to Company A to adopt the standard costing framework. Company A currently only measures fuel consumption, one component of standard costing, and measures it against historical trends. By adopting the measurement of fuel prices, both actual and standard, Company A would be able to improve fuel cost management. This improvement could result from more useable information and insight from the 3 levels of variance analysis.

Using Route 1 as example, the above mentioned useable information will be illustrated in table 5.1 below to illustrate standard costing as a cost management tool.

**Table 5.1: Variance summary - Route 1**

	Total variance	Price variance	Litre variance	KM variance	Consumption variance
Level 1 variance	-R 84 556				
Level 2 variance		R 32 476	-R 117 032		
Level 3 variance				R 32 524	-R 149 556

Table 5.1 illustrates that Company A currently achieves a budget saving of R 84 556. This saving could increase to R 149 556 by better management of fuel price controls and better route management to lower the amount of kilometres travelled.

By ensuring that the filling points being used charge the correct fuel price, Company A could achieve a further budget saving of R 32 476. Company A could further achieve

budget savings by controlling the routes the vehicles travel to ensure the kilometres travelled are within standards. The lower amounts of kilometres travelled will result in budget savings of R 32 524. By addressing these two matters, Route 1 could yield an additional R66 000 (R 32 524 + R 32 476) budget saving.

The above savings could be achieved with the formal performance management system in place. Integrating the performance management framework into Company A would require little change in Company A's current structures. The knowledge about all the components of standard costing is present in Company A and therefore only a limited amount of training would be required. Training would mainly be concentrated on the different functions of the framework and communication channels. The knowledge to interpret and investigate variances is present in Company A and this could only enable the application thereof more formally.

The framework would move the performance measurement of Company A from period based to a per load basis. The framework would also change the focus of the current system that focuses on measurement to one that analyses variances.

#### **5.4 LIMITATIONS OF THE STUDY**

All data with regard to kilometres travelled and fuel prices collected can be directly attributed to each route and can be recreated. Company A's budget is completed by assigning each vehicle a standard consumption. This standard consumption is assigned regardless of what routes the vehicle services. Vehicles service more than one route during a month, resulting in actual consumption reported allocated to this study's routes, based on *averages* for a period. The vehicles' consumption used in chapter 4 is therefore based on all loads done during the given month. This consumption is applied to the kilometres attributed to the given route.

The amount of fuel attributed to each load can be allocated more accurately if the operational system is capable of measuring the amount of fuel used on each load, instead of an average over a period, as in this study.

## **5.5 FUTURE RESEARCH**

### **5.5.1 Revenue impact**

As this study focussed on cost management and not on route profitability, the focus did not address the impact that a change in fuel cost would have on overall profitability at Company A. When Company A calculates a rate for the transport of goods, the rate would include a portion of Company A's fixed cost that each load should recover, and variable costs for each load.

Fuel is calculated based on a consumption that is region based and a standard fuel price. If there are any variances on vehicle consumptions or fuel price, the rate quoted would not be economical. This is due to actual costs being above the amount recovered in the rate charged.

Future studies could investigate the correlation between actual fuel cost and the amount of fuel cost allowed in the rate to customers to ensure maximum profitability or to establish the impact of variance on profitability.

### **5.5.2 Cost management**

In this study standards were allocated based on the number of loads done. Each load was given a standard amount of kilometres, litres of fuel that should be consumed during the load and finally the price of the fuel. These were then compared to actuals and the variances were investigated.

Using the same approach, other costs can also be investigated. Standards applied to the number of loads. These costs can include heavy duty driver wages. Drivers are compensated based on the number of hours worked. Standards can be set as to the number of hours it should take to complete a load and the standard price for the hours. Using the same principles, it should be possible to investigate variances based on the hours worked and rate that was reimbursed.

Other costs that could possibly be investigated is the maintenance cost to service vehicles. Maintenance costs have a certain level of fixed component to it. Predetermined maintenance is standard for a logistics company that can be measured

for costs, based on expected prices. Standards could possibly be assigned to the variable component to be measured against.

## **5.6 SUMMARY**

After reaching both the main and secondary objectives, as set in chapter 1 (refer section 1.3.2 page 6), this chapter again presented all the objectives and illustrated how these objectives have been achieved.

Recommendations were summarised based on the 3 levels of variances, as discussed in chapter 4 (refer table 4.2, page 39; table 4.3, page 42 & table 4.5, page 43), to illustrate how standard costing could assist with cost management in Company A. The chapter continued by stating the advantages of implementing the system and identifying all the factors that would make the framework applicable to Company A.

The chapter concluded by identifying the limitations of the study and suggesting future studies that could be undertaken by building on this study.

## 6 REFERENCES

- Al-Htaybat, K. & Von Alberti-Alhtaybat, L. 2013. Management Accounting Theory Revisited: Seeking to Increase Research Relevance. *International Journal of Business and Management*, 8(18):12-24.
- Bashir, M., Afzal, M.T. & Azeem, M. 2008. Reliability and Validity of Qualitative and Operational Research Paradigm. *Pakistan journal of statistics*, 4(1):35-45.
- Berg, L. 2004. Qualitative research methods for the social sciences. 5<sup>th</sup> ed. United States of America, Pearson.
- BPP. 2011. CIMA study text Strategic Paper P3 Performance Management. 3<sup>th</sup> ed. London, BPP Learning Media Ltd.
- Buehler, R. & Pucher, J. 2011. Making public transport financially sustainable. *Transport Policy*, 18(1):126-138.
- Christopher, M. & Gottarno, J. 2005. Supply chain cost management and value-based pricing. *Industrial Marketing Management*, 32(2):115-121.
- Ciobanu A, 2014. Reasons for buying a product. *Research Journal of Agricultural Science*, 46(1):132.
- Cokins, G. 2013. Top 7 Trends in Management accounting. *Strategic finance*, Dec.
- CSIR (Council for Scientific and Industrial Research). 2013. 10<sup>th</sup> Annual state of logistics survey for South Africa: Bold steps forward. [http://www.csir.co.za/sol/docs/10th\\_SoL\\_Bold\\_Steps\\_Forward\\_web.pdf](http://www.csir.co.za/sol/docs/10th_SoL_Bold_Steps_Forward_web.pdf) Date of access: 1 Jun. 2015.
- DeMarrais, K. & Lapan, S.D. 2004. Foundations for Research: Introduction. London: Lawrence Erlbaum associates.
- De Villiers, R.R. & Fouché, J.P. 2015. Philosophical paradigms and other underpinnings of the qualitative and quantitative research methods: an accounting education perspective. *Journal of Social Sciences*, 43(2):125-142.

De Zoysa, A. & Herath, S.K. 2007. Standard costing in Japanese firms. *Industrial Management & Data Systems*, 107(2):271-283.

Dooley, L.M. 2002. Case Study Research and theory Building. *Advances in Developing Human Resources*, 4(3):335-354.

Drury, C. 2006. Management and cost accounting. 5<sup>th</sup> ed. London, Thomson.

Edwards-Nutton, S. 2008. Standard Costing and variance analysis. *CIMA Topic Gateway series No.24*. [http://www.cimaglobal.com/Documents/Imported Documents/cid\\_tg\\_standard\\_costing\\_and\\_variance\\_analysis\\_mar08.pdf.pdf](http://www.cimaglobal.com/Documents/Imported Documents/cid_tg_standard_costing_and_variance_analysis_mar08.pdf.pdf) Date of access: 20 Jun. 2015.

Ferreira, A. & Otley, D.T. 2009. The Design and use of Performance Management System: An Extended Framework for Analysis. *Management Accounting Research*, 20(1):263-282.

Fleischman, R.K. & Tyson, T.N. 1998. The evolution of standard costing in the U.K. and U.S.: From decision making to control. *Abacus*, 34(1):92-119.

Flyvbjerg, B. 2006. Five Misunderstandings about Case-Study Research. *Qualitative Inquiry*, 12(2):219-245.

Garrison, R.H., Noreen, E.W., Brewer, P.C. 2006 Managerial accounting. 11<sup>th</sup> ed. United States of America, McGraw-Hill International.

Golafshani, N. 2003. Understanding Reliability and Validity in Qualitative Research. *The Qualitative Report*, 8(4):597-607.

Havenga, J.H. 2010. Logistics costs in South Africa: The case for macroeconomic measurement. *South African Journal of Economics*, 78(4):460-478.

Havenga, J.H. 2015. Macro-logistics and externality cost trends in South Africa: Underscoring the sustainability imperative. *International Journal of Logistics Research and Applications*, 18(2):118-139.

Havenga, J.H., Simpson, Z.P., King, D., de Bod, A. & Braun, M. 2016. Logistics Barometer South Africa 2016. Stellenbosch University.

Hays, P.A. 2004. Foundations for Research: Case Study Research. London: Lawrence Erlbaum associates.

Helms, M.M. & Dibrell, C. 1997. Competitive strategies and business performance: evidence from the adhesives and sealant industry. *Management Decision*, 35(9):689-703.

Jansen van Rensburg, M.A. 2000. The role of transport cost and logistics in South Africa's international competitiveness. Potchefstroom: PU for CHE (Dissertation – MCom).

Manjunath, H.S. & Bargerstock, A. 2011. Exploring the roles of standard costing in lean manufacturing enterprises. *Management Accounting Quarterly*, 13:47-60.

Marie, A., Cheffi, W., Louis, R.S & Roa, A. 2010. Is standard costing still relevant? Evidence from Dubai. *Management Accounting Quarterly*, 11(2):1.

McCutcheon, D.M. & Meredith, J.R. 1993. Conducting case study research in operation management. *Journal of operations management*, September.

Morelli, B. & Wiberg, C. 2002. The standard costing system at SKF. University of Pretoria (Dissertation – MCom).

Nha, F.F., Lau, J.L. & Kaung, J. 2001. Critical factors for successful implementation of enterprise systems. *Business Process Management*, 7(3):285-296.

Odendaal, M.M. 2009. The estimation and management of cost over the life cycle of metallurgical research projects. Göteborg University (Dissertation – MCom).

Offenbacher, S. 2004. Introduction: Marginal Costing as a Management Accounting Tool. *Management Accounting Quarterly*, 5(2):7.

Otley, D.T. & Berry, A.J. 1994. Case study research in management accounting and control. *Management Accounting Research*, 5(1):45-65.

Phophalia, A.K. 2010. Modern Research Methodology: New Trends and Techniques. India: Paradise Publishers.

Poister, T.H., Pasha, O.Q. & Edwards, L.H. 2013. Does Performance Management Lead to Better Outcomes? Evidence from the U.S Public Transit Industry. *Public Administration Review*, 73(4):625-636.

Resnik, D.B. 2011. What is Ethics in Research & Why is it Important. *National Institute of Environmental Health Sciences*.

Schulz, R. 2013. UD Trucks tackles fuel consumption. *FOCUS on transportation and logistics*, Apr.

Spaller, R. 2006. Leveraging contribution margin to gain a competitive advantage. *Journal of Performance Management*, 9(2):45-57.

Sulaiman, M., Ahmad, N.N.N. & Alwi, N.M. 2005. Is standard costing obsolete? Empirical evidence from Malaysia. *Managerial Auditing Journal*, 20(2):109-124.

Van der Linde, M. 2011. Embedding an activity-driven operational accounting framework in a fertiliser company. North-west University (Mini-dissertation – MCom).

Wahyuni, D. 2012. The research design maze: understanding paradigms, cases, methods and methodologies. *Journal of applied management accounting research*, 10(1):69-80.

Ward, P.R., Coveney, J., Verity, F., Carter, P. & Schilling, M. 2012. Cost and affordability of healthy food in rural South Australia. *Rural and Remote Health*, 12(1938):1-10.

Zakariah, S. & Pyeman, J. 2013. Logistics Cost Accounting and Management in Malaysia: Current State and Challenge. *International journal of trade, Economics and Finance*, 4(3):119-123.

## 7 APPENDICES

### Appendix 1: Route Summary - Route 1

Route 1	Actual Fuel Cost	Standard Fuel Cost	Fuel Variance	Price Variance	Lt Variance Price	KM Variance	Consumption Variance
Month 1	R 251 796	R 261 752	R -9 956	R 4 530	R -14 485	R 4 085	R -18 571
Month 2	R 307 506	R 317 602	R -10 096	R 7 777	R -17 873	R 1 547	R -19 419
Month 3	R 323 343	R 338 383	R -15 041	R 2 048	R -17 088	R 3 162	R -20 250
Month 4	R 510 971	R 523 707	R -12 736	R 3 651	R -16 388	R 4 220	R -20 607
Month 5	R 472 533	R 465 996	R 6 537	R 3 936	R 2 601	R 5 068	R -2 467
Month 6	R 342 728	R 368 432	R -25 705	R 1 550	R -27 254	R 2 642	R -29 897
Month 7	R 299 561	R 314 388	R -14 827	R 1 547	R -16 374	R 1 035	R -17 409
Month 8	R 134 053	R 130 321	R 3 732	R 821	R 2 911	R -561	R 3 472
Month 9	R 101 297	R 101 165	R 132	R 795	R -663	R 1 296	R -1 958
Month 10	R 137 679	R 135 285	R 2 394	R 1 827	R 567	R 3 241	R -2 675
Month 11	R 190 986	R 190 258	R 729	R 1 867	R -1 138	R 3 920	R -5 058
Month 12	R 190 700	R 200 420	R -9 720	R 2 128	R -11 848	R 2 870	R -14 719
Total	R 3 263 152	R 3 347 708	R -84 556	R 32 476	R -117 032	R 32 524	R -149 556

**Appendix 2: Route Summary - Route 5**

Route 5	Actual Fuel Cost	Standard Fuel Cost	Fuel Variance	Price Variance	Lt Variance Price	KM Variance	Consumption Variance
Month 1	R 84 967	R 84 558	R 409	R 1 534	R -1 124	R 4 271	R -5 395
Month 2	R 117 304	R 116 508	R 796	R 2 183	R -1 388	R 6 161	R -7 549
Month 3	R 85 919	R 85 614	R 305	R 1 611	R -1 307	R 3 743	R -5 050
Month 4	R 141 703	R 142 681	R -978	R 2 228	R -3 206	R 6 340	R -9 546
Month 5	R 118 153	R 111 688	R 6 465	R 1 603	R 4 862	R 4 577	R 284
Month 6	R 126 893	R 122 413	R 4 480	R 2 094	R 2 386	R 6 324	R -3 938
Month 7	R 83 463	R 82 574	R 889	R 1 347	R -458	R 4 456	R -4 914
Month 8	R 63 403	R 64 425	R -1 022	R 669	R -1 690	R 2 588	R -4 278
Month 9	R 79 268	R 81 858	R -2 589	R 927	R -3 516	R 3 382	R -6 898
Month 10	R 40 434	R 43 113	R -2 679	R 668	R -3 347	R 1 590	R -4 937
Month 11	R 77 512	R 78 962	R -1 450	R 852	R -2 302	R 3 295	R -5 597
Month 12	R 31 892	R 34 723	R -2 831	R 255	R -3 086	R 759	R -3 845
<b>Total</b>	<b>R 1 050 911</b>	<b>R 1 049 117</b>	<b>R 1 794</b>	<b>R 15 971</b>	<b>R -14 177</b>	<b>R 47 486</b>	<b>R -61 662</b>

**Appendix 3: Route Summary - Route 8**

Route 8	Actual Fuel Cost	Standard Fuel Cost	Fuel Variance	Price Variance	Lt Variance Price	KM Variance	Consumption Variance
Month 1	R 42 529	R 44 292	R -1 763	R 719	R -2 482	R 185	R -2 667
Month 2	R 62 994	R 63 891	R -897	R 1 089	R -1 986	R 511	R -2 498
Month 3	R 56 637	R 57 076	R -439	R 1 013	R -1 451	R 608	R -2 060
Month 4	R 35 930	R 37 548	R -1 618	R 651	R -2 268	R 339	R -2 607
Month 5	R 76 140	R 74 459	R 1 682	R 1 099	R 583	R 1 965	R -1 383
Month 6	R 58 764	R 59 352	R -587	R 993	R -1 581	R -24	R -1 557
Month 7	R 47 647	R 51 609	R -3 962	R 813	R -4 775	R 197	R -4 973
Month 8	R 38 106	R 41 876	R -3 771	R 469	R -4 240	R -90	R -4 150
Month 9	R 28 827	R 29 469	R -642	R 396	R -1 038	R 435	R -1 473
Month 10	R 35 357	R 36 017	R -661	R 3 636	R -4 296	R -102	R -4 194
Month 11	R 77 976	R 82 551	R -4 575	R 942	R -5 518	R -371	R -5 147
Month 12	R 42 917	R 50 155	R -7 238	R 605	R -7 843	R -424	R -7 419
Total	R 603 825	R 628 296	R -24 471	R 12 425	R -36 896	R 3 230	R -40 126

**Appendix 4: Route Summary - Route 10**

Route 10	Actual Fuel Cost	Standard Fuel Cost	Fuel Variance	Price Variance	Lt Variance Price	KM Variance	Consumption Variance
Month 1	R 19 925	R 20 133	R -208	R 375	R -583	R 238	R -821
Month 2	R 13 816	R 15 033	R -1 217	R 251	R -1 468	R -209	R -1 259
Month 3	R 16 961	R 17 836	R -876	R 333	R -1 209	R 99	R -1 308
Month 4	R 11 019	R 11 264	R -246	R 158	R -403	R -351	R -52
Month 5	R 61 355	R 52 121	R 9 234	R 930	R 8 304	R 10 449	R -2 145
Month 6	R 24 416	R 25 966	R -1 550	R 401	R -1 951	R -882	R -1 069
Month 7	R 50 669	R 55 050	R -4 380	R 842	R -5 222	R -180	R -5 042
Month 8	R 66 861	R 70 867	R -4 006	R 619	R -4 625	R -1 426	R -3 199
Month 9	R 32 752	R 36 017	R -3 265	R 337	R -3 602	R -515	R -3 087
Month 10	R 67 318	R 71 855	R -4 537	R 774	R -5 310	R -1 296	R -4 015
Month 11	R 82 811	R 89 730	R -6 919	R 813	R -7 732	R -1 595	R -6 138
Month 12	R 89 548	R 100 310	R -10 762	R 875	R -11 637	R -1 353	R -10 284
Total	R 537 451	R 566 183	R -28 732	R 6 708	R -35 440	R 2 978	R -38 418